МАТЕРІАЛИ

VI НАУКОВО-ПРАКТИЧНОЇ МІЖВУЗІВСЬКОЇ

СТУДЕНТСЬКОЇ КОНФЕРЕНЦІЇ ЛНМЦ

КАФЕДРИ ІНОЗЕМНИХ МОВ

«SCIENTIFIC AND TECHNOLOGICAL PROGRESS. ADVANTAGES AND DISADVANTAGES»

Суми 2012

Міністерство освіти і науки, молоді та спорту України

Сумський державний університет

Ministry of Education, Science, Youth and Sports of Ukraine

Sumy State University

НАУКОВО-ТЕХНОЛОГІЧНИЙ ПРОГРЕС.

ПЕРЕВАГИ І НЕДОЛІКИ

МАТЕРІАЛИ

VI НАУКОВО-ПРАКТИЧНОЇ МІЖВУЗІВСЬКОЇ СТУДЕНТСЬКОЇ КОНФЕРЕНЦІЇ

лінгвістичного науково-методичного центру

кафедри іноземних мов

(Суми, 18 травня 2012 року)

SCIENTIFIC AND TECHNOLOGICAL PROGRESS.

ADVANTAGES AND DISADVANTAGES

Materials

of the sixth scientific practical university student`s conference

of LSNC of the foreign languages department

(Sumy, May, 18, 2012)

Суми

Сумський державний університет

2012

SECTION I INNOVATIONS IN THE WORLD OF COMMUNICATIVE TECHNOLOGIES

DEVELOPMENT OF TELEPHONE

J.O. Beliavtseva – Sumy State University, group SU-02
V. S. Kurochkina – E L Adviser

The theme under consideration is divided into two parts: *The History of Telephone* and *Innovations in Telephone Communications.*

In the past, people relied on letters to learn about what was going on in the lives of their friends or family members.

The first electrical telegraph was constructed by Sir William Cooke. Another telegraph was developed and patented in the USA in 1837 by Samuel Morse.

All modern telephones have a microphone to speak into, an earphone which reproduces the voice of the other person. Mobile phones are now part of our everyday life. Most people find them essential and cannot manage without them. The company Motorola developed the first mobile phone; it was about the size of a man's forearm. Early devices were bulky and consumed high power. The next generation introduced SMS or text messaging.

Nowadays mobile phones became more functional, for example such functions as MP3, video, games. The first mobile phone with a camera was developed in 1997. There are a lot of companies which produce mobile telephones. They are Motorola, Samsung, Nokia and others.

Recently LG announced the first mobile phone with a 3D display, for which you don't need special glasses. A special version of touch phone LG can be recharged by sun energy.

We use telephones to communicate with each other, to listen to music, to make photos or video, to access to the internet and communicate with our friends on different chats.

A DIGITAL LIFE

D. A. Borshchenko – Sumy State University, group KM - 91
L. A. Denisova - EL Adviser

Human memory can be maddeningly elusive.We stumble upon its limitations every day, when we forget a friend's telephone number, the name of a business contact or the title of a favorite book. People have developed a variety of strategies for combating forgetfulness, but important information continues to slip through the cracks.

Recently the team at Microsoft Research has begun a quest to digitally chronicle every aspect of a person's life. Digital memories can do more than simply assist the recollection orpast events, conversations and projects. Portable sensors can take readings of things that are not even perceived by humans, such as oxygen levels in the blood or the amount of carbon dioxide in the air. Computers can then scan these data to identify patterns: they might determine which environmental conditions worsen a child's asthma. Sensors can also log the three billion or so heartbeats in a person's lifetime, along with other physiological indicators, and warn of a possible heart attack. This information would allow doctors to spot irregularities early, providing warnings before an illness becomes serious. Every word one has ever read, whether in an e-mail, an electronic document or on a Web site, can be found again with just a few keystrokes. Computers can analyze digital memories to help with time management, pointing out when you are not spending enough time on your highest priorities. Digital memories can enable all people to tell their life stories to their descendants in a compelling, detailed fashion.

The vision of machine-extended memory was first expounded at the end of World War II by Vannevar Bush, then director of the U.S. government office that controlled wartime research. Bush proposed a device called the Memex (short for

"memory extender") - a microfilm-based machine that would store all of an individual's books, records and communications. The Memex was to be built into a desk and equipped with a keyboard, a microphone and several display surfaces. The person behind the desk could use a camera to make microfilm copies of photographs and papers or create new documents by writing on a touch-sensitive screen. The Memex user could also mount a camera on his or her forehead to capture pictures while away from the desk. One of the most prescient of Bush's ideas was the suggestion that the Memex should be designed to imitate the associative thinking of the human mind.

Over the next half a century intrepid computer science pioneers developed some of Bush's ideas, and the inventors of the World Wide Web borrowed the concept of the "web of trails" to build their system of linking sites. But the Memex itself remained technologically out of reach. In recent yearsrapid advances in storage, sensor and processor technologies have paved the way for new digital recording and retrieval systems that may ultimately go far beyond Bush's vision.

Manufacturers are producing a new generation of inexpensive sensors that may soon become ubiquitous. Some of these devices can record a wealth of information about the user's health and physical movements. Others can gauge the temperature, humidity, air pressure and light level in the surrounding environment and even detect the presence of warm bodies nearby. And microphones and cameras are now cheap enough to be installed virtually anywhere - particularly in cell phones.The dramatic increase in computing power over the past decade has led to the introduction of processors that can efficiently retrieve, analyze and visualize vast amounts of information. As the hardware for digital recording has improved, more and more people have started to create electronic chronicles of their lives. And the interest will surely

grow once of digital recording becomes easier and more comprehensive.

The existent system requires more development to improve its ease of use and its management of the data. Better software for converting speech to text would greatly enhance the system by allowing users to search for words or phrases in phone conversations or other voice recordings. Automatic face recognition would solve the pesky problem of photograph labeling.

Some of the described scenarios are not all that futuristic. Wearable sensor platforms that collect health data and monitor vital signs such as heart rate, breathing and the number of calories burned are already being commercialized by some companies.

The era of digital memories is inevitable. Even those who recoil atour vision will have vastly more storageon their computers. Some may be frightened at the prospectof ubiquitous recording. Digitalmemories will yield benefits in a widespectrum of areas, providing treasuretroves of information about how peoplethink and feel. By constantly monitoring the health of their patients, doctors may develop better treatmentsfor heart disease, cancer and other illnesses. Scientists will be able to get aglimpse into the thought processes oftheir predecessors, and future historianswill be able to examine the past in unprecedented detail. The opportunitiesare restricted only by our ability to imagine them.

WOLFRAM|ALPHA: COMPUTATIONAL KNOWLEDGE ENGINE

D.Y. Chechelnytskyy - Sumy State University, group IP-11
A.M. Dyadechko - EL Adviser

Wolfram Alpha (also written WolframAlpha and Wolfram|Alpha) is an answer-engine developed by Wolfram

Research. It is an online service that answers factual queries directly by computing the answer from structured data, rather than providing a list of documents or web pages that might contain the answer as a search engine might. It was announced in March 2009 by British scientist Stephen Wolfram, and was released to the public on 15 May 2009.

WolframAlpha is more than a search engine. It gives you access to the world's facts and data and calculates answers across a range of topics, including science, nutrition, history, geography, engineering, mathematics, linguistics, sports, finance, music.

Goals

- Wolfram|Alpha's long-term goal is to make all systematic knowledge immediately computable and accessible to everyone.
- Wolfram|Alpha aims to bring expert-level knowledge and capabilities to the broadest possible range of people—spanning all professions and education levels.
- Our goal is to accept completely free-form input, and to serve as a knowledge engine that generates powerful results and presents them with maximum clarity.
- Wolfram|Alpha is an ambitious, long-term intellectual endeavor that we intend will deliver increasing capabilities over the years and decades to come.

Wolfram|Alpha’s knowledge base covers:

mathematics
statistics &data analysis
physics
chemistry
materials
engineering
astronomy
earth sciences
life sciences

computational sciences
units & measures
dates & times
weather
places & geography
people & history
culture & media
music
words & lunguistics
sports & games
colors
shopping
money & finance
socioeconomic data
health & medicine

Popularity

- wolframalpha.com is worth $1,723,580. This makes wolframalpha.com the 203 most valuable site on Stimator.com.
- wolframalpha.com scored 11 for Page Rank, 8 for Backlinks, and 7 for Traffic Volume.
- Also, wolframalpha.com scored 396,050 for Social Bookmarking, 270,120 for Directory Inclusion, and 15 for Domain Value. Overall, wolframalpha.com has performed Very well on our site valuation analysis.

On February 8, 2012, WolframAlpha Pro was released, offering users additional features for a monthly subscription fee. A key feature is the ability to upload many common file types and data—including raw tabular data, images, audio, XML, and dozens of specialized scientific, medical, and mathematical formats—for automatic analysis. Other features include an extended keyboard, interactivity with CDF, data downloads, and the ability to customize and save graphical and tabular results.

VIRTUAL REALITY CONTACT LENSES

S.O. Chernenko – Sumy State University, group IN-02
S.H. Zolotova – E L Adviser

Contact lenses that help enhance normal vision with megapixel 3D panoramic images are being designed by scientists using military funding.

For those who do not want to rely on contact lenses, future versions could involve lenses directly implanted within the eye, researchers added.

Over the decades, the video displays that everyone from fighter pilots to the general public use have grown increasingly complex. One possibility for advanced displays is a virtual reality (VR) system that replaces our view of the real world with computer-generated vistas. Another idea consists of augmented reality (AR) displays that overlay computer-generated images over real-world environments. However, these often require bulky apparatus such as oversized helmets.

Now Innovega researchers funded by the Defense Advanced Research Projects Agency and the National Science Foundation are developing novel contact lenses that can help view tiny full-color megapixel displays.

The new system consists of advanced contact lenses working in conjunction with lightweight eyewear. Normally, the human eye is limited in its ability to focus on objects placed very near it. The contact lenses contain optics that focus images displayed on the eyewear onto the light-sensing retina in the back of the eye, allowing the wearer to see them properly.

COMMUNICATION BETWEEN THE CARS

A.I.Didorenko – Sumy State University, group IT-02
L.A.Denisova – EL Adviser

During the last period of time the quantity of road accidents considerably increased. There is a great variety of reasons for road accidents: from bad visibility on the road to human mistakes. The scientists will carry out the new system of communication between the cars to make the number of road accidents less.

The scientists from Michigan University plan to carry out the program in the city Ann – Arbor. About three thousand cars equipped by means of radio communication with small radius of the action will appear in the nearest future according to this program. This system of collection of information will allow cars to get information about other cars which are in the radius of action of radio system. This data will contain the information about the speed of the car, its location and direction of movement. Such system of communication between cars will also give the drivers an opportunity to learn about danger and will allow to avoid it. Besides the cars themselves will be able to determine the level of danger and to inform the driver and transport services of the city about it. The example how this system works is below: all the drivers of the cars following of the previous one stop immediately or drive to the crossroads at dangerous speed. In such cases the driver will know what is happening around him and will be able to escape the crash.

In conclusion I should say that such technologies can be a real help to make our roads less dangerous. A prospect concludes in the invention of autonomous cars – robots and automatical public transport which will work on the similar technology but that technology will be more perfect.

LI-FI

R.V. Grudij – Sumy State University, group SU-02
V. S. Kurochkina – E L Adviser

Visible light communication (VLC) uses rapid pulses of light to transmit information wirelessly. Now it may be ready to compete with conventional Wi-Fi (Wireless Fidelity).

At the heart of this technology is a new generation of high-brightness light-emitting diodes. Very simply, if the LED is on, you transmit a digital 1, if it's off you transmit a 0.They can be switched on and off very quickly, which gives nice opportunities for transmitting data. It is possible to encode data in the light by varying the rate at which the LEDs flicker on and off to give different strings of 1s and 0s. The LED intensity is modulated so rapidly that human eyes cannot notice, so the output appears constant.

Li-Fi, as it has been dubbed, has already achieved blisteringly high speeds in the lab. Researchers at the Heinrich Hertz Institute in Berlin, Germany, have reached data rates of over 500 megabytes per second using a standard white-light LED.

There are around 14 billion light bulbs worldwide, they just need to be replaced with LED ones that transmit data. VLC could be used safely in aircraft, integrated into medical devices and hospitals where Wi-Fi is banned, or even underwater, where Wi-Fi doesn't work at all.

Once established, VLC could solve some major communication problems. In 2009, the US Federal Communications Commission warned of a looming spectrum crisis: because our mobile devices are so data-hungry we will soon run out of radio-frequency bandwidth. Li-Fi could free up bandwidth, especially as much of the infrastructure is already in place.

THE INTERNET

B.V. Holyshevsky – Sumy State University, group IN-01
I.A. Bashlak – E L Adviser

On 29 October 1969, Charley Kline, a student in the Network Measurement Center at the University of California, sent the first ever message from one computer to another on the ARPANET. That day is the birthday of the Internet.

The Internet is a global system of interconnected computer networks that use the standard Internet protocol suite (TCP/IP) to serve billions of users worldwide. It is a network of networks that consists of millions of private, public, academic, business, and government networks, of local to global scope, that are linked by a broad array of electronic, wireless and optical networking technologies.

The Internet is growing rapidly, from 2000 to 2011, the number of Internet users globally rose from 361 million to 2.267 billion. This means that every day a little more than 2 billion people use the Internet.

In 2010 global Internet traffic amounts 14,984 petabytes per month or 6,062 gigabytes per second. It's the same as the transfer of 1,290 DVD discs every second.

Any system needs energy. How much energy is used the Internet? Researchers at the University of California, estimate that the internet consumes between 170 and 307 GW. So the internet is responsible for less than 2 percent of the energy used by humanity.

From the above it can be concluded that on average, for the transfer of 1 Mb of information require 38,663 joule of energy. To download DVD movie from the Internet you need to burn about 8.5 kilograms of coal.

The Internet has no centralized governance in either technological implementation or policies for access and usage, each constituent network sets its own standards.

MOTION CAPTURE

O.A.Koloskova – Sumy State University, group EL-11
A.M.Dyadechko – E L Adviser

Motion capture, motion tracking, or mocap are terms used to describe the process of recording movement of one or more objects or persons. It is used in military, entertainment, sports, and medical applications

Video games often use motion capture to make in-game characters. Movies use motion capture for CG effects and for completely computer-generated creatures, such as Gollum, The Mummy, King Kong, Davy Jones from Pirates of the Caribbean, the Na'vi from the film Avatar.

Sinbad: Beyond the Veil of Mists was the first movie made primarily with motion capture, although many character animators also worked on the film.

Mocap is used in producing films which look like live-action cinema. The Polar Express used motion capture to allow Tom Hanks to perform as several distinct digital characters. The characters whose appearances are based on the actors who provided their motions and voices can be created.

During the filming of James Cameron's Avatar all of the scenes involving this process were directed in realtime using Autodesk Motion Builder software to render a screen image which allowed the director and the actor to see what they would look like in the movie, making it easier to direct the movie as it would be seen by the viewer.

Gait analysis is the major application of motion capture in clinical medicine. Techniques allow clinicians to evaluate human motion across several biometric factors, often while streaming this information live into analytical software.

Motion tracking or motion capture started in biomechanics research in the 1970s and 1980s. A performer

wears markers near each joint to identify the motion by the positions or angles between the markers.

There are 2 types of mocap: technology with the use of markers and markerless.

Optical systems utilize data captured from image sensors to triangulate the 3D position of a subject between one or more cameras calibrated to provide overlapping projections. Passive optical system use markers coated with a reflective material to reflect light that is generated near the cameras lens. The camera's threshold can be adjusted so only the bright reflective markers will be sampled, ignoring skin and fabric. Typically a system will consist of around 2 to 48 cameras. Extra cameras are required for full coverage around the capture subject and multiple subjects. The difference between active and passive markers is that active markers themselves are powered to emit their own light.

Mechanical motion: performers attach the skeletal-like structure to their body and as they move so do the articulated mechanical parts, measuring the performer's relative motion.

There are other types of mocap technology: magnetic systems, inertial systems and some other.

Markerless systems do not require subjects to wear special equipment for tracking. Special computer algorithms are designed to allow the system to analyze multiple streams of optical input and identify human forms, breaking them down into constituent parts for tracking.

Mocap is widely spread in filmmaking, computer animation and medicine. Without this technology the process of creating computer characters would be much more difficult.

WHAT IS AN ALGORITHM

Z.V. Kozlov – Sumy State University, group IN-01
I.A. Bashlak – E L Adviser

To make a computer do anything, you have to write a computer program. To write a computer program, you have to tell the computer, step by step, exactly what you want it to do. The computer then "executes" the program, following each step mechanically, to accomplish the end goal.

When you are telling a computer what to do, you also have to choose how it's going to do it. That's where computer algorithms come in. An algorithm is a step-by-step list of directions that need to be followed to solve a problem.

Algorithms are often used to describe how a computer might solve a problem. But there are algorithms in the real world too. A recipe can be a type of algorithm. It tells what ingredients are needed to make the dish and what steps to follow. If the recipe tells exactly what to do without too much confusion, then it is an algorithm. An algorithm is the basic technique used to get the job done.

There is usually more than one way to solve a problem. There may be many different recipes to make a certain dish which look different but end up tasting the same when all is said and done. The same is true for algorithms. However, some of these ways will be better than others. When we look at algorithms as a way of solving problems, often we want to know how long it would take a computer to solve the problem using a particular algorithm. When we write algorithms, we like our algorithm to take the least amount of time so that we can solve our problem as quickly as possible.

Algorithms can be expressed in many kinds of notation, including natural languages, pseudocode, flowcharts, programming languages or control tables (processed by interpreters).

THE MICROSOFT HOME

I.V. Kurinnyy – Sumy State University, group IN-01
I.A. Bashlak – E L Adviser

Everybody knows The Microsoft Corporation thanks to their software products, and there is no a person who has never heard about Windows and Office. But not many people know that Microsoft invests money in other spheres. Inside corporation there are many laboratories that develop technologies which can help to understand psychology of human behavior. They try to understand how person will interact with computers in the future. To demonstrate their developments at the headquarters of Microsoft has been developed an interactive model of "Smart house", such called "The Microsoft Home".

The Home was first opened in September 1994 by Craig Mundie, chief research and strategy officer at Microsoft Corp. Since its inception, it has been a place for the company to explore practical applications of cutting-edge technical trends. Like any house, the Microsoft Home undergoes periodic remodels, which allow the company to explore new concepts and graduate those that are becoming reality. Developers sure that The Microsoft Home is a place to explore technology scenarios that could transform the way we live in the years ahead. In The Microsoft believes that the future users will manage computers through a Natural User Interface (NUI), which includes using voice, gestures and touch screens.

The technologies illustrate how computing that works on our behalf rather than at your command could help us live healthier and more sustainable lives, manage and track a wealth of information, stay connected to the people who are important to us, make learning a fun and immersive experience, and explore the richness of the world around us.

FINGERPRINT SCANNERS

O.S. Lapin – Sumy State University, ES-82
A.M. Dyadechko, ELA

Fingerprints are one of those bizarre twists of nature. Human beings happen to have built-in, easily accessible identity cards. You have a unique design, which represents you alone, literally at your fingertips. People have tiny ridges of skin on their fingers because this particular adaptation was extremely advantageous to the ancestors of the human species. The pattern of ridges and "valleys" on fingers make it easier for the hands to grip things, in the same way a rubber tread pattern helps a tire grip the road.

Fingerprint readers, or scanners, are the most popular and most common form of biometric security devices used.

Biometrics consists of automated methods of recognizing a person based on unique physical characteristic. Each type of biometric system, while different in application, contains at least one similarity: the biometric must be based upon a distinguishable human attribute such as a person's fingerprint, iris, voice pattern or even facial pattern.

Optical fingerprint scanners use a charge couple device, or CCD, similar to those found in a digital camera, to generate an image of your fingerprint. To scan your fingerprint, you place your finger on a sheet of glass covering the CCD. Light emitting diodes illuminate your finger, and light sensitive diodes on the surface of the CCD measure the intensity of the reflected light at many points. An analog-to-digital converter then converts the analog light levels from the photo diodes to digital data. One disadvantage of optical scanners is that they may have problems reading fingerprints from dirty or marked fingers, which will falsely alter the light and dark patterns.

Today companies have realized that fingerprint scanning is an effective means of security

LIE DETECTOR

P. A. Mihaylishin, O.M. Savchenko – Sumy State University, group ЮО-05
V. S. Kurochkina – E L Adviser

The polygraph was invented in 1921 by John Augustus Larson, a medical student at the University of California and a police officer of the Berkeley Police Department, California.

The polygraph is used as a lie detector by police departments, the FBI, government, and numerous private agencies to interrogate suspects and screen new employees. The underlying theory of the polygraph is that when people lie they also get measurably nervous about lying. The heartbeat increases, blood pressure goes up, breathing rhythms change, perspiration increases, etc. A baseline for these physiological characteristics is established by asking the subject questions whose answers the investigator knows. Deviation from the baseline for truthfulness is taken as sign of lying.

Today, polygraph examiners use two types of instrumentation: analog and computerized. In the US, most examiners now use computerized instrumentation. A typical polygraph test starts with a pre-test interview to gain some preliminary information which will later be used for "control questions", or CQ. Then the tester will explain how the polygraph is supposed to work, emphasizing that it can detect lies and that it is important to answer truthfully.

Nevertheless, polygraphy has little credibility among scientists. A 1997 survey of 421 psychologists estimated the test's average accuracy at about 61%, a little better than chance. Also, in 2005 Charles Honts, a psychology professor at Boise State University, states that polygraph interrogations give a high rate of false positives on innocent people.

In our opinion, despite its imperfection, the polygraph is a device which can be of great importance in crime detection.

PROGRAMMING LANGUAGE C

O. Minyaylo – Sumy State University, group IP – 12
S.V. Mikhno – ELA

C is a general-purpose computer programming language developed between 1969 and 1973 by Dennis Ritchie at the Bell Telephone Laboratories for use with the Unix operating system.

It was named "C" because its features were derived from an earlier language called "B", which according to Ken Thompson was a stripped-down version of the BCPL programming language.

In 1978, Brian Kernighan and Dennis Ritchie published the first edition of The C Programming Language. This book, known to C programmers as "K&R", served for many years as an informal specification of the language.

K&R introduced several language features: standard I/O library, long int data type, unsigned int data type, compound assignment operators of the form =*op* .

Although C was designed for implementing system software, it is also widely used for developing application software.

The C language also exhibits the following characteristics:

- There are a small, fixed number of keywords, including a full set of flow of control primitives.
- There are a large number of arithmetical and logical operators.
- Declaration syntax mimics usage context.
- User-defined and compound types are possible.
- Low-level access to computer memory is possible by converting machine addresses to typed pointers.
- Procedures (subroutines not returning values) are a special case of function, with a dummy return type void.

- Functions may not be defined within the lexical scope of other functions.
- Function and data pointers permit *ad hoc* run-time polymorphism.
- A preprocessor performs macro definition, source code file inclusion, and conditional compilation.
- There is a basic form of modularity: files can be compiled separately and linked together, with control over which functions and data objects are visible to other files via static and extern attributes.
- Complex functionality such as I / O, string manipulation, and mathematical functions are consistently delegated to library routines.

So, C is one of the most widely used programming languages of all time and there are very few computer architectures for which a C compiler does not exist.

C has greatly influenced many other popular programming languages, most notably C++, which began as an extension to C.

FIBER OPTIC CABLING

B.S.Oblapenko – Sumy State University group IN-02
S.H.Zolotova E L Adviser

You may know that fiber optic cabling is important to applications like the Internet, telephone systems and cable TV, but have you ever wondered about how it actually works, or why it's so perfect for transmitting data?

Fiber optic cabling is based on optical fibers, which are long, flexible, hair-width strands of ultra-pure glass. Optical fibers are formed when preform blanks – portions of specially manufactured glass – are heated to between 3000 and 4000 degrees and then drawn out at a rate of up to 66 feet per second. As optical fiber is pulled, it is constantly monitored by a laser micrometer, which ensures that its diameter is perfectly uniform from start to finish.

In order for optical fibers to transmit data over long distances, they need to be highly reflective. On their way to being spooled, newly-pulled glass fibers pass through coating cups and ultraviolet ovens, which respectively apply and then cure the thin plastic buffer coating that creates a mirror effect within the fiber.

The finished optical fiber is then extensively tested in a wide range of categories, including Tensile Strength, Refractive Index Profile, Fiber Geometry, Attenuation, Bandwidth, Chromatic Dispersion, Operating Temperature, Temperature Dependence of Attenuation, and Ability to Conduct Light Underwater. After testing has proven that the newly-manufactured optical fiber meets all standards, it is sold for use in fiber optic cabling.

Depending on what type of application it will be used for and how much data it will need to transmit, fiber optic cable can be built around a single strand of optical fiber, or larger groupings of it. To assemble a complete fiber optic

cable, the strand or cluster of optical fiber is placed at the core, to be surrounded by a loose tube of PVC, which leaves the fiber room to bend when being routed around corners and through conduit. The loose PVC is then covered with a layer of shock-absorbing aramid yarn – usually made of Kevlar. To top it all off, the cable receives a final outer-jacket coating of PVC, which helps to seal out moisture.

In order for the finished cable to transmit data signals, it needs to be connected to the two other main components of a fiber-optic system. The first of these is the optical transmitter, a device which converts electrical and analog signals into either On-Off or Linear modulating light signals, then releases that data into the fiber optic cable. The cable then relays the data emitted by the optical transmitter to the optical receiver, which accepts the light signal and reformats the data into its original form.

Fiber optic cabling has advantages over standard copper coaxial cables, in that it can transmit larger quantities of data with far less loss, is able to maintain signals over long distances, carries little risk of corrosion, and is virtually free from interference.

GIS EVOLUTION AND FUTURE TRENDS

K.A. Omelianenko – Sumy State University,
postgraduate student
S. G. Zolotova – E L Adviser

Information has always been the important aspect of effective decisions. Spatial information is particularly complex as it requires two descriptors. For thousands of years the link between the two descriptors has been the traditional, manually drafted map involving pens, rulers, planimeters, dot grids, and sheets. Its historical use was for navigation through unfamiliar terrain and seas, emphasizing the accurate location of physical features.

More recently, analysis of mapped data has become an important part of understanding and managing geographic space. This new perspective marks a turning point in the use of maps from one emphasizing physical description of geographic space, to one of interpreting mapped data, combining map layers and finally, to spatially characterizing and communicating complex spatial relationships. This new vision has set the stage for entirely new geospatial concepts and tools.

Interesting characteristic of the new processing environment is the full integration of the global positioning system and remote sensing imagery with GIS. GPS and the digital map bring geographic positioning to the palm of your hand. Toggling on and off an aerial photograph provides reality as a backdrop to GIS summarized and modeled information.

In addition to the changes in the processing environment, contemporary maps have radical new forms of display beyond 2D planimetric paper map. Today, one expects to be able to drape spatial information on a 3D view of the terrain. Virtual reality can transform the information from pastel polygons to rendered objects of trees, lakes and buildings for near photographic realism. Embedded hyperlinks

access actual photos, video, audio, text and data associated with map locations. Immersive imaging enables the user to interactively pan and zoom in all directions within a display.

Today, Geographical Information Systems (GIS) is very useful technologies in all fields of human activities. IT is on everyone's desk, PDA and even cell phone. In just three decades it has evolved from science to sharing interactive maps of the family vacation.

The use of GIS, promotes quicker solutions for technically complicated geographical problems.

Nowadays GIS are powerful tools that are used for storing, retrieving, transforming and displaying spatial data. GIS are quickly becoming a technology for the automated capture, management, analysis and presentation of location-referred data all over the world.

This ability to store and retrieve data about special aspects of the earth and the way people live on it and the potential to use these data in models of environmental and socioeconomic process in order to learn more about the possible outcomes of natural trends, planning decisions or disaster is very important for industrial and developing countries.

GIS technology has greatly changed our perspective of a map. It has moved mapping from a historical role of provider of input to an active and vital ingredient in the process of decision-making. Today's professional is challenged to understand this new environment and formulate innovative applications that meet the complexity and accelerating needs of the twenty-first century.

THE ADVANTAGES OF USING E-BOOKS

K.S. Polovyan – Sumy State University, postgraduate
V.S. Kurochkina – E L Adviser

In my opinion, there is nothing better or worse than anything else. E-books is just another book format from which to choose. Some people could never give up reading real paper books. Nevertheless, reading a book on your computer and reading an electronic device is just not the same experience.

The aim of this work is to show the benefits of e-books.

Consumers expect e-books to be cheaper than their paper counterparts, but just as with paper books, there are many people who need to get paid for each e-book sale, and it is not as simple as it might seem. E-books can be purchased with no shipping cost, so consumers can download the product immediately. If you want a paper book you have to either pay shipping and wait for delivery, or travel to a store to buy a copy. At the same time you can carry literally a thousand books with you on one device – ~~the~~ one e-book ~~reader~~ will be significantly smaller and lighter than three paper books, thus saving you a lot of space and weight. E-books allow you to shrink or enlarge the text of a book. The text of a paper book will remain the same size forever. E-books allow you to highlight passages and make notes on pages just like you could do it with a paper book. The big difference is that a paper book can become effectively ruined when you write in it, if you'd planned on reselling it in the future or if you just want a clean book with no markings. E-books obviously do not require paper to be used for packaging or the book itself. However, an argument could be made in favor of paper books because discarded e-reading devices add to the problem of wasted electronic material.

Make your choice - having more book format options allows us to choose the type of book we want.

COMPUTER LANGUAGES

S. Rudenko – Sumy State University, group IP – 12
S.V. Mikhno – ELA

The basic knowledge of programming is not possible without the knowledge of its history.

The first programming languages predate the modern computer. From the first, the languages were codes. Herman Hollerith realized that he could encode information on punch cards when he observed that railroad train conductors would encode the appearance of the ticket holders on the train tickets using the position of punched holes on the tickets.

The first computer codes were specialized for the applications. In the first decades of the twentieth century, numerical calculations were based on decimal numbers.

In the 1940s the first recognizably modern, electrically powered computers were created. The limited speed and memory capacity forced programmers to write hand tuned assembly language programs. It was soon discovered that programming in assembly language required a great deal of intellectual effort and was error-prone.

Programs written in high-level languages have a number of advantages. First, they are easier to learn, understand, and modify than machine and assembly language programs. Second, high-level languages do not depend on the machine language of any one type of computer.

For example, when programming is a driver for an operating system, obviously we will use low-level programming. Whereas when programming great applications usually a higher level it is used, a combination of critic parts written in low level languages and others in higher.

Computers can run only programs written in the language that they understand their individual machine language.

In order to support a higher-level language, a special computer program must be developed that translates the statements of the program developed in the higher-level language into a form that the computer can understand – in other words, into the particular instructions of the computer.

The approach or method that is used to solve the problem is known as an algorithm. For example, if we wish to develop a program that tests if a number is odd or even, then the set of statements which solves the problem becomes the program. The method that is used to test if the number is even or odd is the algorithm.

To develop a program, to solve a particular problem, we first express the solution to the problem in terms of an algorithm and then develop a program, which implements that algorithm. Then we can proceed to write the instructions necessary to implement the algorithm on a particular computer system.

C++ is one of the most popular programming languages with application domains including systems software, application software, device drivers, embedded software, high-performance server and client applications, and entertainment software such as video games.

Several groups provide both free and proprietary C++ compiler software, including the GNU Project, Microsoft, Intel and Embarcadero Technologies. C++ has greatly influenced many other popular programming languages, most notably C# and Java.

C++ is also used for hardware design, where the design is initially described in C++, then analyzed, architecturally constrained, and scheduled to create a register-transfer level hardware description language via high-level synthesis.

IDESK

T. M. Shabelnyk – Sumy State University, group ЕП-01
V. S. Kurochkina – EL Adviser

We all know that time is limited in our day to day lives right now. There are some great little devices for around the home that will help you take some of the stress and the hassle out of your everyday life.

Imagine an entirely adaptable workspace that doesn't just hold your equipment, but enhances and interacts with it. The entire desk would be a touch-sensitive display capable of running several simultaneous apps, some of which - such as a calendar, phone, and digital Post-It notes—would replace their physical counterparts entirely. Notifications, to-do lists, video conferencing, Adobe tool palettes, and countless widgets such as calculators and weather reports would all appear right on the surface of your desk, literally putting your entire working world at your fingertips.

The iDesk concept which has been designed and rendered by Adam Benton and takes a look at what desks may hold for the future. The iDesk concept is an entirely adaptable workspace that doesn't just contain your computer and documents. But enhances their functionality by allowing them all to interact with each other.

By placing objects on to the iDesk surface, devices, images and data can easily be transferred from your smartphone, tablet or camera directly to your desktop computer and vice versa. The desktop would become an additional working space to your monitor screen, and enable you to arrange and view documents as if they were paper placed on a traditional work surface.

Even though Benton's iDesk design is still a concept many of the features incorporated into the desk have already been showcased by larger technology firms.

APPLE PRODUCTS

M.S. Shkurat – Sumy State University, group M-01
I.A. Morozova – EL Adviser

Technology is the making, usage, and knowledge of tools, machines, techniques, crafts, systems or methods of organization that make our life much easier. Such technology is produced by a lot of companies and Apple Incorporation is not an exception.

Apple Inc. is a multinational corporation that creates consumer electronics, computer software, and commercial servers.

The first Apple Computer was born on the first of April in 1976 by Steve Wozniak. People did not take the Apple I very seriously, and Apple did not begin to take off until 1977, when the Apple II debuted at a local computer trade show. It was first personal computer to come in a plastic case and include color graphics.

Orders for Apple machines were multiplied by several times after its introduction. With the increase in sales, however, came an increase in company size, and by 1980, when the Apple III was released, Apple had several thousand employees, and was beginning to sell computers abroad.

In 1981, things got a bit more difficult. A saturated market made it more difficult to sell computers, and in February Apple was forced to lay off 40 employees. Wozniak was injured in a plane crash. He took a leave of absence and returned only briefly. Steve Jobs became a chairman of Apple computer in March. He ran Apple Inc. for about 30 years.

Since then the company has reached a huge progress. They created four main products: Apple Macintosh, iPod, iPhone and iPad.

The latest creation in Mac series is MacBook Air. Designing MacBook Air came with one goal: create an

incredibly thin and light notebook computer that's every bit as powerful and capable as one twice its size. It weights only 1,08 kilograms and runs for hours on a single charge. MacBook Air has a Multi-Touch technology. It is a part of practically every Apple product. It's the best and most personal way to interact with devices. When you type on the MacBook Air, it's just as comfortable as typing on a desktop keyboard. The keyboard is backlit, so you can type comfortably even in low-light conditions.

IPod Touch takes fun to the next level. It includes iOS 5, which gives you over 200 exciting new features. And with iCloud, whatever's on your iPod touch is automatically on your other devices, too. On the front of iPod touch is a built-in camera perfect for making FaceTime video calls. It also features a second camera on the back, which lets you shoot amazing 720p HD video. The 960-by-640 backlit LCD display is another reason you won't want to take your eyes off iPod touch.

IPhone is picking up where amazing left off. If there's anything you need, just ask Siri. It is intelligent assistant that helps get things done. Siri not only understands what you say, it knows what you mean.1 It figures out the right apps to use to find the right answer. Then, just like a personal assistant, it answers you. Siri makes phone calls, sends messages, schedules meetings, sets reminders, and more.

IPad has a remarkably thin, light design. It has a dual-core A5 chip, 10-hour battery life, two cameras for FaceTime and HD video recording, over 200 software features in iOS 5, and iCloud. IPad also has a Smart Cover, which is designed to work side-by-side with iPad — and on top and underneath it, too. Smart magnetic technology built into each really pulls them together. It is just incredible.

So think different and maybe someday it will help you to change the world.

SOCIAL NETWORKS AND THEIR PLACE IN OUR LIFE

V. V. Skliarenko – Ukrainian Academy of Banking
I. V. Sokolova – E L Adviser

Social network sites (SNSs) have the potential to fundamentally change the character of our social lives, both on an interpersonal and a community level.

In the past few years, social network sites have become integrated into the daily practices of millions of users, most visibly those of young people, but usage is rapidly spreading to older people and other groups. Like all "new" communication technologies, social network sites replicate features found in earlier communication tools. Social network sites allow us to digitally represent our connections with other users – meaning that we can use these sites to model our network of social relationships by requesting and accepting "friends" or "contacts".

The potential for computer networking to facilitate new forms of computer-mediated social interaction was suggested early on. Efforts to support social networks via computer-mediated communication were made in many early online services (ex. Usenet, ARPANET). New social networking methods were developed by the end of the 1990s, and many sites began to develop more advanced features for users to find and manage friends. At testing to the rapid increase in social networking sites' popularity, by 2005, it was reported that MySpace was getting more page views than Google. Facebook, launched in 2004, has since become the largest social networking site in the World.

Companies have begun to merge business technologies and solutions, such as cloud computing, with social networking concepts. Instead of connecting individuals based on social interest, companies are developing interactive communities

that connect individuals based on shared business needs or experiences.

Social networking allows scientific groups expand their knowledge base and share ideas, and without these new means of communicating their theories might become "isolated and irrelevant". We also use social networks in educational process as a communicational tool.

But there is one great problem – it's a problem of privacy. Privacy concerns with social networking services have been raised growing concerns amongst users on the dangers of giving out too much personal information.

One more issue is psychological effect. As social networking sites have risen in popularity over the past years, people have been spending an excessive amount of time on the Internet in general and social networking sites in specific. It has led scientists to think about a new kind of addiction.

To sum up we should say that social networks have become an integral part of people's life. Despite some problems connected with communication via social networks, the usage of them continues to expand in everyday life as well as in business and scientific environments.

FROM THE HISTORY OF COMPUTERS

Y. A. Susidenko– Sumy State University, group IN-02
S. H. Zolotova – EL Adviser

Computer is an electronic device that can receive a set of instructions called program and then carry out them. The modern world of high technology could not be possible without computers. Different types and sizes of computers find uses throughout our society. They are used for the storage and handling of data, secret governmental files, information about banking transactions and so on.

Computers have opened up a new era in manufacturing and they have enhanced modern communication systems. They are essential tools in almost every field of research, from constructing models of the universe to producing tomorrow's weather reports. Using of different databases and computer networks make available a great variety of information sources.

There are two main types of computers, analog and digital, although the term computer is often used to mean only the digital type, because this type of computer is widely used today. That is why I am going to tell you about digital computers.

Everything that a digital computer does is based on one operation: the ability to determine: on or off, high voltage or low voltage or – in the case of numbers – 0 or 1 or do-called binary code. The speed at which the computer performs this simple act is called computer speed. Computer speeds are measured in Hertz or cycles per second. A computer with a «clock speed» of 2000 MHz is a fairly representative microcomputer today. It is capable of executing 2000 million discrete operations per second. Nowadays microcomputers can perform from 800 to over 3000 million operations per second

and supercomputers used in research and defense applications attain speeds of many billions of cycles per second.

Digital computer speed and calculating power are further enhanced by the amount of data handled during each cycle. Except two main types of computers, analog and digital there are eight generations of digital computers or processing units. The first generation was represented by processing unit Intel 8086.

The second generation central processing unit was represented by processing unit Intel 80286, used in IBM PC AT 286. The third generation is Intel 80386, used in IBM PC AT 386. The microprocessors of the fourth generation were used in computers IBM PC AT 486. There are also central processing units of the fifth generation, used in Intel Pentium 60 and Intel Pentium 66, central processing units of the sixth generation, used in computers Intel Pentium 75, 90,100 and 133. Few years ago appeared central processing units of seventh and eighth generations. They are much more powerful and can perform from 2000 to over 3000 million operations per second.

ASSEMBLY LANGUAGE

A.I.Titenko – Sumy State University group IN-02
S.H. Zolotova E L Adviser

An assembly language is a low-level programming language for computers, microprocessors, microcontrollers, and other programmable devices in which each statement corresponds to a single machine language instruction. An assembly language is specific to a certain computer architecture, in contrast to most high-level programming languages, which may be more portable.

Assembly language allows the programmer to use symbolic representation for machine operation codes (usually called mnemonics), memory locations, registers and other parts of an instruction.

A utility program called an assembler is used to translate assembly language statements into the target computer's machine code.

In normal professional usage, the term assembler is used to refer both to an assembly language, and to software which assembles an assembly-language program. Thus: "CP/CMS was written in S/360 assembler" as well as "ASM-H was a widely-used S/370 assembler."

Many assemblers offer additional mechanisms to facilitate program development, control the assembly process, and aid debugging. Assemblers often include a macro facility (described below), and are called macro assemblers.

An assembler creates object code by translating assembly instruction mnemonics into opcodes, and by resolving symbolic names for memory locations and other entities. The use of symbolic references is a key feature of assemblers, saving tedious calculations and manual address updates after program modifications. Most assemblers also include macro facilities for performing textual substitution—

e.g., to generate common short sequences of instructions as inline, instead of called subroutines.

Assembly languages date to the introduction of the stored-program computer. The EDSAC computer (1949) had an assembler called initial orders featuring one-letter mnemonics. Nathaniel Rochester wrote an assembler for an IBM 701 (1954). SOAP (Symbolic Optimal Assembly Program) (1955) was an assembly language for the IBM 650 computer written by Stan Poley.

Assembly languages eliminated much of the error-prone and time-consuming first-generation programming needed with the earliest computers, freeing programmers from tedium such as remembering numeric codes and calculating addresses. They were once widely used for all sorts of programming. However, by the 1980s (1990s on microcomputers), their use had largely been supplanted by high-level languages, in the search for improved programming productivity. Today assembly language is still used for direct hardware manipulation, access to specialized processor instructions, or to address critical performance issues. Typical uses are device drivers, low-level embedded systems, and real-time systems.

Historically, a large number of programs have been written entirely in assembly language. Operating systems were entirely written in assembly language until the introduction of the Burroughs MCP (1961), which was written in ESPOL, an Algol dialect. Many commercial applications were written in assembly language as well, including a large amount of the IBM mainframe software written by large corporations. COBOL and FORTRAN eventually displaced much of this work, although a number of large organizations retained assembly-language application infrastructures well into the 90s.

COMPUTER HACKING – HIGH-TECH CRIME

M.S. Utkina – Sumy State University, group U-05
T.V. Pochatko – EL Adviser

Take into account technical progress, nowadays one can rob a bank without leaving the house. And it isn't normal. Nowadays you don't need stocking masks, guns and gateway cars, if you are a computer whizz-kid, you could grab a bank armed with nothing more dangerous than a personal computer (PC), a telephone, and, of course, a modem to connect them. The modem converts digital pulses from the computer into analog signals of the kind that the telephone network uses. Once the telephone network, the PC is able to communicate with almost many machine that has a dial-in line – that is, a phone line that is also has a modem connected to it. Once the hacker's modem has connected to the target machine's modem, both devices convert the analog phone signals back to digital once and allow communication to proceed. Generally, the communications software that the hacker uses provides high-quality emulation of a range of popular terminal types and sometimes such packages have a number of built-in features that aid the hacker.

Your actions are very simple. All you have to do is dial into the networks that link the computers in large organizations together, type in a couple of passwords and toy can rummage about in the information that's stored there to your heart's content.

Fortunately it isn't quite as easy as it may sound at first. But, as more and more information is processed and stored on computer, whether it's details of your bank account or the number of tins of baked beans in the stockroom at the supermarket, computer crime seems see to grow.

The biggest part of such computer crimes is "inside jobs", where staff with access to the company's computers fiddle with

the records. A comparatively small amount are committed by the more glamorous – are headline-grabbing – hackers. Even attempting to define the term "hacker" is difficult. According to The New Hacker's Dictionary, a hacker can be defined as a person who enjoys exploring the details of programmable systems and how to stretch their capabilities, as opposed to most users, who prefer to learn only the minimum necessary. Hacker is someone who breaks into computers and computer networks. Hackers may be motivated by a multitude of reasons, including profit, protest, or because of the challenge.

The terms "hack" and "hacking" are also used to refer to a modification of a program or device to give the user access to features that were otherwise unavailable, such as by circuit bending. It is from this usage that the term "hacking" is often used to refer to more nefarious criminal uses such as identity theft, credit card fraud or other actions categorized as computer crime.

There is some dispute about the initial uses of the term "hack" in reference to technology. Its first uses in that context. And what do you know about hacking?

Last month, two New York teenagers, one aged 14 and one aged 17, were charged with breaking into a computer system owned by a company that publishes computer magazines. They are alleged to have changed polite recorded greetings to rude messages, added bomb threats and wiped advertisers' orders.

And there are some ways to protect yourself from hacking. They are: using of different passwords in different websites, using of strong passwords, checking of URL and where you are logging into, don't share your password with anyone, do not trust people pretending to be staff, do not unload unrecognized programs or email attachment, and the best way – is do not panic!

SLR CAMERAS

B. I. Zimoglyad – Sumy State University, group IT-02
L. A. Denisova – E L Adviser

The camera is a device for fixing the images of the material objects with using a light. In this work we consider the principle of operation of the device and the main components of the SLR.

The first progenitors of modern cameras first appeared at the time of Aristotle. At that time it was the usual box with a hole in it. Now the camera is a complex device, although the concepts of operation are similar to ancient ones.

One of the most important parts of SLR is a lens (usually it is removable). Today's lenses consist of different groups of lenses through which light passes and forms the image that we see on the screen (or film if in the camera we use it). Also the technology is not standing still and nowadays a good lens can cost in several times more expensive than the camera is.

In this paper also are disclosed such concepts as a diaphragm and a light gathering power. A diaphragm (or in the slang of photographers it is "hole") is the main device that regulates the amount of light that reaches on the sensor. It allow to make the pictures in bright light or in darkness.

The picture is formed using the integrated circuit - the matrix. In this paper we describe the ways of obtaining color images, the physical size and resolution of matrix.

I want to add only that the foto it's a part of our life story, which is stored either on paper or in digital form

APPLICATION OF MARTIX MULTIPLEXING METHOD

Y. V. Znamenshchykov – Sumy State University, group ES-72
T. V. Pochatko – E L Adviser

At designing of devices for gathering, processing and data transmission in a digital form there is a necessity to work with several sources of the data.

For example, there is a task to make noiseproof coding and data transmission, received from N channels. The data is stored in RAM memory and forms a matrix in the size N×M, where N - quantity of columns, M - quantity of lines. The data from each channel contains in columns, but in memory cells lines of a matrix are written down. We can use application of a noiseproof code (for example, cyclic) to make matrix coding in the lines and to code data file entirely. But if noise in data transmission channel garbles a considerable cluster of bits in information package it will be impossible to restore the data that will lead to its loss.

A method of the matrix multiplexing is expedient to use for noiseproof transmission of a multichannel digital signal. The principle of matrix multiplexing consists in the following.

It is necessary to transpose matrix N×M. It means each channel will be stored in lines, i.e. each channel in a separate cell of memory. So we have the direct access to the data from N channels, we can do their independent coding and transfer. If it is impossible to restore the data from some channels which have been corrupted, the data from other channels will be successfully decoded.

This method can be used for processing and transfer of audio signals, indications of gauges and in other spheres where it is necessary to transfer the data from several sources with high reliability and high speed.

SECTION II LABOUR-SAVING GADGETS IN EVERYDAY LIFE – GOOD AND BAD SIDES

ROBOTICS IN AUTOMOBILE INDUSTRY

V. Akhtyrtsev – Sumy State University, group I – 11
S.V. Mikhno – ELA

The research is dedicated to the role of robotics in automobile industry. Revealing of this topic is very important to the recent stage of engineering development. The work is divided into three main parts: the movement of main parts that come from factories by automated lines; the assembly of major parts and checking a car on a test track.

After the melting of all the main parts in the factory, they are loaded on the conveyor and go further to the assembly line. After the body and all other parts are cast, all the parts of the automobile go to the conveyor. Manual labor is not popular at all stages of manufacturing, robots do almost everything themselves. On the conveyer different models are mixed. After welding, the body passes inspection and is sent to the paint shop, which not only coats, but also produces anti-corrosion treatment by robots. Next starts the assembling of the major parts of the car. Then there is a meeting of body and chassis that move through along parallel lines. They align the engine, transmission to the body to help special automatic bogie. At the final stage of the assembly the wheels are put on the car and process liquids run through it, after which the machine is ready and gets on the stand of quality control. The last step is checking a car on a test track. At this stage, noise and scratches are identified, as well as the serviceability of all equipment.

Enabling robots to make our lives easier is a reasonable solution for individuals and society as a whole. So, without automatization today's industry is impossible because it's simpler, easier and much faster.

MODERN ROBOTS

A. Chernobrova − Sumy State University, group EM-11
N.M. Usenko − ELAdviser

A robot is a mechanical or virtual intelligent agent that can perform tasks automatically or with guidance, typically by remote control. In practice a robot is usually an electro-mechanical machine that is guided by computer and electronic programming. Robots can be autonomous, semi-autonomous or remotely controlled.

Al-Jazari designed and constructed a number of automated machines, including kitchen appliances, musical automata powered by water, and programmable automata.

The Three Laws of Robotics are a set of rules devised by the science fiction author Isaac Asimov and later added to.

I must say that Leonardo da Vinci sketched plans for a humanoid robot around 1495.

An android is a robot synthetic organism designed to look and act like a human, and with a body having a flesh-like resemblance. The most famous android is Aiko. Its weight is 30 kg, its height is 151 cm. She can speak, read text, identify objects and colors, and solve mathematical problems. Aiko is made of soft silicone. It is able to "feel the pain".

Next kind of robot is Military robots. Military robots are autonomous robots or remote-controlled devices designed for military applications.

An industrial robot is an automatically controlled, reprogrammable, multipurpose manipulator programmable in three or more axes. The field of robotics may be more practically defined as the study, design and use of robot systems for manufacturing.

A Ballbot is a mobile robot designed to balance itself on a single spherical wheel, both while in motion or staying in place.

ROBOTS AND THEIR USING IN OUR EVERYDAY LIFE

K.N Kulinich – Sumy State University, group EF – 02
I.A. Morozova – EL Adviser

Technology has affected society and its surroundings in a numbers of ways. It help develop more advanced economies and other fields. In today's society, machines are used in everyday tasks and have become an essential part of most people's lifestyle.

Robots and machines should be freely incorporated into our lifestyles, so long as they aren't expected to do work that is more performed by human.

A robot is a mechanical or virtual intelligent agent that can perform tasks automatically or with guidance, typically by remote control. In practice a robot is usually an electro-mechanical machine that is guided by computer and electronic programming.

Robots never become sick or tired, they don't make errors associated with fatigue and so are ideally suited to performing repetitive tasks.

A robot's computer "brain" tells it what to do. Of course, these machines cannot really think as people do. A robot's "brain" is a computer. People must plan every step of an action they want a robot to do. Then they write a set of instructions, called a program, for the robot's computer. The computer follows these instructions and makes the robot's body move. Television cameras act as "eyes" and send pictures to the robot's computer brain.

Robots will likely continue to impact various aspects of our lives, and scientists and philosophers continue to debate the possibilities for the human race.

Robots can go where people cannot. The two landers that visit Mars are also a kind of robots, signals from Earth

controlled them and robots took pictures of the planet and tested its soil. Space-based robotic technology at NASA falls within three specific mission areas: exploration robotics, science payload maintenance, and on-orbit servicing.

Robots can help people become better doctors and nurses. For example, a robot can be a "real patient" on the operating table. Some robots are programmed to act as a real person would when given certain medicines.

Robots can work for disabled people, too. People who cannot move their arms and legs may be able to move their heads to guide a robot that can feed or dress them. Some people may need to wear a robot arm and hand, which can pick up an egg without breaking it. A scientist in Japan is working on a robot "guide dog" for blind people. A talking robot that can read books to blind people is already in use.

People also use robots just for fun. Some amusement parks and restaurants have robots that sing, dance, play the piano, or tell jokes. A few even have robots that bring the food you order.

People even have robots in their homes. Today, though, most of these robots are just costly toys. One day, perhaps, home robots may answer the door, cook the food, or walk the dog.

So, robotics is the branch of technology that deals with the design, construction, operation, structural disposition, manufacture and application of robots. Robotic systems continue to evolve, slowly penetrating many areas of our lives, from manufacturing, medicine and remote exploration to entertainment, security and personal assistance.

AMPLYFIRES OF MICOWAVE FREQUENCY

Puryha O.O. – Sumy State University, group FE-01
Headed by Pronyaeva V.E.

When radiators of Microwave frequency understand electromagnetic radiation with decimeter and millimeter wavelengths. However, the clear distinction between the distribution of infrared, terahertz, microwave and conventional ultra high waves can be framed differently. Let's take into consideration two main groups of amplifies: high power and low power.

The high power microwave radiation is using for radar and non-contact heating bodies. The basis for appliance of heating bodies is magnetron. As for the low intensity the radiation of microwave frequencies is based virtually all wireless devices – radios, cellular phones, devices based on WiFi, WiMax, Bluetooth technologies. The main objective of the present in the amplification of ultrahigh frequency radiation is to increase the efficiency of existing plants and reduce energy consumption.

The following samples of classic amplifies are: traveling-wave tube, klystron, pentode. Among them only klystron – Vacuum super power amp is used. It converts the continuous flow of electrons in to alternating modulation by electrical field at microwave frequencies. Pentode low-power radio is used in Hi-Fi sound amps. Platynotron – super radio, single sample is the amplytron which is base on the crossed fields. It's efficiency reaches about 90%.

Modern power amps such as delta-sigma band amps are operating in the module key to minimize the loss efficiency and provide more than 70%. Optimized microwave transistor called MOSFET is also use in modern high frequency devices. Also you can see the bipolar transistors with low charge storage

mode saturation called HBT. One of the new devices are the devices based on the indium phosphide.

THE ROBOTS OF MEDICINE:DO THE BENEFITS OUTWEIGHT THE COSTS?

M.K.Rozhyn - Sumy State University, group – IN-02
S.H.Zolotova- Adviser

In theory, surgical robots should assist clunky humans with tasks that we have trouble with, but we're still outperforming them in many ways.

The image is an entertaining one: A robot-doctor rolls into a surgical suite in scrubs and gloves and asks its human assistants, "So, what are we doing to this guy today?" Unfortunately, the operating room is not quite there yet. In reality, the use of robotics in surgery is still quite subtle in most areas of medicine, and the robots themselves are more like high-tech instruments than they are robo-surgeons. Robotics has gained some momentum in recent years, but there are still a lot of unanswered questions about its efficacy when pitted against conventional surgery. Certain procedures, like prostate removal, routinely use robotics, but even for these, the jury is still out on whether the benefits outweigh the costs – both medical and financial.

In theory, the great benefit of surgical robotics is that it can assist us big, clunky humans with tasks that we have trouble with, or are simply incapable of. For example, there are certain procedures, like suturing the urethra during prostate cancer surgery, that even the most technically skilled doctors have trouble with, so tiny is the prostatic urethra, and so delicate the required suturing action.

A related benefit is that robotic extensions can be extremely tiny, so they can go where human hands simply won't fit: Some incisions through which robotic "arms" can

operate are as small as eight millimeters, according to Dr. Michael Argenziano, who directs the Minimally Invasive and Robotic Cardiac Surgery department at New York-Presbyterian Hospital/Columbia University Medical Center. This can reduce the risk of complications and a patient's recovery time.

The robo-crab could make it much easier to treat gastric cancers, which represent the second-most common cause of cancer deaths across the globe.

Despite the theoretical benefits, some commonly used forms of robotics are generating discussion about their practical benefits. One new study suggested that men who have their prostates removed have no better sexual function or less incontinence with robot-assisted surgery vs. the conventional kind. (In case you're wondering, almost 90 percent of the men reported "moderate or big" problems with sexual function 14 months after surgery, and almost one-third had problems with incontinence after this same period.) Earlier research has found that there are no differences in how well the two procedures actually treat cancer, although robotics may be linked to shorter hospital stay, and less blood loss and transfusion.

Given the mixed evidence, the use of robotics in prostatectomy, which is touted so heavily by some hospitals and robotics manufacturers, may not be the great boon we might be led to believe. But it's also important to remember that both forms of surgery had high rates of adverse effects. Other research has found that skill of the surgeon and the number of prostatectomies done at one's hospital may have more to do with the success of the surgery than anything else.

Another new study found that in hysterectomy, a common treatment for endometrial cancer, the rates of complications in women who had laparoscopic (minimally invasive surgery) surgery vs. robotic surgery were virtually

identical after controlling for factors like insurance plans, hospital location, and race. The cost associated with robotics, however, was over $1,200 more than conventional surgery.

Critics point out (PDF) that the study compared robotics to laparoscopy, which, although now recommended, is still not the norm because of its complexity and use in only the most straightforward scenarios. Using laparotomy as a comparison instead might have led to different results, and possibly more cost effectiveness. In any case, critic Mario M. Leitao Jr. urges us to accept some early costs when putting promising new technologies in place. "How will we ever advance innovative technology in surgery," he asks, "if we cannot understand and accept the associated start-up costs?"

Despite the questions surrounding these conventional robot-assisted surgeries, there are some interesting new developments in the field. One of these is the tiny "crab," which accesses the innermost hollows of the body -- the gastrointestinal tract -- without having to go through the many layers of tissue between it and the outside world. Using the ergonomic living crab as a model, Lawrence Ho and his team at Singapore's National University Hospital endowed the robotic crab with hook and pincers to remove cancerous tissue, and the ability to cauterize blood vessels.

Attached to the end of an endoscope, the crab goes in through the mouth, the most intuitive avenue for entry, says Ho. The robo-crab could make it much easier to treat gastric cancers, which represent the second-most common cause of cancer deaths across the globe. Because of its recent development, large-scale studies to assess its efficacy compared to other forms of treatment haven't yet been done.

The verdict on the use of robotics is that there is none, which is commonly the answer in many areas of research and medicine. It's important not to hype robotics, but acknowledge their promise for certain types of procedures.

"Robotics is a tool, albeit the most technologically advanced and expensive one, but a tool nonetheless," says Dr. Bernard Park, the chief of thoracic surgery at Hackensack University Medical Center. "No technology will ever replace the critical importance of a skilled, thoughtful surgeon."

THE WORLD'S MOST USEFUL ROBOTS

A.V. Sylka – Sumy State University, group IN-02
S.H. Zolotova – EL Adviser

Eco Bot. The robot, developed at the University of Bristol, is designed to power itself by eating flies. Feed the EcoBot a dead bluebottle every so often, and it will digest the insect in one of its eight microbial fuel cells, each filled with sewage slurry teeming with bacteria. A sugar compound in the fly's exoskeleton is extracted and metabolised by the bacteria to generate energy, which is turned into electricity. 'The idea is that it could go places we don't or can't go and send back information,' says Ioannis Ieropoulos of the EcoBot team. It might take temperature readings, or toxic gas measurements. For now EcoBot's achievements seem modest. In endurance tests, eight flies lasted the bot for 12 days, but it only moved for a few seconds every 14 minutes. And its developers aren't sure how it will attract its food. It's not yet WALL-E, nor is it autonomous, but it's on the way.

Big Dog. It may be the best known kick on the internet. A man in a car park kicks a strange, spooky, headless thing with four legs. The thing staggers, then it rights itself. The thing is a robot; the humming noise, the engine that powers it. Made by Boston Dynamics and partly funded by the Pentagon outfit that brought us the internet, Big Dog is designed to be a military pack animal. It is powered by a gas engine, has a ball for each foot, and can walk or trot at a maximum of four mph. It can distinguish terrain, carry 165lb and cross ditches.

Robonaut. It's either an advanced piece of space robotics, or Boba Fett on a skateboard. Robonaut, with its 'centurion-inspired' helmet, is Nasa's star robot. Its torso is meant to look human, but not too much: research shows that humanoid robots can only look so human before humans freak out. 'Robonaut was designed to work with the same tools and interfaces that have been built for an astronaut's gloved hand,' says Ron Diftler, project manager at Nasa's Johnson Space Centre in Houston. Eventually, it will 'assist astronauts with tasks the same way a nurse helps a doctor, and provide maintenance on lunar or Martian bases between astronaut visits.'

Neuro Arm. Last month, a Canadian woman became the first person to have a robot's hands inside her head. Controlled by a neurosurgeon at a computer workstation, neuroArm worked for nine hours to remove a tumour from Paige Nickason's head. Neuro Arm, developed at the University of Calgary, has a sense of touch, a necessity in brain surgery, where surgeons judge how to proceed by how soft the brain is. And for precision, the two robotic arms are peerless.

Wakamuru. This rotund, yellow, black-eyed robot, launched by Mitsubishi Heavy Industries in 2005, was the first properly useful helper robot for the home. It can talk to its elderly owner; recognise faces and voices; download from the net and relay the news out loud; and send an urgent call to a hospital or police station.

SECTION III ENVIRONMENT PROGRESS AROUND US

SUSTAINABLE DEVELOPMENT OF THE REGION BASED ON ENVIRONMENTAL INNOVATION

J. Alibekova – Sumy State University, postgraduate
S. G. Zolotova – E L Adviser

In the process of socio-economic development the contradictions between the economic activity and the state of the environment become essential. These contradictions include the potential environmental hazard, causing the need and importance of identifying, organizing and taking into account environmental and safety principles of social and economic development.

In modern terms the role of regions in the implementation of program tasks of the President of Ukraine and the Government significantly increases. It's becoming also important to achieve sustainable economic development and to deepen the European integration processes. Enhancing the role of regions in economic and social life of the country is one of the fundamental principles of the European Union.

This concept is based on the following principles: the limit of human impact on the biosphere to the level of its possibility of stable reproduction; the support for biodiversity inventories and renewable resources; the use of non-regenerative natural resources at a rate not exceeding the making of their replacement by reproduction; the equal distribution of income and expenses as a result of natural resource consumer and environmental management; the development and introduction of technologies that increase the volume of production per unit of resource consumed; the use of economic mechanisms that will stimulate manufacturers to

consider environmental consequences of their decisions; the use of interdisciplinary approaches to decision making.

According to the principles of sustainable development, the basic principles of structural changes in the regional development should be as following: innovation, resource conservation, environmental protection, activation of the intellectual potential, humanization of social processes, focus on new technological way of production, and determinants of structural changes - system innovation.

Sustainable development of the region is provided by creating synergies in the process of regional restructirisation. The basis of synergy is a combination of enterprises based on the innovation of material base, systems of relations in manufacturing, distribution, exchange and consumption and the necessary general infrastructure. In our opinion, the basis of effective integration of forms ensuring is the formation of vertical (territorial-production) cluster that would have combined cycle of reproduction of one type of product.

A necessary condition for the formation of clusters is establishing private-public partnership, including development reproductive strategy of the region, working towards all kinds of functioning cluster infrastructure - development of technology parks, free economic zones for achievements of investment attractiveness of regions and new forms of integration in the context of international value.

The main factor of the cluster functioning is its value chain, based on a “new way of technology” (totality of technological processes in material and immaterial spheres).

Thus, a cluster based on innovation changes of technology of the region is a prerequisite for sustainable territorial development.

ECONOMY, CULTURE AND ECOLOGY INTERRELATIONS: SYSTEMIC APPROACH

O.O. Bilopilska – Sumy State University, postgraduate student
S. G. Zolotova – EL Adviser

Nowadays, when the world becomes a big village, scientists from different fields of social, technical and humanitarian studies try to cooperate in finding a general scheme of human society‘s functioning. In the article, we shall try to combine theoretically two global spheres of people‘s life: their common home – the **environment,** and people‘s interrelations and communications - the **human society.** So we shall combine ecological and sociological studies using system based approach through understanding that ecology and society can be seen as one system **—**“green home where people are happy”.

Ecology, the science about the relationships of organisms with other organism sand with their physical environment, last time has much more meanings, for example: world outlook and cultural significance. Ecology that includes study ofthe structure and functions of natural systems last times pays attention to technical and social systems, too. But what is the mechanism how ecological and social systems are intersected? The answer can be found in Parsons‘ action theory. Parsons analyses four subsystems of action system:

1. **The behavioral organism** (or system) serves as a bridge between the material and ideal worlds - norms, values, meanings that make up the world of action. It performs the function of adaptation to physical environment.

2. **The personality system** performs the function of setting goals. It is created in the process of individual socialization and designed to internalize the values and norms. It becomes an instrument to distinguish the order of goals inaction system.

3. **The social system** is the set of role-status-driven standards that determine what actions are preferable. It performs the function of integration.

4. **The cultural system** is the set of "historical experience" - ideas, ideals, values, etc. It functions as "latent pattern maintenance‖ and specifies the ideas in the norms of the social system, internalizing the system identity.

Each of those subsystems should be seen as independent axis of action system elements organization. It means that none of them could be reduced to the other or their combination. Each of the systems presupposes the existence of other, because the social system cannot exist without the personalities and culture.

Now when ecological ethic and culture has been established in the scientific community through the crisis of cultural values of consumer attitudes toward nature initiated by ecological crisis of society, It is necessary to look for mechanism to transfer these values to society functioning. This problem can be solved using general action model, that Parsons called ―unit act. It implies a generalized model of any human action and includes:

- actor – person with a desire to act, having defined goals and is able to describe ways to achieve them;

- situational environment - mutable and immutable factors of the environment, against which the action is directed and from which it depends.

In the process of interaction as the individual himself and his environment have systemic effects on each other. As a result of this interaction both, the internal components of the structure of the individual and the state of the environment, may vary. Further development of transformed societies to sustainable growth direction is hardly possible until ecological goals and values, including national-based ones, are formed on personality and actors social systems levels.

SYNERGETIC BASES OF THE INDUSTRIAL ENTERPRISES ENVIRONMENTALLY ORIENTED DEVELOPMENT

T.B. Bondar – Sumy State University, postgraduate
S. G. Zolotova – E L Adviser

In view of reality of social development, we can argue about its degeneration. Therefore, the society for its own activities makes it impossible to develop in the future. Of course, extremely important task in these conditions is to change the paradigm and methodology of social development. The main objective should be to achieve a planned coherent socio-natural development.

The paradigm of scientific thinking has been changing under current conditions of post nonclassical stage of development. Synergetic has become a tool for understanding by humanity of its activities results in the new scientific worldview. Therefore, in our opinion, it is appropriate to introduce the methodological principles of environmentally oriented development of industrial enterprises based on synergetic.

The processes of globalization contribute to the international co-ordination and integration of environmental. Strategic initiatives have been implementing at global level conceptually. Thus, in 1992 at the United Nations Organization conference the Concept of Sustainable Development have been adopted that is an enlarged reproduction of the environment, limiting needs, dialectical development of all sectors of society considering the fundamentals of reproduction. At the level of national legislation, there are target instructions on sustainable development. However, there is the actual problem of the implementation of conceptual positions in mechanism of state functioning. We should note that the foundation of this problem is the mentality and the current development

paradigm, the foundation of which is to meet growing needs, personalization demand and differentiation supply and expanded reproduction of social production. In the social consciousness, the primacy of material has been entrenched deeply. Thus, source of all these problems is the spiritual crisis of society. Society has not been realizing scientific and technological potential in full, because they do not take into account the fundamentals of development. So, technological progress tends to its own degeneration.

That is why the urgent task is to create an updated development concept of industrial enterprises, because industrial enterprises are the material basis of social relations. Industrial enterprises have to become the primary component of the mechanism of sustainable development of the state. Modern concepts of enterprises development do not consider environmental factors at the conceptual level. Today it is recognized that the primary purpose of business is profit. Although today, the concept of social and environmental responsibility already being implemented in many enterprises, and thus are competitive. However, such initiatives are fragmented in the context of the full development of society.

The development must be based on the systematic basis. System development of the enterprise means the implementation of its positive feedbacks with the natural, economic, social, technical, technological and other components of the global economic system. Ecological and economic transformation is the starting point, initiated impulse to design such nature of enterprise that would have system-wide orientation for sustainable development in the long run.

Thus, taking into account the synergetic principles of environmentally oriented development in the process of industrial enterprises management will form qualitatively new basis of development and, therefore, − a new management model development.

ALTERNATIVE ENERGIE

S. Degtjar , Aspirant, Sumy State University
I. Saizewa, Berater der deutschen Sprache

Alternative Energie ist sehr wichtig für die Menschen und die Ökologie des Planeten .

Bei der Windenergie handelt es sich um die kinetische Energie der bewegten Luftmassen der Atmosphäre. Da sie kurzfristig durch die Einwirkung der Sonne nachgeliefert wird, zählt sie zu den erneuerbaren Energien. Die Windenergie-Nutzung mittels Windmühlen – heute zur Stromerzeugung mit Windkraftanlagen – ist eine seit dem Altertum bekannte Möglichkeit, um Energie aus der Umwelt für technische Zwecke verfügbar zu machen.

Als Sonnenenergie oder Solarenergie bezeichnet man die Energie der Sonnenstrahlung, die in Form von elektrischem Strom, Wärme oder chemischer Energie technisch genutzt werden kann.

Ein Wasserkraftwerk oder eine Wasserkraftanlage ist ein Kraftwerk, das die kinetische Energie des Wassers in mechanische Energie bzw. elektrische Energie umwandelt. Damit wird die Wasserkraft für den Menschen nutzbar gemacht.

Die Geothermie oder Erdwärme ist die im zugänglichen Teil der Erdkruste gespeicherte Wärme. Sie umfasst die in der Erde gespeicherte Energie, soweit sie entzogen und genutzt werden kann, und zählt zu den regenerativen Energien.

Biokraftstoffe (auch Biotreibstoffe, Agrotreibstoffe) sin d eine Formular der Biomasse.

Dies sind nur einige der möglichen alternativen Energiequellen. Aber sie sind wichtig und sind bereits entwickelt.

HUMAN CAPITAL ECONOMICO-ECOLOGIC WELLFARE AS A BASIS OF ITS COMPETETIVENESS

Z.V. Derkach – Sumy State University, postgraduate
G.I. Litvinenko – K.f.n, docent

In general human capital is determined by genetic features, developed through upbringing and overall education while its success (competitiveness) depends on the material well-being, adequate stimulation of the institutional environment and the level of specific skills.

It is human capital, rather than plants, equipment, and inventories that is the cornerstone of competitiveness, economic growth and efficiency. It is time to learn how to measure the value of this wealth and the factors affecting it. The very fact of attempts to assess it will help to change the views of managers, their approach to human capital not just as a cost factor but as an enterprise asset that must be wisely used to improve competitiveness.

The competitiveness of the enterprise means its advantage over other enterprises of a certain industry sector within the country and abroad. A human being is a link that provides the most efficient use of company resources, which can be used to improve competitiveness.

However, health and environmental medicine must be open to public and used for the solution of problems of increasing competitiveness by providing real theoretical and practical problem-solving socio-economic development. It is necessary to change the ordinary way of thinking and bring economic and hygienic calculations to substantiate their financial recommendations. Currently there are only a few calculations of certain types of health damage and completely separate and disparate issues of damage calculation only for the effect of chemical contamination. So now the task is to sum up these separate calculations into the integral method of

determining the damage from all types of contamination, including biological, and its compensation on the level of territories, entities and physical persons.

A specific tool may be the development of information and expert system used in determining payments for environmental pollution, developed at the Sumy State University. The system consists of an integrative overview on the location electronic map of all components of the environment and all kinds of human capital and the result of their interaction as to the types of activities and costs. A multi-dimensional integrative topological map which includes layer by layer of ecological and geographic characteristics of the area with the representation of all main objects, polluting the environment, with the help of colors and their intensity is created on the screen. The state of population and workers health (illness) is reflected as a separate layer or integrally with the ecological and economic components. It also shows the level of ecological and economic damages caused by a variety of natural and anthropogenic factors, and possible or necessary expenditures to achieve maximum well-being, or any particular result. The maps can be accessed by all levels of government authorities or interested parties. We have worked through this system in the areas of oil production in the Sumy region. The problem is that the immediate need for energy causes the usage of small deposits in poor areas with developed agriculture in and fertile soil, which exacerbates the problem of economic and environmental security. The second side of the issue is social and environmental problems of contamination of the rural population habitat, exacerbated by the existing problem of pollution of land and water by animal waste, i.e. co-chemical and biological contamination. But for economic and social mainstream of this problematic situation we are lacking quantitative estimates of the hazards (risks) of population infection in these areas.

PASSIVE HOUSE

A. A. Galagan – Sumy State University, group SU-02
V. S. Kurochkina – E L Adviser

The present condition of environment and high cost of power resources force mankind to search for more non-polluting and energy-saving variants of all things that surround us. Passive houses are designed to solve this problem in field of our habitation.

The Passive house standard originated from a conversation in May 1988 between Professors Bo Adamson of Lund University, Sweden, and Wolfgang Feist of the Institute for Housing and the Environment, Germany. Their concept was developed through a number of research projects, aided by financial assistance from the German state of Hessen. This standard means that for this kind of house it is necessary to spend much less thermal and electric energy for normal functioning.

The measurements in the Passive House in Darmstadt Kranichstein confirmed: with presently available technology, the electrical consumption for household appliances can be reduced to one third of its current average value. The additional gas consumption for appliances which need heat amounts to less than 15% [Ebel/Feist 1997]. Also these savings due to efficient technology have been historically proven to be stable.

In the year of 1990 the first Passive house residences were built in Darmstadt, Germany, and in the following year they were occupied by the clients. Since that time passive houses have started to develop and have earned wide popularity nowadays.

NEW URBANISM

Glushakova Olga – Sumy State University, group IN-91
EL Advisor Dyadechko A.M

New Urbanism is an urban design movement which promotes walkable neighborhoods that contain a range of housing and job types. It arose in the United States in the early 1980s, and has gradually continued to reform many aspects of real estate development, urban planning, and municipal land-use strategies.

New Urbanism is strongly influenced by urban design standards that were prominent until the rise of the automobile in the mid-20th century; it encompasses principles such as traditional neighborhood design (TND) and transit-oriented development (TOD). It is also closely related to regionalism, environmentalism and the broader concept of smart growth.

New Urbanists support regional planning for open space, context-appropriate architecture and planning, and the balanced development of jobs and housing. They believe their strategies can reduce traffic congestion, increase the supply of affordable housing, and rein in suburban sprawl. The Charter of the New Urbanism also covers issues such as historic preservation, safe streets, green building, and the re-development of brownfield land.

Until the mid 20th century, cities were generally organized into and developed around mixed-use walkable neighborhoods. For most of human history this meant a city that was entirely walkable, although with the development of mass transit the reach of the city extended outward along transit lines, allowing for the growth of new pedestrian communities such as streetcar suburbs. But with the advent of cheap automobiles and favorable government policies, attention began to shift away from cities and towards ways of growth more focused on the needs of the car. Specifically, after

World War II urban planning largely centered around the use of municipal zoning ordinances to segregate residential from commercial and industrial development, and focused on the construction of low density single family detached houses as the preferred housing option for the growing middle class. The physical separation of where people lived from where they worked, shopped and frequently spend their recreational time, together with low housing density, which often drastically reduced population density relative to historical norms, made automobiles indispensable for efficient transportation and contributed to the emergence of a culture of automobile dependency.

New Urbanism is having a growing influence on how and where metropolitan regions choose to grow. At least fourteen large-scale planning initiatives are based on the principles of linking transportation and land-use policies, and using the neighborhood as the fundamental building block of a region. Miami, Florida, has adopted the most ambitious New Urbanist-based zoning code reform yet undertaken by a major U.S. city.

More than six hundred new towns, villages, and neighborhoods in the U.S. following New Urbanist principles are planned or under construction. Hundreds of new, small-scale, urban and suburban infill projects are under way to reestablish walkable streets and blocks. In Maryland and several other states, New Urbanist principles are an integral part of smart growth legislation.

In the mid-1990s, the U.S. Department of Housing and Urban Development (HUD) adopted the principles of the New Urbanism in its multi-billion dollar program to rebuild public housing projects nationwide. New Urbanists have planned and developed hundreds of projects in infill locations. Most were driven by the private sector, but many, including HUD projects, used public money.

ECOLOGICAL PROBLEMS

A. V. Kolesova– Sumy State University, group IN-02
S. H. Zolotova – EL Adviser

Since ancient times Nature has served Man, being the source of his life. For thousands of years people lived in harmony with environment and it seemed to them that natural riches were unlimited. But with the development of civilization man's interference in nature began to increase.

Large cities with thousands of smoky industrial enterprises appear all over the world today. The by-products of their activity pollute the air we breathe, the water we drink, the land we grow grain and vegetables on.

Every year world industry pollutes the atmosphere with about 1000 million tons of dust and other harmful substances. Many cities suffer from smog. Vast forests are cut and burn in fire. Their disappearance upsets the oxygen balance. As a result some rare species of animals, birds, fish and plants disappear forever, a number of rivers and lakes dry up.

The pollution of air and the world's ocean, destruction of the ozone layer is the result of man's careless interaction with nature, a sign of the ecological crises.

The most horrible ecological disaster befell Ukraine and its people after the Chernobyl tragedy in April 1986. About 18% of the territory of Belarus was also polluted with radioactive substances. A great damage has been done to the agriculture, forests and people's health. The consequences of this explosion at the atomic power-station are tragic for the Ukrainian, Belarus and other nations.

Environmental protection is a universal concern. That is why serious measures to create a system of ecological security should be taken.

Some progress has been already made in this direction. As many as 159 countries — members of the UNO — have set

up environmental protection agencies. Numerous conferences have been held by these agencies to discuss problems facing ecologically poor regions including the Aral Sea, the South Urals, Kuzbass, Donbass, Semipalatinsk and Chernobyl. An international environmental research centre has been set up on Lake Baikal. The international organisation Greenpeace is also doing much to preserve the environment.

CHERNOBYL NUCLEAR ACCIDENT

T.V. Kozlenko - Sumy State University, group M-03
V. S.Kurochkina - E L Adviser

Chernobyl break down is an ecological disaster that was caused by the destruction of the fourth unit of Chernobyl nuclear power plant. It happened in Ukraine on 26 April 1986. The disaster is the largest in the history of nuclear power.

After the accident a radioactive cloud appeared over the European part of the USSR, the greater part of Europe, the eastern part of the United States. Approximately 60% of nuclear fallout was deposited on the territory of Belarus. About 200,000 people were evacuated from the areas of contamination. First, the leadership of the USSR tried to conceal the scale of the tragedy, but after the reports from Sweden and the assessment of contamination, evacuation of about 130,000 residents of Kyiv region from the contaminated areas was organized. There was created a 30-km exclusion zone around Chernobyl.

The accident resulted in emission of radioactive substances, including uranium, plutonium, iodine-131 (half-life of 8 days), cesium-134 (half-lifeof 2 years), cesium-137 (half-lifeof 33 years), strontium-90 (half-life of 28 years).

In the first weeks after the accident, radioactive iodine and tellurium were the most dangerous substances to people.

After the Chernobyl catastrophe, 116,000 people from Pripyat, Chernobyl, over 70 settlements were evacuated from the 30-kilometer zone. Altogether, 600 000 people, including liquidators of the disaster, have been affected by the radiation.

Such breakdowns as at Chernobyl or Japan's Fukushima nuclear plants force humanity to be alert and encourage scientists to invent the alternative energy sources.

ENVIROMENT AND TECHNICAL PROGRESS AROUND US

A.V.Lebedka, Y.O.Kaba – Sumy State University, group IT-11
D.O.Marchenko – E L Adviser

Our Earth is our home and people must take care of our Motherland. There are a lot of industrial enterprises in our country, that's why we can't ignore the problem of the protection of our environment. Our main aim is the protection.

In today's modern world, technological progress is important for all countries. It is undeniable that technological progress has contributed greatly to the development of countries across the world. The development of many modern machines has led to air pollution. This leads to poor air quality.

Positives:

- Better technology can help us study and better understand how we are affecting the environment.

Negatives:

- Advancements in exploitation techniques can also get rid of things such as forests, aquifers, and other natural resources we need.
- Technology of production vehicles, air-conditioning and other advanced gadgets have caused air pollution.
- Carbon dioxide and other greenhouse gases are released into the air, causing global warming.

The problem of protecting the nature is of primary importance today. With the rise of advanced technology, the rapid spread of industrialization and the increase of human population pollution has become a universal problem.

Our environment must be clean. We have to control atmospheric and water pollution, to study the man's influence on the climate. The pollution of the environment influences the life of animals, plants and our human life.

POLLUTION IN UKRAINE

V.V.Lyashenko – Sumy State University, group U − 12
N.M.Usenko – ELAdviser

This topic is extremely relevant today because ecology of Ukraine is in critical condition! Ukraine is suffering many environmental problems. There are many consequences of damaging the environment. One of them is water pollution.

Water is necessary for life. All organisms contain it, some drink it and some live in it. Plants and animals require water that is moderately pure, and they cannot survive, if water contains toxic chemicals or harmful microorganisms.

Another problem is air pollution. For example, pumping waste gases from a power station or metallurgical plants do not get rid of them. People have always polluted their surroundings. But until now pollution was not such a serious problem. Automobiles are polluting the air but they provide fast transportation for the people. Plants and factories pollute the air and the water but they provide jobs for people and produce necessary goods. Fertilizers and pesticides are important for growing crops but they pollute soil. The waste gases cause acid rains. Acid rains are dangerous for animals, plants, water and people.

We make a lot of waste. Some of which is TOXIC. We pour toxic waste into our rivers, lakes, and seas. Chemical

waste pollute river water, killing wildlife .The pollution affects the health of people and animals.

As you see our country has many ecological problems. We must take care of our nature. That's why we must not drop litter in street, we must improve traffic transport, use bicycles, create more parks. If our generation doesn't do our best to solve these ecological problems we will have a global ecological catastrophe.

GRAVE EFFECTS OF AIR POLLUTION

I.Yu. Matyushenko – Sumy State University, group EK-71
L.P. Yarmak – EL Adviser

It is well recognized that air pollution may cause poor health and even death. Air pollution is caused by both natural and man-made sources. Major man-made sources of air pollution include industries, automobiles, and power generation. Indoor pollution results from tobacco smoke, the combustion of solid fuels for cooking and heating. In addition, construction material, furniture, carpeting, air conditioning, home cleaning agents and insecticides can also be significant sources of chemical and biological indoor pollutants.

Outdoor air pollution results from pouring hundreds of millions of tons of gases and particulates into atmosphere each year. One of the most common forms of outdoor air pollution is smog. Most air pollution results from combustion (burning) processes. Fuel combustion is the primary source of a large number of health-damaging air pollutants, including carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen oxides (NOx), volatile organic compounds (VOCs), ozone (O_3), and atmospheric lead. Some of these pollutants are direct by-products of fuel combustion, but others (such as O_3) are formed in the air through chemical reactions with other agents in the atmosphere.

Air pollution has both acute and chronic effects on human health. Health effects range anywhere from minor irritation of eyes and the upper respiratory system to chronic respiratory disease, heart disease, lung cancer, and death. Air pollution has been shown to cause acute respiratory infections in children and chronic bronchitis in adults. It has also been shown to worsen the condition of people with preexisting heart or lung disease.

Air pollution is associated with cardiovascular disease in human population. The time-series approach investigates whether air pollution is accompanied by short term changes in the incidence of cardiovascular events such as heart attacks. This method generally uses available data on daily counts of deaths or hospital admissions and relates these to ambient concentrations of air pollution on the same or previous days, measured by monitors situated in the study area – usually a city. Evidence from a large number of time-series studies show very clearly that, with few exceptions, all of the commonly measured pollutants are positively associated with increased mortality and hospital admissions for cardiovascular disease. These associations are likely to be explained by air pollution making existing disease worse or by precipitating an acute event such as a heart attack in one who is already vulnerable to this possibility.

Health impact of air pollution depends on the pollutant type, its concentration in the air, length of exposure, other pollutants in the air, and individual susceptibility. Different people are affected by air pollution in different ways. Poor people, undernourished people, very young and very old, and people with preexisting respiratory diseases are more at risk. In cities, for instance, the poor tend to live and work in the most heavily polluted areas, and in rural areas the poor are more likely to cook with the fuels of poor quality.

Air pollutants can also indirectly affect human health through acid rains, polluting drinking water and entering the food chain, and through global warming and associated climate changes.

As a result of several decades of tighter emission standards and closer monitoring, levels of certain types of air pollutants have declined in many developed countries. Although, even at much reduced levels, air pollution continues to threaten public health all over the world.

THE INFLUENCE OF CFCs ON THE ENVIRONMENT

I.S. Merzliakov, D.O. Levchenko – Sumy State University,
Department of Technical Thermal Physics
V.S. Kurochkina – E L Adviser

In the modern world of innovative technologies a significant place is occupied by ecology and safe environment. Regulation and safety control are carried out on the high international level, and all the countries should follow the directions and execute them in full measure. Today there exists a huge amount of industrial and household refrigeration and heat pump equipment without which it is difficult to imagine normal existence of humanity. However, very few people know the way how coldness or warmth is formed in those plants and how safe it is to have climatic equipment in your home.

Freon is used as working substance in refrigeration and heat pump equipment. It is colourless gas or liquid, odourless, nonexplosive, incombustible, poorly soluble in water. Freon, also known as chlorofluorocarbons (CFCs), and halon are inert and non-toxic substances. They were widely used in foams, aerosols and dry-cleaning, while halon in fire extinguishers. As it turned out afterwards, CFCs can cause destruction of large amount of ozone in the stratosphere and, as a result, increase the number of cases of skin cancer among people, as well as

cause the occurrence of other serious problems. It has become possible to replace them with less ozone-destructive products.

Therefore, the international community took up solving this problem that eventually resulted in signing the Montreal Protocol in 1987 in order to reduce the production and consumption of chlorofluorocarbons and halon, substances which deplete the ozone layer in the upper atmosphere. The agreement also provides for trade bans on CFCs and CFC-consuming products. Since then emissions of CFCs around the developed world have largely ceased.

HEAT TREATMENT OF THE DISK CUTTER MODULE

Z. V. Parhomchuk – Sumy State University, group MT-71
M. N. Dunaeva – EL Adviser

Disc cutter unit are designed for cutting gear teeth by copying. The main factor to consider when designing cutters is a special distribution of physical forces at the time of teeth contact with the surface of the workpiece. Therefore it is necessary to apply the most suitable materials with regard to their value and scarcity.

Resistance properties are properties that instrument as a whole, and not of steel. When cutting resistance properties depend on several factors: the properties of tool steel and thermal conditions of processing; the cutting conditions; the cutting process character; the properties of the material.

Under the wear resistance of cutting tools one understands the destruction of its contact surfaces due to friction on the front surface of the tool and its rear surfaces of the piece.

Technical requirements for the product should enhance the reliability of its work during the operation.

In order to save steel R6M5 was chosen.It fully meets all technical requirements and applies to all types of cutting tools in the processing of carbon-alloy structural steels.

The steel, used for production of a disc cutter module must meet the requirements: high surface hardness; the strength characteristic (tensile strength in bending); technological properties (scaling resistance; heat and thermal conductivity; machinability and hardenability; deformability; stability against the formation of cracks and etc).

Preliminary heat treatment. Annealing of high-speed steels produced for the following purposes:

- to reduce the hardness to from 207 to 300 HB after hot plastic deformation;
- to improve the machinability;
- to prepare the structure for quenching.

For this cutter, one applies isothermal annealing. Structure after annealing is grainy troosto-sorbitol plus carbides.

The main and most critical operation of heat treatment is quenching in salt bath**.**

Tools of high speed steel heat are treated according to the following regime: the first heated in a salt bath at a temperature of 600 to 650 °C; the second heating in a salt bath at a temperature of 800 to 850 °C; the final heating in hlorbarievoy or barium bath at temperature 1210 to 1230 °C (steel R6M5); cooling during quenching can be saltpetrous bath (at 500 to 550 °C) or oil (at 20 to 140°C).

The structure of high-speed steel after tempering consists of martensite, retained austenite and carbides.

After quenching the part is subjected to tempering at 520-580 °C: reduces of the hardening stress; increases the hardness of the tool to 2-3 HRC; the transformation of retained austenite to martensite.

Low-temperature nitrocarburizing tool is a the process of saturation of the surface layers of steel products in carbon and nitrogen. Used to increase hardness and red hardness of high speed cutting tools and high-chromium steel. Carbonitriding temperature is the same as in the tampering at 580°C.

The main factor to consider when designing cutters is a special distribution of physical forces at the time of teeth contact with the surface of the workpiece. Therefore it is necessary to apply the most suitable materials with regard to their value and scarcity.

ECOLOGICAL PROBLEMS OF ENGINEERING

R. Protsai – Sumy State University, group I – 11
S.V. Mikhno – ELA

The problem under consideration is engineering environmental hazards. Everybody should know about ecological problems. Biosphere of the Earth is exposed now to negative influence, which is caused by technical progress.

It's possible to allocate some main processes worsening the ecological situation on the planet, otherwise we will get such problems as:

-chemical pollution of atmosphere;

-chemical pollution of hydrosphere;

-acid pollution of soil.

The main sources of chemicals in the atmosphere are thermal power stations which together with smoke throw out sulphurous and carbonic gas into the air and also metallurgical enterprises and chemical plants.

Basic sources of pollution of hydrosphere are the enterprises of food-processing industry and agriculture. Considerable volume of organic substances is dumped into the rivers together with industrial and household drains.

One of the sharpest global problems is a problem of acid rains. They are the result of the economic activity of people, accompanied with the emission of oxides of sulphure, nitrogen and carbon. The main source of acid rains is a burning of slates, oil, coals and in the factories.

So, as a conclusion, it should be said that mechanical engineering is the main source of probable poisonous chemical compounds which put an irreparable harm to the ecology of the Earth and destroy the biosphere.

ENVIRONMENT AND TECHNICAL PROGRESS AROUND US

A .S. Samoylenko – Ukrainian Academy of Banking of the National Bank of Ukraine, group IE – 12
I.A. Bokun – E L Adviser

I want to draw your attention to the urgent problem of your life: Technical progress and Environment. Because of the lack of time I will start with the short characteristic of the environment. Its common knowledge that environment is everything that is around us and affects the character and growth of living things. When talking about the environmental problems, ecological issues can't be separated their effect on mankind nor can't human activities be separated from their effect on the ecology. Taking into consideration the experience of several generations, witnessing the results of people's activity, we can say that the problem of our environment and technical progress is closely connected. Being a result of people's activity, environmental pollution is a term that refers to all ways how human activity harms the natural environment. It is done in different ways - black smoke and fume of factories etc.

Some kinds of pollution do not actually dirt the land, air and water, but they reduce the quality of life of people and

other living creatures, for example, noise from transport, some air pollutants have reduced the capacity of our atmosphere to filter out the sun's harmful ultraviolet radiation. The unreasonable usage of mineral resources, the desire of fast profits leads to the point when it will be too late to return.

Today we can speak about population expansion. Our planet holds more than 7 billion people. The rapid growth of the population makes people find new ways of the solution of this problem, how to feed, dress and give shelter to them.

It's difficult to imagine anyone in the world not using sprays, washing powder, plastic bags etc. Farmers have to use fertilizers and pesticides to grow better harvests, but nowadays we hear more often about famine. Farmers use fertilizers and pesticides not always rationally. It leads not only to pollution of agricultural products but to the pollution of land and water resources.

Science as well as people's personal observations come to the conclusion that most products of people's activity sooner or later become pollutants which cause climatic changes. Severe frosts, longer periods of droughts, heavy floods make us stop and think what to do. To end or greatly decrease pollution people will have to find new sources of energy such as wind, sun instead of gas, oil or coal, to reduce use of cars and other modern conveniences, to close or change production methods. Pollution can and must be reduced in many ways without serious disrupting people's life. For example, governments can pass laws that encourage business to adopt less polluting methods of operation, to install purifying filters, ban usage of plastic bags, washing powder with harmful chemicals etc. As to the situation of the environment in Sumy and Sumy region, the latest analysis shows that the level of emission of harmful substances degreased: in 2010 – 31.7 thousand tons of toxic substances were thrown out into the atmosphere. But still the main sources of the pollution are not only our plants and

factories but also transport. It contains 64% of total pollution or 54,2 thousand tons. It's interesting to mention that the emission of toxic substances per person is 2000 – 61kg (kilos) per person, 2010 – 76,2kg per person. The total emission is 88,9 thousand tons in Sumy region, it is 1% of total emission in Ukraine. As to our factories and plants the main pollutants are our plant "Frunze" – 480 tons (2010), Сумы ЛВУМГ – 9770 tons and "Химпром" – 1990 tons.

Such measures can help to improve the situation:
use of new sources of energy, especially new kinds of fuel such as "Euro 3" and "Euro 4", building of new road bypasses and highways, strengthening of existing control, extending and improving monitoring of air pollution.

ZERO ENERGY HOUSE AS ENVIRONMENT SAVING TECHNOLOGY

Y.I. Shkurko – Sumy State University, group M-93
I.A. Morozova – EL Adviser

Nowadays there is a growing imbalance between energy supply and demand. Energy demand growth is exceeding production growth, leading to increased supply scarcity. Energy generation, transportation and consumption contribute to GHG emissions and associated air pollution. That's why great attention is paid to ecological problems and development of green technologies in order to prevent global warming process. One of these novations is Zero-energy house (ZEH).

A zero-energy house, also known as a zero net energy building, or Net Zero Building, is a popular term to describe a building with zero net energy consumption and zero carbon emissions annually.

Zero Energy Housing is a term applied to a house or residential development that produces as much energy from renewable sources as it consumes on an annualized basis.

A ZEH combines state-of-the-art, energy-efficient construction techniques with renewable energy systems (usually solar and wind power) to create as much energy as it uses on an annual basis. Because solar and wind power are unpredictable, most ZEH's are connected to the local electrical grid. When the home can't produce enough power to meet its needs—at night or on a cloudy winter day, for instance—the homeowner purchases energy from the utility provider.

On the other hand, when the house is producing more energy than it needs, the extra energy is sent back into the utility grid. In some cases, the home's electric meter literally spins in reverse. If, over the course of the year, the home produces as much energy as it consumes, it can be considered a zero energy home.

Although net-zero energy homes have a higher initial cost of building, there are numerous advantages to building/owning a NZEH. These benefits include:

- isolation for building owners from future energy price increases;
- increased comfort due to more-uniform interior temperatures;
- reduced total cost of ownership due to improved energy efficiency;
- the value of a ZEB building relative to similar conventional building should increase every time energy costs increase;
- future legislative restrictions, and carbon emission taxes/penalties may force expensive retrofits to inefficient buildings.

Disadvantages:

- initial costs can be higher - effort required to understand, apply, and qualify for ZEB subsidies;
- very few designers or builders have the necessary skills or experience to build ZEBs;
- without an optimized thermal envelope the embodied energy, heating and cooling energy and resource usage is higher than needed. ZEB by definition do not mandate a minimum heating and cooling performance level thus allowing oversized renewable energy systems to fill the energy gap.

Thus, Zero-energy house is an effective way of saving environment from pollutions and adverse effects of energy generation, transportation and consumption. Utilization of these buildings can make our life more comfortable and healthier.

METHODS OF PROTECTION (PELLETING) OF NITROGEN FERTILIZERS

Spivak I.S – Sumy State University, group XM-71
Iarmak L.P.

To receive heavy yields various types of fertilizers are applied in modern agriculture. First of all these are mineral fertilizers including nitrogenous, phosphorous and potassium ones.

Nitrogenous fertilizers give plants growth and green herbage but also they have some disadvantages. One of them is quick outgoing of nitrogen out of ready product grain. This can be followed by accumulation of nitrates in plant fruits, their leaves and thighs. The solution of this problem can be in covering of grains with protective coat. This will decrease nitrogen-to-soil penetration rate and improve quality of ready agricultural products.

There are several approaches of receiving slowly dissolved fertilizers in technology

The Work provides the covering method of mineral fertilizers which assures gradual outgoing of nutrients and improves the balance and conditions of plant nutrition during land application. This method has the following advantages:

1.it has natural origin that is not injurious to soil microorganisms and human and harvest cultivated by means of these fertilizers;

2.it creates the protective coat at grain surface through which the moisture from soil enters the grain and forms the nutritious solution to grain that can come out of grain;

3. it gives significant hardness and strength, does not split off the grain during transportation and pouring;

4. is accessible and has small estimated cost.

The following issues were determined in the Work:

1. There was justified appropriateness of application of organic wastes as a covering to provide decreasing of nutrients outgoing out of nitrogenous mineral fertilizers.

2. The growth mechanism of organic suspension grains in fluidized bed was determined.

3. Four modes of grain growth typical for organic suspension granulation in fluidized bed were specified.

4. Physical model of coating process was designed.

5. The technology of production of granulated sustained action nitrogenous fertilizers with coat of cheap organic material was developed.

6. The proposed technology has ecological effect because it prevents the penetration of untreated animal wastes to surface water and does not litter soil with biogenic matters.

SECTION IV TECHNICAL PROGRESS AROUND US

FINANCIAL PROVIDING OF ENTERPRISES' INNOVATION ACTIVITY

A.V. Abryutina – Sumy State University, postgraduate
S.G. Zolotova– EL Adviser

The innovative trend of modern informative society and comparatively low level of enterprises' innovative activity have caused considerable scientific and technological lag in Ukraine. Thus it is necessary to develop effective organizational and economic methods of management aimed to achieve the economic growth and social progress. Analysis of dynamic processes in developed countries show that innovations are preconditions of strategic advantages and competitiveness on micro and macro levels. Furthermore, innovative activity is a base of paying capacity and profitability of economy agents in the framework of unstable political and economic terms. However, the problem of financial deficit is still urgent for Ukrainian enterprises.

It should be said, that theoretical and methodological questions of innovative activity, development and management are research object for many scientists in our country and abroad, among them: V. Aleksandrova, L. Antonyuk, I. Balabanov,P. Druker, R. Foster, A. Galchinskiy, V. Geets, G. Goldshtein, S. Illyashenko, L. Krushvits, P.Solou, B. Twiss, S. Valdaytsev, V. Zombart etc.However, scientific and methodical approaches to financial providing of innovative activity require further development and improvement. You musttake into account national features.

The research purpose is to analyze modern alternative forms of financial providing of enterprises' innovative activity.

On the basis of the world experience in financing in novations, key sources of financial providing include: self-

financing (equity capital, profit, amortization, issue of shares and debt securities etc.); banking credits; venture capital; private, corporate, internal and foreign investments; budgetary facilities; government privileges and stimulant measures etc.

Obviously, self-financing is the most common used source, but it isn't enough to provide sufficient volume of monetary resources for realization of innovative activity. Besides it, financial institutions and companies are often reluctant to back research-intensive investments due to the inherent relatively high levels of uncertainty and risk compared to more traditional business areas. Thus, venture capital or banking credits may become a good solution, but they are expensive and have a lot of limitations.

Looking at this situation in a wider context, international financial programs should be mentioned. Firstly, a good chance for innovative enterprises is proposed by The Risk Sharing Financing Facility (RSFF). RSFF is an innovative, debt-based facility designed by the European Commission and the European Investment Bankas part of EU's 7th Research Framework Program with the purpose to create additional capacity for higher-risk financing to support the research, technological development and innovation activities. Besides, small and medium-sized enterprises (SME) have a possibility to take part in Competitiveness and Innovation Framework Program (CIP). CIP is a European Commission program which aims to encourage the competitiveness of enterprises, support innovation and provide better access to finance to generate economic growth and create more jobs as well as boost productivity, competitiveness and innovation. GIF targets seed and start-up investments, providing capital focusing on specific sectors, technologies or research.

In conclusion, enterprises should use a combination of all above mentioned alternative financial sources. In turn, Ukrainian government needs to pay attention to above-listed

programs and adopt such practices to increase financial base of innovation activity.

HEAT TREATMENT OF THE STAMP HOT DEFORMATION

K. V. Berladir – Sumy State University, group MT-71
M. N. Dunaeva – EL Adviser

The priority of metallurgy today is to develop new high-strain-hardening regimes that will improve the level of physical and mechanical properties and performance stamping tools.

For the manufacture of stamping blanks by hot deformation in forging machines are used special tools – stamps. In accordance with the applicable standart stamp is a tool for forming, surface and contour of one or both parts of which corresponds to the processed part or blank.

Design stamps depend on their purpose, deformation character, method of loading, mode of action and other factors. Various configurations of stamps are used for preliminary and final operations. Stamps can be divided into opened (for stamping with burr) and closed (for stamping without burr). They are used to perform various operations on the deformation character: cutting, precipitation, extrusion, bending and combined deformation. Stamps hot deformation consists of the following parts: lower half, upper half, punch, matrix and ejector.

Influence of cyclic temperature-force action on an engraving of stamp determines the main types of damage to the instrument, which exclude its use:

1. Wear parts engravings, leading to a change in the size of die cavity due to the removal from the surface layer of metal.

2. Plastic deformation (collapse) of elements of engraving, causing a change in its size and shape.
3. Cracks thermal (thermomechanical) origin.
4. Cracks mechanical fatigue.

The metal, used for hot stamping, must have certain properties, such as: high-temperature strength, red hardness, thermal resistance, toughness and hardenability. Alloy steels correspond to these requirements. The most common is the steel HNM5 and its substitutes: HGM5, HNSV5 and HNT5.

Steel HNM5 has a high impact strength and ductility, high hardenability. But along with this, steel characterized by a low thermal resistance, which does not provide the required operational stability stamp tool.

As the heat treatment of steel HNM5 for stamps hot deformation can be used thermocycling process – heat treatment under conditions of cyclic thermal effects, allowing obtaining the plasticity and toughness preserving the strength characteristics.

Thermocyclic treatment consists of two cycles of heating to 840 °C, cooling between the cycles is in the air to from 250 to 300 °C and with the last cycle - in the oil, duration at each heating is 60 minutes. It also includes tempering at 370 °C.

As a result of such a regime stamps after thermocycling treatment showes maximum resistance and hardness from 44 to 45HRC.

INTERNATIONAL THERMONUCLEAR EXPERIMENTAL REACTOR

O.O. Bondarenko – Sumy State University, group IN-02
S.H. Zolotova – E L Adviser

ITER (originally an acronym of International Thermonuclear Experimental Reactor) is an international nuclear fusion research and engineering project, which is currently building the world's largest and most advanced experimental tokamak nuclear fusion reactor at Cadarache in the south of France.

The ITER project aims to make the long-awaited transition from experimental studies of plasma physics to full-scale electricity-producing fusion power plants.

The project is funded and run by seven member entities - the European Union (EU), India, Japan, the People's Republic of China, Russia, South Korea and the United States. The EU, as host party for the ITER complex, is contributing 45% of the cost, with the other six parties contributing 9% each.

The ITER fusion reactor itself has been designed to produce 500 megawatts of output power for 50 megawatts of input power, or ten times the amount of energy put in. The machine is expected to demonstrate the principle of getting more energy out of the fusion process than is used to initiate it, something that has not been achieved with previous fusion reactors.

Construction of the facility began in 2007, and the first plasma is expected in 2019. When ITER becomes operational, it will become the largest magnetic confinement plasma physics experiment in use, surpassing the Joint European Torus.

The first commercial demonstration fusion power plant, named DEMO, is proposed to follow on from the ITER project to bring fusion energy to the commercial market.

PHOTOGRAPHY IS A PURE MIRACLE

Drozdenko Daria – Sumy State University, group E-71
supervisor Mulina N.I., Ph.D.

No wonder technical devices take the first place in the list of modern miracles. Photography should be mention at the top of the list. Photography is the process, activity and art of creating still or moving pictures by recording on film or an electronic sensor.

Photography is a purely technical miracle. It is the result of combining several technical discoveries. Invented at the beginning of the 19th century, photography seemed to be able to capture more details and information than traditional media, such as painting and sculpting. Joseph Niépce made the first permanent photo from nature with a camera obscura in 1826. The modern cameras evolved from this. New technological trends in digital photography opened a new direction in full spectrum photography in 1960, where careful filtering choices across the ultraviolet, visible and infrared rays have led to new artistic visions. Full spectrum photography proves to benefit greatly in fine art photography, geology, forensics and law enforcement. And even some people claim it is used in ghost hunting. Photo used in some ways. First, commercial photos are those for which the photographer is paid for images rather than works of art. Second, photography is considered to be a modern art as well as music, painting, etc. Then, an amateur photography is when the photographer practices it as a hobby but not for profit. Moreover, in science photo can be used in recording events and data.

Photo is not only a technical wonder as it allows you to keep the memory of remarkable moments, such as a child's happiness, the end of the war, a moment of your victory, your parties. But some people do not like to be photographed because they argue it takes away some part of your soul.

MUSICAL FOUNTAIN IN VINNITSA

Y.V. Fashchuk – Sumy State University, group M-93
I.A. Morozova – EL Adviser

Technology is everywhere. It runs our society, without it we wouldn't be able to do many of the things we enjoy today. There are many amazing technological innovations in Ukraine. One of the examples of high technological development is beautiful musical fountain in Vonnitsa.

It was completed by Emotion Media Factory Laserland (EMF) by order of Roshen Confectionery Corporation. EMF Laserland implemented the entire project, from a rough sketch of the idea via planning, design, installation and show production in just nine months.

The fountain was funded by Pyotr Poroshenko. The fountain is 140 meters in length and can project water columns 70 meters high. The fountain is located on the Bug River. It was opened on September 4th of 2011 and it is a sound and light fountain where holographic images are projected onto fantastic displays of water, illumined by a projection camera, colored lasers and accompanied by music for a spectacular show. Over 70,000 people attended the opening.

It is the Europe's biggest floating multimedia fountain system. This wonderful work of engineering art is a gift of Roshen Confectionery Corporation to Vinnitsa and whole Ukraine.

Within a very short space of time this fascinating spectacle has become known beyond the borders of Ukraine and attracts over 20,000 visitors to the city each week. Every evening a 25-minute-long thrilling story is told featuring water, music, laser, light and colours. It claims to be a show for young and old which can be understood without language and which arouses the feelings of the spectators.

Coloured fountains of water spout up to 70 m up into the sky. A 50 m wide and 18 m high screen of water acts as the projection surface for the story which has been composed and produced by EMF. High performance video systems project seemingly three-dimensional images in brilliant colours onto the water screen. The story is backed up dramaturgically by giant fountains.

Now all those who wish may watch the unique show regularly. The powerful water streams rise up under the music accompaniment and light and laser effects as well as video projection on the huge screen. By the totality of characteristics, Roshen Fountain in Vinnitsa is the biggest in Europe, and according to the experts it is one of the top 10 beautiful and spectacular world fountains. Unlike most of the fountain systems installed in the artificial swimming pools with water treatment systems, the uniqueness of this project is that the fountain uses the water of the 'living' river.

Vinnitsa fountain show uses the superpower LED lamps allowing to create an extremely bright and spectacular underwater illumination, yielding the magnificent effects. Contrarily to most of Ukrainian fountains, Roshen Fountain contains the mobile elements rotating around their axis, due to which the water streams inclination angles vary dynamically. The different shows can be started by staff using the easy-to-handle ISEO surface of a touch panel.

In order to protect the technology from drift ice and the cold, the floating installation is constructed so that it can be lowered to the bottom of the river in winter.

The fountain is a part of a complex upgrading project of Pivdenny Buh quay reconstruction near Roshen confectionery factory that costs 70 million US dollars. This is the first social and cultural project in the Ukraine's history of such a scale which was implemented for funds of a private company.

CAN WE CREATE A HUMAN FROM SCRATCH?

K.S. Gorbatyuk – Sumy State University, group IN-01
I.A. Bashlak – EL Adviser

Do you know who Frankenstein is? Probably yes, but I would like to remind you. Victor Frankenstein is the protagonist of the novel, Mary Shelley's "Frankenstein or the Modern Prometheus." In the novel, Victor Frankenstein is a young student from Geneva. He creates a living being from inanimate matter. This matter he collects from the fragments of dead bodies. Then doctor Frankenstein finds "a scientific" method to bring him back to life. However a coming back to life creature appears a monster. Frankenstein aspires to cognition that he does not limit to ethic considerations. But only when a doctor created a monster, he realizes that went a vicious way. Frankenstein and his monster illustrate the failure of human attempts to undertake the functions of God. Perhaps you want to know why I'm talking about the history of Dr. Frankenstein. The answer is simple. This story can become a reality in our time. It is not a secret that scientists already learned how to create artificial organs and successfully replant them. For example, in 2009 scientists of the Fraunhofer Institute hoped to mass-produce skin at low cost for clinical testing and other uses. Now the factory can produce 5,000 penny-sized discs of whitish translucent tissue every month. But the real goal of this factory is to pave the way for factory-produced human tissue, complete with blood vessels, which could be used to treat injuries or various medical conditions. Another example, a team of researchers at Japan's RIKEN Center - the same group who earlier this year engineered a mouse retina that is the most complex tissue ever engineered - have now derived a working pituitary gland from mouse stem cells. That's saying something. For one, the pituitary gland is an integral part of the body's endocrine system. From it's

position at the base of the brain it doles out key developmental hormones that instruct the body on how to grow and develop over time. But perhaps more importantly, the pituitary gland cannot itself develop without special chemical instructions from the hypothalamus (the brain region just above it). The researchers overcame this with a 3-D cell culture and some good old fashioned trial and error. They had a notion of what kind of signaling factors would be needed to make a proper pituitary gland grow and tried combinations until they found the right fit. The result is a working pituitary that expressed the right hormones. And to remove any doubt, the researchers implanted their lab-grown glands into mice with pituitary defects. The mice quickly showed restored levels of key pituitary hormones and behavioral symptoms of pituitary problems disappeared. These pituitary glands, by all appearances, seem to work like the original biological glands were meant to. One more example, at the University of Nottingham, a team of researchers with help from researchers elsewhere in the U.K., the U.S., Israel, and Spain is trying to create a "reprogrammable cell" that can act as the in vivo cell equivalent to a computer's operating system. In other words, they are trying to create cellular software that would let researchers alter living cells without changing their hardware. Customized living cells could be tailored to clean up environmental disasters, scrub unwanted carbon from the air, pull pollutants from drinking water, attack pathogens inside the human body, protect food sources from agricultural pests, the list is potentially endless. Does it mean that in a few years we will be able to become a next Frankenstein and to collect a living anthropoid creature from separate organs? Is it possible to consider him as a HUMAN? Will he have feelings and personality? Will he be able to react in adequate on environment? Is it necessary to test a fate and create the real Frankenstein's monster?

OPTOELEKTRONIK

A. Grischtschuk, – Sumy State University, group EP-71
I. Saizewa, Berater der deutschen Sprache

Optoelektronische Bauteile sind Bauteile, die als Schnittstelle zwischen elektrischen und optischen Komponenten wirken oder auch Geräte, die solche Bauteile enthalten. Damit sind meist (aber nicht ausschließlich) mikroelektronische Bauteile gemeint, die auf der Basis von Halbleitern funktionieren.

Die Bauelemente der Optoelektronik lassen sich in Aktoren (Sender) und Detektoren (Empfänger) unterteilen. Optoelektronische Aktoren sind Halbleiterbauelemente, die aus Strom Licht erzeugen, also Laser- und Leuchtdioden. Das Emissionsspektrum kann sich dabei sowohl im sichtbaren als auch im unsichtbaren (UV oder Infrarot) Spektralbereich befinden. Optoelektronische Detektoren sind die Umkehrbauelemente der Aktoren, also Fotowiderstand, Photodiode (auch Solarzelle) und Fototransistor. Lichtsensoren können auch als integrierte Schaltung aufgebaut werden, z. B. als CCD-Sensor. Auch Photomultiplier werden zur Optoelektronik gezählt. Werden Aktor und Detektor als System betrieben, resultiert daraus ein optischer Sensor, ein sogenannter Optosensor. Das Fachgebiet wird analog dazu als Optosensorik bezeichnet. Die einfache Kombination aus einem Aktor und Detektor in einem Bauteil wird als Optokoppler bezeichnet. Neben diesen gibt es noch weitere Bauteile die bei der Übertragung, Verstärkung oder Modulation von Signalen benötigt werden.

IDENTIFICATION OF MOTION

V.O.Hlushchenko, I.I.Kolodochka, A.O. Miroshnychenko, –
Sumy State University, group K-81
A.M. Dyadechko – EL Advisor

Nowadays, science is developing very rapidly, and people need to test the new inventions in practice. But some of these tests are very expensive, some dangerous, or we can't hold them in the Earth conditions, such as the explosion of atomic bomb or rocket launch into space. In the recent past, people spent months or even years, with millions of dollars to prepare such experiments and if something goes wrong then started again incurring huge financial losses. But now we can avoid this by changing a few keystrokes, using FlowVision.

Program complex FlowVision – leader of the numerical simulation of steady and unsteady motion of liquid and gas. FlowVision solves the problems of internal and external aero-hydrodynamics. Numerical integration of equations of fluid motion is based on the finite volume method.

FlowVision has unique features: dual solves the problem of interaction flow with the body, expects the joint motion of the free surface and floating bodies, automatically builds a grid for the calculated areas of any difficulty.

In turbo mechanical engineering FlowVision effectively counts for a aggregate with rotating parts. If the rotating parts can be surrounded by cylindrical surfaces we use the technology of “sliding grids”. If the rotors can not be surrounded by a cylindrical surfaces - the technology of "movable bodies".

FlowVision is used to simulate the mixing of liquids in a variety of chemical reactors. During the simulation process is controlled by the quality of mixing. In such way increase the productivity of the unit.

Summing up should be added that the ability to solve difficult problems in power engineering and thermal physics

makes FlowVision invaluable for all engineers. Set of models of physical processes helps to calculate the motion of gases and liquids inside burners, engines, boilers, pumps, turbines, compressors, etc.

Every engineer in the world in the beginning of any calculation of liquid or gas motion faces with a problem of identification of motion.

In the recent past to solve this problem engineer have to build very difficult systems of equipments and in the end of calculation they takes not at accurate results with errors. But now we can solve it in five minutes with the help of FlowVision Complex.

There are two main types of motion: laminar flow, turbulent flow.

WOMAN INVENTORS

T.E.Ivanova, M.I.Bilan - Sumy State University, group EF-02
I.A. Morozova – EL Adviser

Every day we use lots of various inventions. Most people think, that opinion that all inventors are men. But we want to talk today about great women inventors.

Ann Moore (born 1940) is an American nurse credited as the inventor of the Snugli and Weego child carriers. After the birth of the couple's first daughter, following their return to the United States, Ann attempted to carry her child in the style used in Africa by using a long shawl as a sling to strap the infant to her back. Finding this method to be ineffective, as the child would slip, she, with the help of her mother, developed a backpack harness that, following modifications, would become the forerunner to the Snugli. The Snugli was patented in 1969.

Mary Anderson (1866–1953) was a real estate developer, rancher, viticulturist and inventor of the windshield blade. In November 1903 Anderson was granted

her first patent for an automatic car window cleaning device controlled inside the car, called the windshield wiper.

The disposable diaper was invented in 1950 by Marion Donovan. Her first leak-proof diaper was a plastic-lined cloth diaper. Donovan then developed a disposable diaper. She was unsuccessful at selling her invention to established manufacturers, so she started her own company.

Donovan's first breakthrough, in 1946, was to design a waterproof diaper cover. Steadily working her way through a series of shower curtains, Donovan designed and perfected on her sewing machine a reusable, leak proof diaper cover that did not, like the rubber baby pants of time, create diaper rash. Donovan called her diaper the «Boater» because it helped babies stay afloat.

Rush Handler had noted that her daughter Barbara, who was becoming a preteen, preferred playing with her infant paper doll sand giving them adult roles. She wanted to produce a plastic doll with an adult body but her husband and Mr. Matson thought it wouldn't be sold. She reworked the design of the doll and renamed her Barbie after her daughter. Barbie debuted at the Ney York toy fair on March 9.1959. Barbie became an instant success, rocketing the Handlers and their toy company toward fame and fortune.

The first modern brassiere to receive a patent was the one invented in 1913 by a New York socialite named Mary Phelps Jacob. Mary found that the whalebones poked out visible around the plunging neckline and under the sheer fabric. Having tied two silk handkerchiefs and some pink ribbon Mary designed an alternative to the corset.

Mary Walton was an American independent inventor who worked in the late 19th century. In 1879, Walton created a method for reducing the environmental hazards of the smoke emitted from factory smokestacks.

Kevlar (a polymer fiber) that is five times stronger than the same weight of steel. Kevlar is used in bullet-proof vests, helmets, trampolines, tennis rackets, and many other commonly-used objects. Kevlar was invented by Stephanie Louise Kwolek.

Ruth Graves Wakefield invented chocolate chips (and chocolate chip cookies) in 1930. Her new cookie invention was called the "Toll House Cookie." Broken-up bars of semi-sweet chocolate were used in her original cookies

History knows many women who have invented useful things. These things are now used in everyday life. An educated person should know them and respect the contribution made by women scientists. We should thank the wonderful half of humanity, not only for their beauty, charm and kindness, but also for the ideas they saw in the simple things.

UMWELT UND WISSENSCHAFTLICH-TECHNISCHEN FORTSCHRITT

A. Junak, Aspirantin, Sumy State University
I. Saizewa, Berater der deutschen Sprache

Der wissenschaftlich-technische Fortschritt ist der Prozess der quantitativen und qualitativen Veränderungen in Wissenschaft und Technik. Sein Ziel ist es, neue wissenschaftliche Kenntnisse zu gewinnen, das heißt die Naturgesetze immer tiefer zu erkennen, um sie technisch zu verwirklichen und in die Produktion einzuführen.

Durch den wissenschaftlich-technischen Fortschritt werden in der Produktion zwei wichtige Aufgaben gelöst. Einerseits werden die bereits vorhandenen Maschinen und Technologien vervollkommnet, andererseits werden völlig neue Arbeitsmittel und Technologien entwickelt.

Der wissenschaftlich-technische Fortschritt führt zu tief greifenden Veränderungen im Leben der ganzen Gesellschaft.

In diesem Zusammenhang spricht man heute von der wissenschaftlich-technischen Revolution. Diese Revolution umfasst die ganze Welt, ohne auf Unterschiede in der Gesellschaftsordnung zu achten.

Ausgelöst wurde die wissenschaftlich-technische Revolution durch große Fortschritte in den letzten Jahrzehnten, besonders in Physik, Chemie, Biologie und Kybernetik. Die Wissenschaft ist zu einer unmittelbaren Produktivkraft geworden. Sie forscht vor allem, um Anwendungen in der Produktion zu ermöglichen. In immer kürzerer Zeit werden neue wissenschaftliche Ergebnisse in der Praxis genutzt.

In Deutschland und Europa ist die Notwendigkeit erkannt worden, der Elektromobilität mit Förderprogrammen auf die Sprünge zu helfen. Die Wirtschaftzeitung Produktion stellt die wichtigsten Förderquellen vor. Der globale Klimaschutz als Teil einer ökologisch orientierten Industriepolitik wird auch in der Elektromobilität als Synonym für die Nutzung von Elektroautos und elektrisch betriebenen Hybridkraftfahrzeugen für den Personen- und Güterverkehr seiner Bedeutung gerecht. So hat die Bundesregierung einen „Nationalen Entwicklungsplan Elektromobilität“ erstellt, dessen Ziel es ist, Deutschland zum Leitmarkt für Elektromobilität zu entwickeln und bis 2020 eine Million Elektrofahrzeuge in den Verkehr zu bringen.

Bei heute weltweit fast einer Mrd Kraftfahrzeugen, davon rund 700 Mio Pkws, wird bis 2030 von einer Verdoppelung ausgegangen, so dass eine Reduktion der verkehrsbedingten Schadstoffemissionen zu einer enormen Herausforderung führen wird. Diesen Erfordernissen stellt sich auch die „Gemeinsame Geschäftsstelle Elektromobilität“ (GGE), die im Januar 2010 vom Wirtschafts- und Verkehrsministerium gegründet wurde. Auch innerhalb der Europäischen Kommission sollen, gemeinsam mit der Industrie, bis 2013 eine Mrd Euro für Forschung und

Entwicklung für die Elektromobilität bereitgestellt werden. Dar über hinaus zeigen sich auch weitere europäische Länder wie beispielsweise Großbritannien, Frankreich, Spanien oder Italien daran interessiert, die Entwicklung der Elektromobilität voran zu treiben. Je nach Initiative sind beziehungsweise sollen Ressourcen etwa zum Ausbau der erforderlichen Infrastruktur, der Kosteneffizienz leistungsstarker Elektro und Hybridfahrzeuge sowie zur Energieforschung insgesamt bereitgestellt werden.

In Deutschland fördert die Bundesregierung von 2009 bis 2011 mit 500 Mio Euro aus dem Konjunkturpaket II Ausbau und Marktvorbereitung der Elektromobilität.

Elektrofahrzeuge gelten derzeit als Fortbewegungsmittel der Zukunft.

LA COUVERTURE DES NOUVELLES INTERNATIONALES DU JOURNAL «JOUR»

Kalita Marina – Sumy State University, group ZhT 81
Adviser Aleksakhina Tatiana

La principale caractéristique commune est que les nouvelles sur la vie internationale sont couverts par jour dans les deux versions de publications. Mais si les journaux «jour» de publications contenues dans les sections ("Situation", "Affichage", "Deux Vues", "Tourner", "Exclusif", "Une Interview Minute", "photofact", "Fotoshtryh" etc .), l'édition en ligne est une colonne de total pour les événements en Ukraine et dans le monde, intitulé "Dernières Nouvelles".

Nous attirons l'attention sur la rubrique "Photofact" et "Fotoshtryh." Comme il ressort de leurs noms, une priorité, a pris des photographies. Une différence significative est également sources d'information. Dans le journal a mis en lumière combinées avec des matériaux empruntés, et de l'édition en ligne toutes les nouvelles prises à partir de

ressources d'information d'autres (agences). Objet nouvelles très diversifiée. Le plus complet, et il est devenu typique de la couverture médiatique des événements en Ukraine la politique, l'économie, d'urgence, la diplomatie et les conflits militaires dans les derniers mois sont devenus aiguë. Ainsi, les deux versions électronique et imprimée de la publication «jour» essayant de gagner le plus large éventail possible de l'information des consommateurs. Ce qui est important c'est le moment de rendre publics les médias ukrainiens sur d'autres pays, ils ont leur propre travail dur par des journalistes, non pas qu'il était une réimpression à partir d'autres sources. En outre, prendre la dernière place et ce que les journalistes écrivent - l'information doit être équilibré. Cela signifie qu'en plus de la politique et l'économie sont nombreux autres domaines de la société, ce qui est également intéressant d'apprendre à partir des pages de périodiques.

FINANCING OF INNOVATIVE ACTIVITY OF THE ENTERPRISES

I. V. Karpenko – Sumy State University
S. G. Zolotova– E L Adviser

In the current economic climate strong role in the competitiveness of individual companies, regional and national economy in general have an innovation.

Ukraine as part of the national economy of the former USSR had a considerable innovative potential. According to UNESCO, the share of Ukraine in the world engineering and scientific potential was almost 7 per cent. Unfortunately nowadays, Ukraine – a state with enormous innovative potential in the past – today is unable to realize it in the competitive environment of the open market, lagging behind in economic development after the recently less powerful Poland, Hungary, Slovakia and even Romania.

Some aspects of investment provision for innovative development in Ukraine are explored by the renowned Ukrainian economists such as O. Amosha, M. Arefyev, Y. Bazhalo, Y. Vasylenko, O. Vasyurenko, Y. Halushko, A. Halchynsky, V. Heyetz, A. Hrynyov, B. Danylyshyn, H. Dobrov, H. Zavlin, M. Krupka, A. Kuznyetsova, T. Kosova and others. Despite significant number of scientific management, there are many complex issues, which need further development.

According to leading Ukrainian experts, the main source of investment provision of innovative development is the resources of enterprises themselves. But considering the resource shortage at most enterprises, the low level of profitability, high level of assets depreciation, it is possible to make a conclusion about the limited capacity for investment provision of innovative development of the Ukrainian economy from the resources of enterprises.

Another form of financing investments and innovative activities in Ukraine is by means of financial and industrial capital. Since the introduction of the first normative documents in Ukraine, which allowed the creation of financial and industrial groups, none were registered in the country. It is quite difficult to estimate the efficiency of financial and industrial groups in investment provision of innovative development in Ukraine because of the nontransparency of such structures, the lack of statistical check of their activity, incomplete and fragmentary data.

Banks only fragmentary participate in the investment provision of innovative development, which is explained by the short-term character of their resources, imperfection of banking laws and a high risk level of such operations The low level of bank activity in relation to investment in innovations is caused by the fact that most Ukrainian banks have a small size of capital (the capital level of all Ukrainian banking system

corresponds to the level of capital of one middle-sized bank in California or one big bank in Central Europe. The financial potential of Ukrainian commercial banks is five times smaller than the potential of commercial banks in Russia and 200 times smaller than in Japan.

Nowadays the national economy sustains significant losses because of the absence of favorable conditions for innovative development. The introduction of innovative strategies can not be carried out without solving the problem of their financial provision. For this reason considerable attention should be paid to the formation of effective innovative policies, as the future development will be determined by the level of innovative activity and its financial provision. The problem of providing financial resources needed for realization of innovative activity can only be solved when various sources of financing (state and free market of capital) are used.

TRAITEMENT THERMIQUE DES METAUX

Katkalo Bogdan – Sumy State University, group TM 92
Adviser Aleksakhina Tatiana

L'équipement pour la découpe du métal thermique a longtemps été indispensable dans la construction et de fabrication. Habituellement, ce terme implique un atome d'oxygène (oxycombustion) ou de la technologie plasma: ils ont leurs usages, avantages et inconvénients. Oxycoupage est habitué à travailler avec faible teneur en carbone des nuances d'acier, dans les cas où la qualité des bords déchiquetés n'est pas une priorité absolue. Par exemple, pour couper des tuyaux ou des poutres métalliques en cours de construction. Le procédé est basé sur le fait que le métal chauffé dans l'incendie selon l'une quelconque gaz inflammable et d'oxygène mélange est brûlé dans un courant d'oxygène commercialement pur. En outre, l'oxygène pour le mélange air-combustible est alimenté

séparément de l'oxygène de coupe. Mais le bord de la coupe après le travail, doivent généralement être nettoyés à partir d'oxydes, et coupe de précision trop faible.Le métal doit satisfaire à certaines spécifications: température de fusion doit être supérieure à la température de fusion d'oxydes et la température d'inflammation du métal dans l'oxygène. En outre, l'oxygène ne peut pas être coupées avec des métaux à haute conductivité thermique et la fluidité faible.

Découpe au plasma a ses avantages. Le processus est beaucoup plus simple, n'a pas besoin des bouteilles d'oxygène lourds, et la précision et l'exactitude de la coupe est beaucoup plus élevé. Habitué à travailler pour les métaux à faible carbone et aciers alliés, ainsi que la non-ferreux et alliages divers. Vaste, facile à utiliser et une précision élevée de découpe au plasma préférable dans de nombreux cas.

THE LASER INTERFEROMETER SPACE ANTENNA

S. Klochko – Sumy State University, group IN-02
S.H. Zolotova – EL Adviser

The Laser Interferometer Space Antenna (LISA) is a planned space mission to detect and accurately measure gravitational waves from astronomical sources. LISA was originally conceived as a joint effort between the United States space agency NASA and the European Space Agency (ESA). However, on April 8th 2011, NASA announced that it would likely be unable to continue its LISA partnership with the European Space Agency, due to funding limitations. ESA is planning to begin a full revision of the mission's concept, renamed the Next Gravitational -Wave Observatory (NGO), with selection of the winning Cosmic Vision L-class mission candidate due in February 2012.

If launched, LISA will be the first dedicated space-based gravitational-wave detector; it will measure gravitational waves by using laser interferometry to monitor the fluctuations in the relative distances between three spacecraft, arranged in an equilateral triangle with 5-million-kilometer arms, and flying along an Earth-like heliocentric orbit.[3] Passing gravitational waves create oscillations in the inter-spacecraft distances, as measured by light, in directions transverse to the direction of wave propagation. LISA will be sensitive to waves in the frequency band between 0.03 milliHertz to 100 milliHertz, including signals from massive black holes that merge at the center of galaxies, or that consume smaller compact objects; from binaries of compact stars in our Galaxy; and possibly from other sources of cosmological origin, such as the very early phase of the Big Bang, and speculative astrophysical objects like cosmic strings and domain boundaries.

TOP 7 'INVENTIONS' THAT CHANGED THE WORLD

I. O. Korsun – Sumy State University, group IN-02
S. H. Zolotova – EL Adviser

Scientists, from the British Science Association, have drawn up a list of the top 5 things that have changed the world.

1. GPS Technology

Originally developed as a navigation system by the United States military, the Global Positioning System uses a network of satellites around the Earth to pinpoint the exact position of a receiver anywhere on the planet. It is now used in cars, aircraft and boats. Geologists use it to track the movements of continental plate tectonics and glaciers while conservation scientists have tagged turtles with GPS receivers to follow their epic migrations.

2. The Bar code

These boring sets of black and white lines can now be found on almost every single item bought from a shop. At first glance, it seems hard to see how they possibly made any impact on the world, but they have fundamentally changed the way we shop. Norman Woodland first developed an early form of the bar code in 1949 by combining ideas from movie soundtracks and Morse code to help him speed up store checkouts.

3. Social Networking

Around the world, every day, more than three billion minutes are spent by computer users on Facebook. Along with other social networking sites such as MySpace and Twitter, it has completely changed the way we interact and who we interact with. Millions of people now communicate tiny details of their professional and personal lives by poking, twittering and posting. Online social networking has allowed people to rekindle friendships with friends they lost touch with years ago.

4. Text messages

Text messaging has created a new vocabulary and new grammar that is almost incomprehensible to those who do not use it. LOL and FYI have now passed into everyday English. It has also changed the way people use their thumbs – the old QWERTY keyboard layout suddenly became redundant..

5. Electronic Money

In the UK there were 7.4 billion purchases made during 2008 with plastic cards. Combined with internet banking, cards have made the cheque almost redundant. Credit cards gave us greater convenience for spending, greater security and the ability to spend money anywhere in the world. They also brought us internet fraud and record levels of debt that have contributed to the global credit crunch.

HEAT TREATMENT OF NODE ROD-EARRING

V.E. Kotenko – Sumy State University, group MT-71
M. N. Dunaeva – EL Adviser

Node rod-earring is designed to transfer the translational motion of the crank mechanism in piston engines and compressors. It is operated in a fairly harsh conditions and hostile environments, so to ensure its functionality and reliable operation requires a high surface hardness and wear resistance with a fairly viscouscore, corrosion resistance, high accuracy and quality of the surfaces of the executive. The efficiency of node rod-earring is determined by the condition of the surface layer.

One of the most effective ways of hardening the surface is anion-plasma nitriding.

Plasma nitriding, also known as ion nitridin gis an industrial surface hardening treatment for metallic materials.

The most important benefits of ion-plasma nitriding are:

- high rate of saturation;
- possibility of regulating processing settings and through this - structure, phase composition, hardness, durability and roughness;
- a high cleanliness level the surface;
- reduction of length of nitriding (in 2- 2,5 times);
- the process is not toxic.

Currency of my work is development technological variants of nitriding processes that provide the formation of a definite structure and phase composition of the nitrided layer for the desired physical and mechanical characteristics of node rod-earring.

The most appropriate grade of steel for node rod-earring is steel H2MYA38.

Heat treatment of this steel includes:

- quenching from the temperature above the point A_3;

- warming to the temperature 620-640 ºC;
- nitriding at the temperature 540-550 ºC. During this process nitrogendiffuses into the surface of a metal to create a case hardened surface.

As a result ofthe workwe investigated the influenceofion nitridingon the structure, microhardness, toughness and impactresistance ofselectedsteel.

BANKRUPTCY PREDICTION AS ONE OF THE IMPORTANT AREAS OF FINANCIAL STABILITY ENTERPRISE

Ye.V. Kovalenko – Sumy State University, group E-72
L.Ya. Khmelyk – E.L. Adviser

Bankruptcy prediction is a study for measuring financial problems of the firms. The bankruptcy of any company has potentially significant consequences not only for itself, but also for those ones doing business with it. The consequences of a large company's bankruptcy can be especially devastating, because it affects not only many other businesses and individuals, but it also affects its suppliers and other business associates.

It is possible to point out some key indicators that can be used in predicting corporate bankruptcy: 1) net income to total assets; 2) total liabilities to total assets; 3) quick ratio; 4) retained earnings to total assets; 5) working capital to total assets; 6) debt to equity, etc.

Financial and operating deficiencies pointing to financial distress include: 1) significant decline in stock price; 2) inability to obtain further financing; 3) inability to meet past-due obligations; 4) movement into business areas unrelated to the company's basic business; 5) a high degree of competition, etc.

There are various models developed by economists which can help you in predicting the financial well-being of firms. These models provide early warning signals so that a potentially disastrous situation can be averted. Discriminant analysis is the most important instrument for early warning of bankruptcy and method of predicting bankruptcy. There are univariate (model Bivar, Weibel and others) and multivariate discriminant analysis (Altman, Lis, Tafler, Springate, Fulmer, Tereshchenko, and others). In Ukraine they use multiple analysis techniques, but most of these methods are meaningless, as they do not take into account industry characteristics and do not contain the appropriate "keys" of interpretation.

The ways to avoid financial problems include: 1) merging with another financially stronger similar company; 2) selling off unproductive assets; 3) deferring the payment of bills; 4) increasing fundraising efforts and contributions; 5) applying for grants, etc.

Today the process of bankruptcy prediction is accelerated with the use of modern technology. Data that would have taken weeks or even months to assemble can now be collected in a matter of hours or days. But financial health prediction and risk assessment are still beyond of the reach of most companies. The task of predicting financial stability is extremely difficult even using the most sophisticated systems and technologies.

The number of the known companies which positions seemed unshakable has become bankrupt during the last years. Why did it happen? Usually the reason was that their management had no prediction gift in general. A lot of people have overslept the internet and "figure" arrival, some simply did not understand that it is impossible to continue working as before. As an example, we can name a few major international companies which went bankrupt: Borders (2011), Kodak (2012) and Elpida (2012).

In conclusion we can say that bankruptcy prediction is a helpful tool for a business operation. By using criteria similar to ones used by lenders, it is possible to determine if the business is moving in a direction increasing potential for bankruptcy. Analyzing the data used for the prediction can help any company develop new operational strategies that minimize the potential for bankruptcy, and ultimately allow the business to remain profitable for a long time.

MOLECULAR NANOTECHNOLOGY

Loboduk Marina – Sumy State University, group FE01
Adviser Aleksakhina T.A.

Molecular nanotechnology (MNT) is a technology based on the ability to build structures to complex, atomic specifications by means of mechanosynthesis.

Mimicking nature is a recurring theme in nanotechnology and molecular nanotechnology, inspired by the natural nanostructures found in our own bodies, offers many exciting potential outcomes.

One proposed application of MNT is so-called smart materials. This term refers to any sort of material designed and engineered at the nanometer scale for a specific task.

This is the idea of self-healing structures, which would repair small tears in a surface naturally in the same way as self-sealing tires or human skin.

This is medical nanorobotics or nanomedicine, an area pioneered by Robert Freitas in numerous books and papers. The ability to design, build, and deploy large numbers of medical nanorobots would, at a minimum, make possible the rapid elimination of disease and the reliable and relatively painless recovery from physical trauma. Medical nanorobots might also make possible the convenient correction of genetic defects, and help to ensure a greatly expanded healthspan.

However, mechanical medical nanodevices would not be allowed (or designed) to self-replicate inside the human body, nor would medical nanorobots have any need for self-replication themselves since they would be manufactured exclusively in carefully regulated nanofactories. A fear exists that nanomechanical robots (nanobots), if designed to self-replicate using naturally occurring materials (a difficult task), could consume the entire planet in their hunger for raw materials, or simply crowd out natural life, out-competing it for energy.

FORMGEDÄCHTNISLEGIERUNG

A.Myslywtschenko, die Gruppe MT-71
I. Saizewa, Berater der deutschen Sprache

Formgedächtnislegierungen (FGL, englisch shape memory alloy, SMA) werden oft auch als Memorymetalle bezeichnet. Dies rührt von dem Phänomen, dass sie sich an eine frühere Formgebung trotz nachfolgender starker Verformung scheinbar „erinnern“ können.

Die Formwandlung basiert auf der temperaturabhängigen Gitterumwandlung zweier verschiedener Kristallstrukturen (allotrope Umwandlung) eines Werkstoffes. Es gibt die Austenit genannte Hochtemperaturphase und den Martensit (Niedertemperaturphase). Beide können durch Temperaturänderung ineinander übergehen (Zweiwegeffekt). Die Strukturumwandlung ist unabhängig von der Geschwindigkeit der Temperaturänderung. Zur Einleitung der Phasenumwandlung sind die Parameter Temperatur und mechanische Spannung gleichwertig; das heißt die

Umwandlung kann nicht nur thermisch, sondern auch spannungsinduziert herbeigeführt werden.

Ein bekannter Vertreter für diesen Strukturwandel ist u. a. Eisen bzw. Stahl. Allerdings besitzt Stahl kein Formgedächtnis, es muss daher noch eine andere Bedingung erfüllt sein. Formgedächtnis-Legierungen brauchen in jedem Kristallsystem eine Reihe gleichberechtigter Schersysteme, die sich aus der Raumsymmetrie der Elementarzelle ergeben. Sind alle Scherungen bei einer Umwandlung gleich verteilt, ist keine äußere Formänderung zu erkennen. Werden aber beispielsweise durch äußere Kräfte nur einige Schersysteme bevorzugt, werden Formänderungen beobachtet.

MOVING FORCES OF TECHNOLOGY

Y.O. Nadtochiy – Sumy State University, group M-11
L.Y. Khmelyk – EL Adviser

We live in the world of technological devices. In the XX century people discovered, designed and invented as much as never before. And technology doesn't seem to slow down its victorious march. People speak a lot about advantages and disadvantages of technology but what makes it develop so fast? To my mind there are two main forces that move technology forward. They are curiosity and laziness. These are two main features of peoples' character that will always help us to discover new things and to invent new devices.

Driven by curiosity people have built submarines and space shuttles. They just wanted to see what was beyond the point they could reach. But let's not forget that curiosity killed a cat. There are still a lot of different things in this world we don't even know.

People often behave like children playing with the forces they can't manage. That's the main problem of invention. You do whatever you would like to get what nobody got before and you can never be sure of the result. It is fun and challenging when you're trying to invent a never-ending pen, but it frightens when it comes to Hadron Collider.

Curiosity is a great force – a wonderful power that makes serious scientists do crazy things and leads them to success despite all the problems. It often boarders with insane and brings troubles to society, environment and first of all to inventor himself, but can never be stopped.

People are very active when they are curious in something but they are very lazy by their nature. In common technology is the thing that makes our life easier giving us time to do what we want to do leaving what we must for different tools and devices.

Nobody wants to do the hand wash or go 300 km on foot from one town to another. We prefer to have washing machines and to travel by car or a comfortable train. We type on the computers what check spelling of the words instead of using dictionary.

Technology is developing fast. Different devices change each other improving our life and making it easier. People work without leaving their homes, machines function automatically operated by robots; smart computers solve scientific problems and entertain us. People need lots of high quality goods to be produced to satisfy their endless needs but they start to lose their qualification in crafts.

Another problem is that in the age of highly developed communications we forgot how to communicate. Having all the faxes, cell phones, computers connected to the Internet and other electronic devices, we don't need to go to the post to send a letter and then wait a few months to get an answer. But we don't need to leave a flat to talk to the neighbor either.

And that is where a vicious circle begins. People develop technology to have more time for themselves. But they spend it in the web doing nobody knows what or playing computer games instead of football or hockey. Teenagers often see their friends only in the pictures of the accounts in the social networks. People become addicted to high-tech.

Laziness brings more laziness and we start looking for the way to improve the technology to make our life easier even more.

It all sounds scary and seems like there is no way out of this situation. But it's not true. We can talk hours about pollution, harm and addictions but it is really hard to give up using technological achievements because they are everywhere. We are used to them and can't imagine our life without them. The only thing we must remember is that things were made for us and not vice versa.

Technology is great when you have a right attitude to it. And it's always better to have more curiosity and less laziness in your life.

DER EIGENTLICHE TECHNISCHE FORTSCHRITT: TECHNOLOGISCH-INVESTIVER FORTSCHRITT

L. Nikolajenko,Aspirantin
I. Saizewa, Berater der deutschen Sprache

Der originäre, technologisch-investiv geprägte technische Fortschritt - der technische Fortschritt gemeinhin – kennzeichnet den Wachstumsschub, den ein bestimmtes technisches Fachgebiet innerhalb einer bestimmten Zeitspanne als Folge eines neuen, wirkungsvolleren technischen Objektes (technisches Verfahren oder technische Anordnung) erfahren hat.

Der Begriff „technischer Fortschritt“ entstand erst im 19. Jahrhundert. Der „Technische Fortschritt“ ist dennoch nach wie vor ein unverzichtbares Kriterium für objektive Werturteile über die Tragweite von technologisch-investiven Ergebnissen.

Aus den Messwerten - der Zeitspannen und der technische Wirkungen - des technischen Objektes, das als vorletztes und damals als wirkungsvollstes aufgetreten war, und des Objektes, das danach und damals als wirkungsvollstes erschienen war, sowie des neuen, zu bewertenden Objektes ergibt sich eine Bewertungszahl (ein Tangentenverhältnis). Die Zahl ist ein Maß für die Größe des Fortschrittes.

Ein naturwissenschaftlicher Fortschritt tritt immer vor einem technischen Fortschritt ein. Beide Fortschritts-Kriterien ermöglichen objektive Erfolgsnachweise von grundlegenden oder angewandten Forschungen, von konzepttechnischen oder produkttechnischen Entwicklungen, von naturwissenschaftlichen Entdeckungen, von naturwissenschaftlichen Erfindungen oder von wissenschaftlichen Fehlernachweisen.

THE RELATION OF FOREIGN STUDENTS TO THE PROBLEM OF HIV/AIDS

Piddubna A.I – Sumy State University, postgraduate student
Marchenko D.O. - E.L. Adviser

HIV infection/AIDS - is a global problem of mankind. Therefore it's correct to speak about the importance of HIV infection in the medical practice of any speciality.

The aim of the study is to assess the awareness of foreign English-speaking medical students about HIV/AIDS, as well as an analysis of the degree of tolerance for future medical stuff towards HIV-infected individuals.

To solve these tasks a questionnaire of 29 items was developed, each of which contained from 3 to 6 answer variants. The questions dealt with the etiology, pathogenesis, diagnosis, treatment and prevention of HIV infection.

54 foreign students with the age range from 21 years to 31 years were questioned, among whom there were 36 males (66,7 %) and 18 females (33,3 %). The students were from Tanzania, Kenya, Nigeria, India, Zambia, Syria, Egypt, Cameroon, Malaysia, Sudan and Rwanda. More than 50 % of the respondents gave the correct answers to general questions. Incorrect responses regard to the question of contact with potentially hazardous biological materials. They were recorded in 9 students (16,7 %). It was noted that 5 (9,3 %) respondents indicated the need for isolation of HIV-positive individuals in the society, which suggests the presence of discrimination towards people living with HIV among future health professionals.

Foreign medical students are knowledgeable about HIV/AIDS. It is necessary to strengthen the control of students' knowledge concerning the actions of medical personnel in emergency situations, to focus more on bioethics itself,

including the inadmissibility of stigma and discrimination against HIV-infected individuals in the society.

DEVELOPMENT OF ALGORITHM FOR CONSTRUCTION MIDDLE-MANAGERS INCENTIVE SYSTEM

A.O. Poznanska – Sumy State University
S.G. Zolotova – EL Adviser

The role of middle management will certainly increase while transiting to an innovative way of factory management. We need to increase the productivity of middle-managers. Then the performance of an enterprise will grow. How can we do it? With the help of quality incentive system of labour for middle-managers.

At first, let's determine the main functions of middle managers. There are:

1) Support for customer satisfaction;
2) Support of corporate loyalty and "fighting spirit";
3) Recruiting and team building;
4) Sales and effectiveness;
5) Innovation;
6) The implementation of the senior-management's vision.

Therefore manager must possess the following knowledge such as management, marketing, financial management, personnel management, team building, effective business communication, time management (including planning) and delegation.

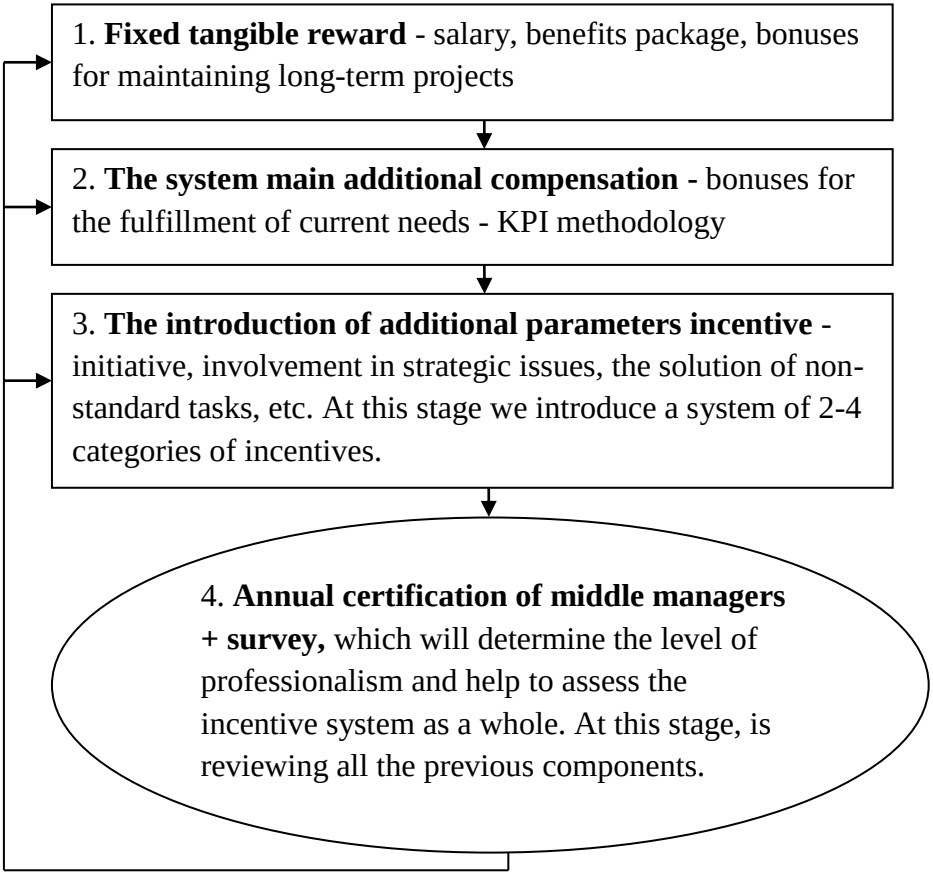
So, how to encourage middle managers to maximize their productivity?

In fact, we can identify the categories in every incentive system. They are:

1) Financial and economic incentives;
2) Professional and labour incentives;

3) Prestige and social status;
4) The incentives associated with career advancement (non-material incentives).

On the basis of these categories and the mail functions of managers we have developed following algorithm for constructing incentive system – scheme 1.



Scheme 1 - Algorithm for constructing incentive system

This algorithm is not ideal, but it can be a good example how to organize the process of constructing the incentive system.

INTELLIGENCE DECISION SUPPORT SYSTEM FOR DIAGNOSTIC ONCOLOGICAL DISEASES

M.S. Rudenko – Sumy State University, Postgraduate student.
S. Zolotova – E L Adviser

Oncological diseases are the leading cause of death in the world and costs more in productivity and loss of life than any other illness. With the increase in the aging population and changes in lifestyle behaviour, the incidence of cancer is on the rise globally in economically developed and developing countries. The majority of the suits reviewed concerned breast cancer. There are several reasons for this. First, the tumours in these cases were most frequently discovered by the patients themselves. Any physician delay in securing prompt diagnosis and treatment is readily apparent to the patient. Second, physician misinformation remains common.

Breast lesions cannot be adequately evaluated either by palpation or by mammography alone. In one case, the doctor conscientiously followed a patient for two years, recording a clinical diagnosis of fibroadenoma repeatedly, until the enlarging mass was finally biopsied, and the cancer was revealed. Similarly, it must be recognized once and for all that a negative mammogram does not exclude the diagnosis of breast cancer. Because false-negative findings occur, therefore, all clinically suspicious lesions must be biopsied. Furthermore, images visual estimation, gained by biopsy method, is too complex and it is required considerable experience and high qualification and level of skill from physician-oncologist for recognition disease.

The aim of study is to develop intelligence decision support system (IDSS) for oncopathology diagnosis, in bounds of information-extreme intelligence technology (IEIT), on basis of analysis of morphological tissue images. IDSS assume recognition 3 basic oncological diseases, which are typical for

daily clinical practice and occur very frequently. These classes are the following: fibroadenoma, mastopathy and cancer.

Single typical image of oncological disease was selected from one person. 90 persons were used to form the learning dataset. Each class of recognition has 30 realizations enabled to build a representative learning sampling. After the processing of the image in polar coordinates, multi-dimension learning matrix was formed in which every line involves 600 signs, describing the brightness of red, green and blue color.

This conception was implemented on the basis of IEIT with optimization of control tolerance for the recognition of signs. The basic idea of learning means the transformation from a priori fragmentation of sign space to non-fuzzy fragmentation of classes.

After the formation of learning matrix the algorithms of learning and parallel optimization of the control tolerances system were implemented, that enabled to build faultless error-free decision rules.

In the examination mode the recognition system must make (with reliability close to asymptotical) decision about belonging the image to the proper class from the alphabet, formed at the learning stage.

Such approach, either for therapy or for simple improvement will help to treat patients and increase diagnostic possibilities.

NEXT GENERATION OF CREDIT CARDS

K.V. Sayeva – Ukrainian Academy of Banking, group EC – 02
I.V. Sokolova – E L Adviser

Nowadays there is a new tendency in the world of credit cards. Static plastic cards are in the past, cutting-edge card manufacturers are literally changing the face of credit cards to make them something they've never been before: interactive.

Cards were born from cardboard, they've been 'mag striped' and 'chipped' and now we enter their silicon age, with an LCD display and touchpad, opening up a multitude of possibilities.

Credit cards of next generation have a complete computer architecture. There are over 70 electrical components squeezed into one-tenth of a cubic square inch of volume.

In the near future, credit cards may contain a tiny powered LCD screen programmed to display single-use passwords, account balance and eventually even a three-dimensional, 360-degree video of you for identification purposes. It may even speak in host's own voice.

The card of next generation looks like standard-issue debit card with two additions to its face: a small rectangular LCD screen in the upper right corner and an integrated "press" button in the lower right. Press the button and the card generates a one-time pass code that helps prevent fraud in card-not-present (CNP) online and telephone transactions.

The new cards are as thin and flexible as a typical credit. They are also scratch resistant and waterproof. One thing they do not have is one-type-fits-all characteristics.

These cards have multiple accounts. In order to select an account, all you do is press a button, and when you press a button it lights up, you rewrite all 1200 bits of data to that magnetic stripe, so you can swipe it in a traditional reader.

In additional, new technologies shore up card security. A host of new anti-fraud technologies join display screens to make it easier for card issuers to thwart fraud.

The new multilayer strategy involves embedding the various substrate layers of a laminate card with features that work together to make verification easy, but replication difficult. These include:

1. Color-shifting inks and films, similar to those in use on some U.S. currencies.

2. Microtext: the microscopic print in these background layers are only legible under certain magnifications.

3. Holograms: useful for instant visual verification.

4. Ultraviolet inks: popular on national ID cards, this technology only shows up under a UV light.

5. Retroreflective images: these images only appear under a focused light source.

6. Floating images: these images seem to be suspended or "float" below the surface of the card.

Lenticular printing, the process whereby different print layers make an image appear to move when the card is tilted, has largely been used for marketing purposes. But it also may have a role in the multilayered approach to card security.

To sum up, credit cards of new generation contain some elements of computer architecture. This will help people to make financial operations easier and secure.

GADGETS IN FUTURE

E.A.Semenenko - SumyStateUniversity, groupIP-11
A.M.Dyadechko - E LAdviser

Morph-one of the leading manufacturers of mobile phones, Nokia introduced the concept of mobile phone of the future Nokia Morph, which was developed in conjunction with the University of Cambridge. The uniqueness of the concept lies in the fact that it involves the use of nanotechnology. But potential buyers it should surprise its broad functionality, flexibility and most importantly body. The flexibility will allow Nokia Morph transform it into various forms, including the bend, stretch and fold. Flexible color touch screen covers the entire surface of the Nokia Morph, a body made of flexible nanotelefona transparent plastic. In addition, the surface of the concept is waterproof and self-cleaning.

Flying phone- thanks to special magnets built into the charging dock, the phone levitates in the air. But that's not all. When the phone receives a message or receives a call, text and icons on the screen take on three-dimensional look.

Reference device-his user moves the gadget to the object of interest, or text, select the desired portion of it and then gets help information. When the traveler being in an unfamiliar place, would get their "gadget of the future", and for example, will bring to the unfamiliar building, landmark, a guide, defining the outlines of the building will bring all the information about him, plus another show like attractions on the map in the environ , load the card, and possibly auudio-guide

SWYP (See What You Print) printer- is an idea conceptualized by designers at Artefact. It raises the bar in printing devices. It utilizes touch screen to perform all tasks from editing to printing. As the display is standardized to the printer, users can get a preview of what precisely will be

printed out. The touch screen will be employed to see the sample of the contents and alter them before printing such as deleting unnecessary printing spots off the screen. Margin and scaling may also be fine-tuned with a lone tap of the display. The touch screen printer boasts of connectivity features such as wireless connection to one's phone or camera. Photos from social network sites like Facebook and Flickr can be printed directly. The home screen can be modified to make a system for online resources. A camera may be directly linked to the printer wirelessly to choose images and revise them before printing. The printer may be placed above the PC to edit and save all the display contents. The ink icon features the ink levels and other printer concerns.

Cornucoppia- MIT Media Lab's creation concept of a printer that can "print" real food. According to the developers of the concept, the miracle of the printer to offer "real control over the quality and preserve all the nutrients of products."

iDropper - wonderful stylus pen for an intuitive connective experience on mobile devices. Gadgets like smart phones, laptops, and PDAs, form the essence of our environment these days and the intuitive iDropper interface allows you to connect fast and move data between devices in a jiffy. Modeled on the eyedropper, this new-age thing allows you to "suck in" and "spit out" information such as a mobile application, text, or an image. This easy step eliminates the complexities of existing transmission process between devices to an intuitive eyedropper method. This device will be released no earlier than 2050.

AIO Card-a super thin, credit-card shaped device, the AIO Card is powered through its solar panels and has an e-ink-like display, allowing for touch screen capabilities, fairly high resolution, and incredibly low power consumption. The device will run over wireless, allowing all your data and applications to remain stored on a server. You are granted instant access to

whatever you need through the integrated Bluetooth and WiFi connections. Moreover, the AIO Card will reportedly have all your favourite multimedia functionality (almost limitless storage for your MP3s, take that Apple), provide you with access to your favourite web application (according to the pictures, it looks like it can run Firefox), and even act as a GPS unit.

Sony Nexter- developed to be worn as a bracelet, this computer concept is constructed out of a flexible OLED touch screen. Earmarked for the year 2020, features like a holographic projector (for screen), pull-out extra keyboard panels and social networking compatibility, make the concept plausible.

Samsung Amoled- The Super AMOLED displays actually use the PenTile matrix, which takes a lot of heat at the moment for the bad quality on the Droid 3, however the new Super AMOLED Plus and HD are back to the usual RGB pixel arrangement, that is why the quality is a lot better. Obviously, the pixels are organic and self-lit, which means that the contrast ratio is next to none, while overall the displays are more energy efficient, brighter and reflect less sunlight.

UPGRADE OF INTEGRATED MARKETING COMMUNICATIONS TO PROMOTE THE «SSU MANAGEMENT OF INNOVATIVE ACTIVITY»

Y.A. Timokhina – Sumy State University, group MK-72
L. Ya. Khmelik – EZ Adviser

Integrated marketing communications (IMC) is defined as customer centric, data driven method of communicating with customers. This method is the coordination and integration of all marketing communication tools, functions and sources within a company into a seamless program that

maximizes the impact on consumers and other end users at a minimal cost.

This management concept is designed to make all aspects of marketing communication such as advertising, sales promotion, public relations, and direct marketing work together as a unified force, rather than permitting each to work in isolation. IMC components that can be used to promote «SSU Management of innovative activity» are: the foundation - corporate image and brand management, buyer behavior, promotions opportunity analysis; advertising tools - advertising management, advertising design, theoretical frameworks and types of appeals, message strategies, advertising media selection. Advertising also reinforces a brand and a firm image; promotional tools - trade promotions, consumer promotions, personal selling, database marketing, and customer relations management, public relations and sponsorship programs; integration tools - Internet marketing, IMC for small business, evaluating and integrated marketing program.

Integrated marketing is based on a marketing plan that consists of situation analysis, marketing objectives, marketing budget, marketing strategies, marketing tactics, evaluation of performance. This plan should coordinate efforts in all components of the marketing mix. According to IMC concept all forms of communications and messages are carefully linked together. So we can maximize the impact on university applicants at a minimal cost using all components of marketing communications.

MODERN TECHNOLOGY, ADVANTAGES AND DISADVANTAGES

K. D. Trakhtenberg – Sumy State University, groupJIC – 103
I. M. Terletska – E L Adviser

Nowadays we create technology, but technology also creates us. Today technology has advanced in tremendous leaps and bounds. Technology can be defined as science applied to practical purposes. Nowadays when the rapidness of development and research is impressive, it is easy to think about the advantages of modern technology. Nevertheless some people argue that science can destroy mankind. It is also obvious that we are close to era where technology is limited only by our imagination. Therefore the most frequently asked question is: Does technology go the right way and will it save or ruin our civilization?

Technology today has made life better and quicker In our modern society people can't see themselves without computers, cell phones, voice mail etc. The technological progress makes our society more convenient and safe. Making impossible things possible are similar features of the changes which previous people have experienced: like shifting from a hunting society to an agricultural society and establishing a commercial society due to the invention of new tools. To consider these advantages and change of society, modern technology, which we use today, might be not only a new tool but also the tool, which makes a dramatic change in history. So, the contribution of modern technology to society should not be eliminated and should be distributed evenly.

As there are so many advantages from highly developed technology, there is also a great deal of disadvantages. One disadvantage is that as technology develops, robots and machines will take over many jobs and people will lose their jobs by contract. As people lose their jobs, they will have hard

time getting money which would make it hard for them to continue to meet living expenses. Moreover, as people use less money the economy would be difficult to control and, especially if it is a large country, the problem will influence the world greatly.

Another disadvantage of highly developed technology is that machines and robots are complex. It is hard to activate all the machines you have unless you can give multitasks. Think about it, if most people have trouble on computers and almost all of us don't know the actual limit of computers' abilities, how will us, normal people, work with all the robots and machines? Moreover, just like computers, robots and machines will easily break and most time you won't know how to fix them and one will have to call someone to fix them. People will lose their temper over this and it will create a large expense to repair them.

Also, the industry despite highly developed machinery pollutes the globe. The world has come a long way ever since, but in an industrialized and mechanized society, things have gone drastically wrong in terms of environmental living quality.

Lastly, do new technologies make us happier? It is not an easy question and each person should consider it.

There are many people that can't see themselves without the new tools of the 21st C. Even as there are many advantages and disadvantages of technology, we personally wish to have a more advanced world with great technologies. It would be so cool to work out all the complicated machines and robots. Don't you think it will be awesome to press just a few complicated buttons that do the labor themselves? In the future it would be more about using your brain and being intelligent than doing the hard labor yourself. We hope these days will come within our lifetime.

WASHING CARBON OUT OF THE AIR

N. M. Udovychenko – Sumy State University, group KM - 91
L. A. Denisova - EL Adviser

The world cannot afford to dump more car-box into the atmosphere. Yes it is cutting back. All indications are that the concentration of CO_2 will continue to rise for decades. Despite great support for renewable energy, developed and developing countries will probably burn more oil, coal and natural gas in the future.

So how are we to keep the CO_2 concentration from rising beyond its current level of 389 parts per million? Unless we ban carbon-based fuels, one option is to pull CO2 out of the air. Allowing forests to expand in area could absorb some of gas, but humans produce so much that we simply do not have the land available to sequester enough of it. Fortunately, filtering machines – think of them as synthetic trees – can capture far more CO_2 than natural trees of a similar size.

Carbon dioxide would have to be captured on a grand scale of curtail climate change, but the basic concept is already well established. For decades scrubbers have removed CO_2 from the air breathed inside submarines and spaceships and from air used to produce liquid nitrogen. Various chemical processes can accomplish this scrubbing, but machines with solid sorbents promise to trap the most gas per unit of energy required. Early, small prototype units suggest that wide dissemination of solid-sorbent machines could stop or even reverse the rise of atmospheric CO_2.

Like their leafy counterparts, air capture machines come in different shapes and sizes. Demonstration units intended to go beyond the laboratory prototypes should each trap from a ton to hundreds of tons of CO_2 per day. Their design being developed by Columbia and Global Research Technologies offers an example of how the technology can work. Thin fibers of sorbent material are arranged into large, flat panels akin to

furnace filters, one meter wide and 2.5 meters high. The upright filter panels will revolve around a circular, horizontal track that is mounted on top of a standard 40-foot (12.2 meters) shipping container. The panels will be exposed to the air. Once they are loaded with CO_2, they will move off the track and down into a regeneration chamber inside the container. There the trapped gas will be freed from the sorbent and compressed to a liquid. The refreshed panel will be moved back up onto the track to pull more gas from the wind.

Many industries use carbon dioxide - to carbonate beverages, freeze chicken wings and make dry ice. The gas is also used for stimulating the growth of indoor crops and as a nonpolluting solvent or refrigerant. Few industrial sources exist, so the price is driven by the cost of shipping.

With the advent of clean energy sources, however, the prize for air capture would be the production of fresh liquid fuel from CO_2 feedstock. As noted earlier, well established technologies such as electrolysis and reverse water-gas shift reactions can produce synthesis gas from CO_2 and water, leading to fuel synthesis. The big cost is the electricity needed.

Until fuel synthesis becomes affordable, humankind will have to dispose of all the emissions it generates. Technologies such as geologic sequestration and mineral sequestration are being developed for storing CO_2 collected at power plants. Air capture can work with the same storage approaches, and machines could be installed at the same disposal sites.

Until clean transportation technologies become significantly more efficient, extracting carbon from the air would allow cars, planes and ships to continue burning liquid fuels, with their emissions captured by far away air collectors. Unlike ozone or sulfur dioxide, CO_2 remains in the atmosphere for decades to centuries, giving it ample time

to travel extensively. An equivalent amount of the gas could even be removed before emissions are released; a car could be made carbon - neutral by collecting its estimated lifetime emission of 100 tons before the vehicle rolls off the assembly line.

Air capture could also be a cheaper way to sequester emissions from power plants, especially older ones not easily retrofitted with flue stack scrubbers or those located far from storage sites. And in a future world in which atmospheric CO_2 concentrations have already been stabilized, air capture could even drive levels down. In effect, air capture can deal with past emissions.

GlOBALIZATION

A.V. Vereschak –Sumy State University, group SU – 11
D.O. Marchenko – E L Adviser

Nowadays millions of people from all over the world feel themselves how our world is becoming global. And they see how globalization interferes with economics, societies, goods and cultures. It, of course, has it's own advantages and disadvantages.

Some people think that globalization is very good for them and for their country. It means that there are several major factors of good effect of it. Firstly, the Internet has become spread around the world and it is possible nowadays to talk to an American, Italian or Japanese friend. Besides, the Internet saves time, energy and helps study. With the help of computers we can get a lot of knowledge because computers are connected to libraries, universities and major research institutions. Secondly, now it is easier to make different operations with money because in today's world there is a universal currency called Euro. We can easily use it in any European country and every bank or shops will take it. Finally,

globalization makes it easier to communicate with each other, because everybody learns one international language. It is very important, because it makes our life easier.

In today's world there is enormous pressure on culture and traditions. It is impossible to say that traditions can be global. But speaking about people's values nowadays, they are humanistic. It is very difficult to persuade nations to live together in peace. And though it is so, there are organizations which try to solve such problems because they don't need the Third World War.

There are problems with education, diseases and politics, but. Anti-globalization protestors are protesting about the dominance.

Globalization plays an important role in my life and in life of everybody in this world not only because that it helps to make a global language but also because it simply unites people from all over the world.

NEW INVENTIONS

V.V. Vlasenko – Sumy State University, group EM – 91
D.O. Marchenko – E L Adviser

Science is all about having an open imagination, not being afraid of making mistakes and asking the right questions. Almost all old and new scientific inventions and discoveries owe their origins and existence to these three essential human attitudes. The development of technology started in the real sense in 1960s and 1970s. There is a short list of few important inventions. There is an attempt to enlist few of the new important inventions. These may not be the greatest inventions of all time, however, they are important in their own right. The descriptions of these inventions should provide a rough idea of their working and especially the importance in today's life.

New Inventions:

1) Digital Pen

A digital pen is one of the new electronic inventions that can help us record information.

Despite the digital age, we still use pens. But it would be great to have our handwritten notes and drawings digitally recorded without having to use a scanner.

A computer pen is a wireless pen that uses a clip-on receiver to digitally record what you write.

It uploads the information to your computer where it can be viewed, edited and filed as a word processing document.

2) Contact Lenses Measure Glucose

A new medical invention has been created by scientists at Harvard Medical School. The new invention is a contact lense that can dispense a regular dose of antibiotics to your eye for more than a month. A biodegradable polymer film is mixed with a medication (antibiotic) and coated with hydrogel, which is the same material used to make contact lenses. The film slowly releases the medication into the eye at a rate of 134

micrograms each day for 30 days. Eye drops are used to dispense most eye medications but they are inefficient. Only about 1 to 7 percent of eye drop medications are absorbed into the eye because most of them out.

3) Electric Eye

The 'Electric Eye' is one of the best inventions of the year 2010 with the potential of providing partial eyesight to blind people. The main component of this device is a chip encased in a titanium cover. It (titanium) prevents water from damaging the chip. The whole device comes in the form of eye glasses fitted with a camera. This camera is used in the transmission of captured images to the titanium covered chip. As the chip receives transmission from the camera, it fires an electrode array present under the retina which in turn does the task of stimulating optic nerves. This new invention can therefore, be considered as one of the most important.

4) Flying car

The flying car is an automobile that can travel on roads and take off, fly and land as an aircraft. If you want to drive the flying car, you must have a driver license and a pilot's license.

5) Teleportation

It was considered one of the major inventions. The success in teleporting information from one atom to other led to this invention It is considered to be important due to the fact that it can prove to be useful in the creation of secure and fast computer systems. It is one of the best inventions of 2010.

All these inventions are known for their usefulness. Such device as the 'Electric Eye' can be of great help to the blind people. Inventions have an especially important value for all people. Important inventions are the technologies of the future. Inventions are opened by new possibilities for humanity. Innovative activity was, is and remains the main motive force of development of humanity.

LINEAR PARTICLE ACCELERATORS

Volk Yurij – Sumy State University, group FE-01
V. E. Pronyaeva — *adviser*

Accelerators are used to obtain microparticles with high energy. This allows to study the smallest details of the matter structure, which cannot be revealed by any other means. Accelerators are essential for basic researches in microparticle physics. Linear accelerators (LinAcs) are the accelerators where particles move along the line. Particles increase their velocity by moving through a series of oscillating electric potentials. First researches were dedicated to direct particles of matter – electrons, protons, neutrons. Accelerators made it possible to obtain microparticles with energy higher than 1 GeV, which revealed new side of our world. Protons and neutrons beyond this barrier are destroyed and new unstable particles born in the collisions. The higher the energy is, the heavier particles are obtained. LinAcs are divided into separate groups: high voltage accelerators, induction linacs, resonance linacs, collective accelerators. Extensive development of linear accelerators is associated with a number of advantages, such as the possibility of obtaining accelerated beam of particles with high intensity and high density and absence of braking radiation. Nowadays linear accelerators are used in many departments of science: physics researches, flaw detection, radiation control, medical diagnosis and radiotherapy.

Accelerators have come to their constructional limit. The significant increase in particle energy would be possible only if the colliders became linear along with effective method of particle acceleration. A laser and laser-plasma thechniques are very promising. Thus, short but powerful laser pulse accelerates particles directly or creates a disturbance in a plasma cloud, which picks up flying bunch of electrons and accelerates it.

Наукове видання

НАУКОВО-ТЕХНОЛОГІЧНИЙ ПРОГРЕС. ПЕРЕВАГИ І НЕДОЛІКИ

МАТЕРІАЛИ

VI НАУКОВО-ПРАКТИЧНОЇ МІЖВУЗІВСЬКОЇ

СТУДЕНТСЬКОЇ КОНФЕРЕНЦІЇ

лінгвістичного науково-методичного центру

кафедри іноземних мов

(Суми,18 травня 2012 року)

SCIENTIFIC AND TECHNOLOGICAL PROGRESS. ADVANTAGES AND DISADVANTAGES

Materials

134

of the sixth scientific practical university student`s conference

of LSNC of the foreign languages department

(Sumy, May, 18, 2012)

Відповідальний за випуск Г. І. Литвиненко

Комп`ютерне верстання С. В. Міхно

Формат 60х84/16. Ум. друк. арк. 7,67. Обл.- вид. арк. 6,50. Тираж 40 пр. Зам. № 583

Видавець і виготовлювач

Сумський державний університет,

вул. Римського-Корсакова, 2, м. Суми, 40007

Свідоцтво суб'єкта видавничої справи ДК № 3062 від 17.12.2007.