MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE

SUMY STATE UNIVERSITY

DEPARTMENT OF COMPUTER SCIENCE

Bachelor Thesis

on the topic:

"MAKING CARTOONS AND VIDEO GAMES"

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Supervisor	**Protsenko O. B.**

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"_____" 2020

Task of Bachelor Thesis

Fourth-year student, group IN-65a specialty "Informatics" Computer programming.

On the topic: "MAKING CARTOONS AND VIDEO GAMES"

Approved by order of the Sumy State University

№_____ of _____ 2020

Contents Explanatory Note: 1) An informational review of the literature; 1.1) Method and lists of Cartoon analysis; 1.2) Theoretical part Concept Cartoon Research; 1.3) Problems and statements ; 2) Programming software; 2.1) Adobe Animate; 2.2) JavaScript Language 3) Development of software; 3.1) Diagrams; 3.2);   Definition/Scription; 3.3) Few lines of code for the project;   Conclusions, References.

Date of issuance of the task

"_____" 2020

Supervisor _____ Protsenko O. B.

Task adopted to be implemented by _____ Kwangu Silupya

CONTENTS

ABSTRACT

Note: 30 pages, 13 figures, 1 table, 15 sources literature, 1 app.

Object of study - making cartoons and video games using Adobe Animate CC 2019 and Java Script.

Purpose - To develop a Cartoon and a Video Game

Research methods - Concept Cartoons research and video game development research.

Results - Software developed and implemented for making cartoons and video games.

ADOBE ANIMATE 2019, PROGRAMMING, GRAPHICS TABLET, LINKING INSTANCES, GAME DEVELOPMENT, ANIMATING, CARTOON RESEARCH, COLOR PALLETS, KEY FUNCTIONS

INTRODUCTION

The project of working on cartoons and video games, is an interesting topic. Most people think it's easy but only a few people know how difficult the process can be sometimes. Animators, Developers, Programmers, Puppeteers and others who make cartoons spend sleepless nights sometimes just to come up with ideas, write storylines, code, draw characters, animate, and so much more.

In today's modern world of technology, cyber communications, online presence and gadgets, Cartoons and video games have gained much popularity amongst people of all ages.

Cartoons and video games have also been used in healing, at certain medical facilities in areas such as stress or depression. They have also been used to communicate secret messages by certain secrete organizations. Some Presidents have even used cartoons during campaigning in order to win youths over.

Studies also show that most companies that use Cartoons or video games to market or make money generate a lot of sells than companies that don't. This is due to research that the average human being spends about 12 hours a day on social media. And most time people are bored and decide to entertain themselves there.

What usually happens is that if a user comes in contact with a video games either by link or via the download page for the video game and decides to download it, the company or developer make a money from it. And most of them like to aim at in in-app purchases. If the user wants to purchase certain items in the video game, unlock advanced new levels or unlock new items, they will have to buy them using their money via online. Through out history cartoons and video games have been a major part in the entertainment world, business world, education system, and healing programs. And studies have shown that these are industries that are blooming.

1 INTFORMATIONAL REVIEW

I chose to work on such a project because this is an area of computer programming that i am most comfortable in and good at. I used to draw a lot when i was younger and once i became an adult i decided to advance into making cartoons and video games.

By using apps like Sketch Ware, Pixlr, e.t.c and softwares such as Adobe Animate 2019, Android studio, Coral draw and others.

To show that i have experience in the field of expertise I taught children at a summer camp how to make cartoons and also taught children at an art school here in Ukraine how to make cartoons. To the extent that the woman who invited me to teach them how to make cartoons, asked me to make her a short cartoon and she entered it into the Euro Vision contest in Paris. It won and she was given an award. She then later on asked me to design her a logo for her at school.

The figure 1.1 below shows the logo i designed using the software Adobe Animate.

Figure 1.1 - The logo i designed using the software Adobe Animate.

To draw the cartoon and art, i would use a mouse and also a graphics tablet. The figure.1.0 below shows the Graphics Tablet which i used during designing and drawing in the software Adobe Animate.

Figure 1.2 -The Graphics Tablet which is used during designing and drawing in the software Adobe Animate.

Project is about making cartoons (animating and drawing) and making video games using computer programming. It involves the use of Adobe Animate CC 2019 and JavaScript. Its a short but interesting project.

Such a project was decided to do because this is were most programmers and engineers rarely touch or talk about but it is of cardinal importance. Cartoons can be made on phone using apps such as 'SketchWare', 'Video show', 'Pixlr', e.t.c. Research was done on how most people or companies like 'Disney', 'Cartoon Network', and 'Boomerang' made their cartoons. Some used old technology to make their cartoons such as 'flip books', 'old computers', 'Rube Goldberg Machine', e.t.c. New discoveries on techniques were brought to light which are explained later on such as 'Exaggeration', 'Cartoon analogy', 'Cartoon irony' and others.

After doing research on the old, research was done on how people make cartoons today and discoveries show how some of them use softwares and

applications such as 'Coral Draw', 'Firebase Google systems', 'Java Script and other Java domains', 'ToonTube', 'Adobe Animate CC 2019' and may others. 'Adobe Animate CC 2019' was chosen and settled for, because it also has 'Java Script'.

1.1 Methods and lists

Cartoon Analysis

Cartoons are mostly used for entertainment, communication and marketing.

Cartoons that are political and editorial can be used in classrooms also. And this can be very beneficial. Cartoons can be used in language arts (language use), art, music, education and social studies (historical, political, interactive, popular events and individuals).

Teachers can use cartoon to do presentations and activities, the cartoons that they create can be also interactive or directive. To create artoons, teachers can use softwares or applications such as 'Adobe Animate CC 2019'(Which is being used to make the cartoons and video games in this project), 'Corel Draw', 'Pixlr' and so many cartoon making applications and softwares. In Adobe Animate CC 2019, you can deduce a cartoon analysis using Adobe Flash technology. Cartoon analysis is the analysing and understanding of cartoon's concepts and ideas, identifying symbols and trying to understand what the cartoonist meant by each symbols. You will need any cartoon making software or Flash player (Adobe Animate) to use the analysis. If you decide to use Flash Player, you will need at least version 8 of Flash Player.

Cartoonists use a lot of persuasive techniques to make cartoons, but focus on

these five common persuasive techniques: exaggeration, labeling, symbolism, analogy, and irony. Here is a brief explanation of each technique:

•Exaggeration - This technique exaggerates the physical properties of people or things in order to express their unique ideas.

•Labeling - This technique labels objects and people in order to make it clear what they are or stand for (for example draw a character and label him 'Boss' and perhaps write on his desk or door office 'Boss').

•Symbolism - This technique uses objects to represent larger concepts or ideas (for example certain cartoons will have ancient war symbols or secret societies symbols in them in order to give credit or acknowledgement)

•Analogy - This technique draws comparisons of two very different things in order to help viewers see things in a different way (for example a dinosaur and a robot, reality and fiction, truth and lies, e.t.c)

•Irony - This technique uses and exaggerates the difference between the way things are and the way things should be.(for example, you might see birds swimming and fish flying in cartoons, when in reality its the opposite)

1.2 Theoretical part

A long time ago the first cartoon to be created where done by making puppets, flipbooks and paintings. Even cavemen of prehistoric times used to make cartoons using paintings on walls,. Years later into the future. Human beings learn't how to make cartoon using the help of machines such as Computers, Advanced Mechanical Puppets for children theaters and many others.

Cartoons have been used to help with the development of mankind and enhancement of business, music, entertainment, psychological and emotional healing and education.

To make cartoons on phone using apps such as 'SketchWare', 'Video show', 'Pixlr'. is possible and is demonstrated in the picture below

Figure 1.3 of end product of application of softwares on phone to make cartoons.

Figure 1.3 - Product of application of softwares on phone to make cartoons

Research on how most people or companies like 'Disney', 'Cartoon Network', and 'Boomerang' made their cartoons. Some used old technology to make their cartoons such as 'flip books', 'old computers', e.t.c.

Discovering some of them use softwares and applications such as 'Coral Draw', 'Firebase Google systems', 'Java Script and other Java domains', 'ToonTube', 'Adobe Animate CC 2018' and may others. 'Adobe Animate CC 2018' would be the best for it because it also has 'Java Script'.

The images below display the end results from the application of softwares such as Adobe Animate on Computers to make them.

Figure 1.4 - Application of softwares on computer to make cartoons

Figure 1.5 - Application of softwares on computer to make cartoons.

Concept Cartoons Research

Cartoons can be a very powerful tool for sales, marketing and communication tools, but if focus is turned to Concept Cartoons. Understand that Concept Cartoons are a way of showing and also presenting scientific ideas.

Teachers use them to teach students how to do certain things or know certain things.(for example learning English, counting and how to do other things) because it is a much easier, simpler and fun way to teach.

Brenda Keogh and Stuart Naylor in 1991 created Concept Cartoons as a strategy to bring out students' ideas, push their ideas to another level and provide

pointers for how those ideas might be made. Proper research gathered and and distributed for using them in teaching, learning and work in classrooms and for adult students such as student teachers. Doctoral studies done by Brigid Downing were included in their research, where the main focus provided more adequate information on pupil talk and reasoning. The focus before for their research concerning Concept Cartoons had been to educate scientifically. Some questions were included:

- When Concept Cartoons are used, how interested are students?

- How good is the strategy for bringing out students' ideas, exploring their ideas and helping them to decide how to execute their ideas?

- How effective does the strategy link together the process of finding out and developing students' ideas?

- How easy is it to use the strategy in teaching science?

- How well do they support reasoning?

- What is conversation and rezoning like when Concept Cartoons are used to teach?

Data were collected through questionnaires, written feedback, interviews, and classroom observation from teachers and student teachers. The main findings show that Concept Cartoons are:

- It's motivating in all age ranges and with learners of different levels of intelligence and understanding.

- Effective at both revealing and challenging learners' ideas, and linking together the process of bringing out and reconstructing ideas.

•Effective in integrating learning and assessment into a single strategy.

•Viewed as very easy to manage in the classroom and potentially offering a valuable strategy for differentiation.

•Able to influence teachers' practice without the need for extensive professional development.

1.3 Problems and statement

Adobe animate is great for making 2D cartoons and video games, but unfortunately cannot make 3D cartoons or video games. It takes ups too much disck space and screen resolution and sometimes when the system is full the program becomes slow, sluggish or crashes.

In one situation, a client asks you the Developer, Animator or Computer programmer to make them a cartoon, And at the end of the Cartoon, A button should be added to send them to the Clients' website. In order to solve this problem, you must find out what the client, needs, every form of detail from background details, color pallets, audio voices, functions of the line of code if needed, cartoon characters, to time duration and so on.

After having received these details, developer must work according to the details and time given to hand in the work. Developer must pay good attention to the clients needs and wants in order not to make any mistakes. To add lines of code in the Cartoon, Developer must open the Action scrip tab in Adobe Animate 2019 by pressing F9, only then can he add lines of code to the animation or cartoon.

Once the work is done and developer has shown it to the Client, the client will then decide if there happy with the work or not. If there happy with the work, the Developer will get paid.

Another situation is that when a Developer builds a game for a client and then the games a problem in functioning. What does the Developer do?

Developer must decompile the APK or go back to the software and begin to go through the lines of code. Once he finds the error in the lines of code or the bug in the APK, developer must correct the mistakes and then recompile the game again. The game must be tested on different platforms and observed for a month or more. After seeing that the game is ok, the developer may send it back to the client.

2 PROGRAMMING SOFTWARE

2.1 ADOBE ANIMATE

Adobe Animate (formerly Adobe Flash Professional, Macromedia Flash, and FutureSplash Animator) is a multimedia engineering and computer animation program developed by Adobe Systems. It supports raster graphics, rich text, audio and video embedding, and ActionScript scripting.

Animate is used to design vector graphics and animation for television programs, online video, websites, web applications, rich internet applications, and video games. The program also offers support for raster graphics, rich text, audio and video embedding, and ActionScript scripting. Animations may be published for HTML5, WebGL, Scalable Vector Graphics (SVG) animation and sprite sheets, and legacy Flash Player (SWF) and Adobe AIR formats.[2]

In 1996 it was released as FutureSplash Animator, Macromedia Flash was what it was renamed upon its acquisition by Macromedia. It was created to serve as the main authoring environment for the Adobe Flash platform, vector-based software for creating animated and interactive content. It was renamed Adobe Animate in 2015 to more accurately reflect its market position then, since over a third of all content created in Animate uses HTML5.[2][3][4]

2.2 JavaScript language:-

JavaScript is a programming language commonly used in game design, cartoon animation and web design. Netscape originally developed it as a means to add dynamic and interactive elements. Like server-side scripting languages, such as PHP and ASP, JavaScript code can be inserted anywhere within the HTML of a webpage.

3 DEVELOPMENT OF SOFTWARE

3.1 Diagrams

The diagram below shows a structure of the development of a video game software. The diagram explains the processes the Developer or producer must go through in order to be successful at developing the software. Each step is simply and carefully explained and thoroughly shown. It shows the procedure in Adobe Animate with JavaScript and explains how a cartoon is transformed into a video game from Developer stage to user stage. From drawing the pictures, to animating them, to writing the lines of code using the F9 key on the system to bring the ActionScript panel, which is JavaScript itself. On this panel lines of code maybe written and executed.
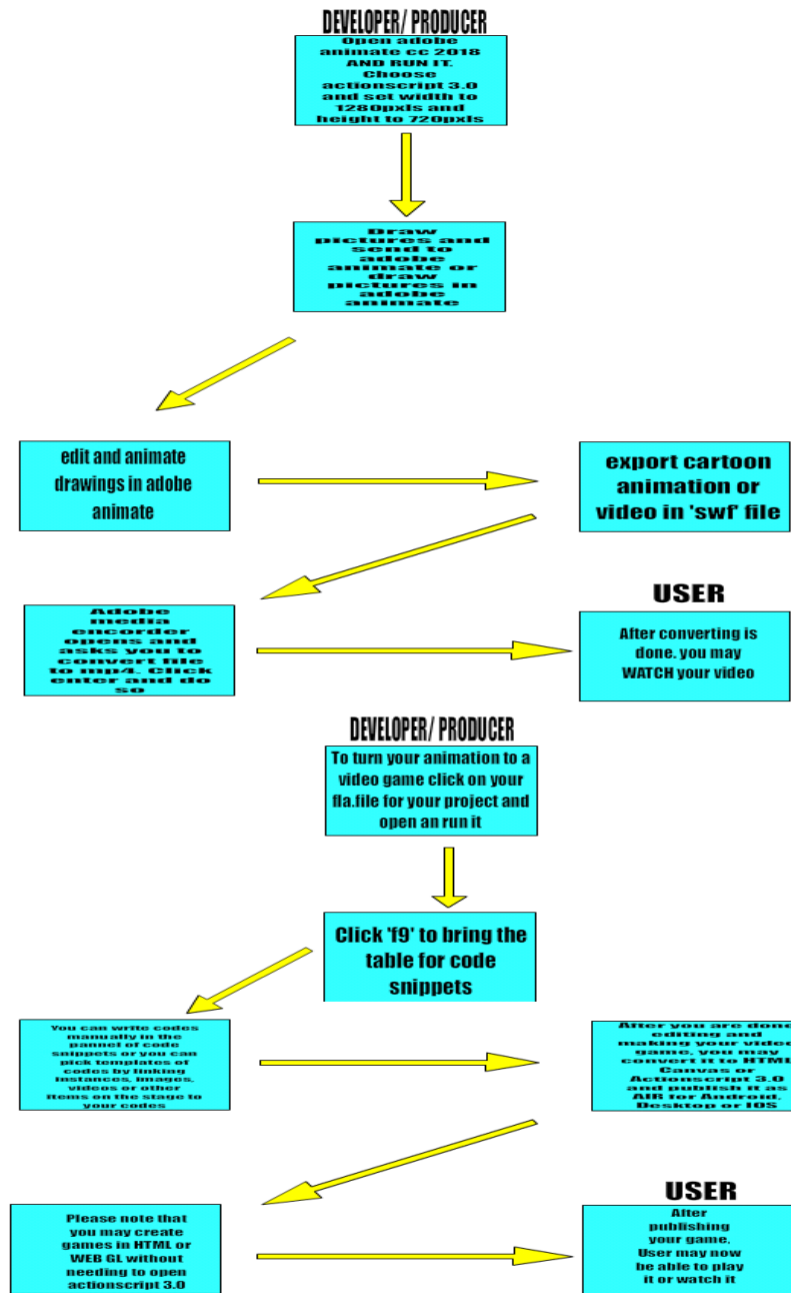
Figure 3.1 - Application of softwares on computer to make cartoons.

3.2 Definition/Scription

The images below show briefly made cartoons and video games using Adobe Animate cc 2019.

Figure 3.2 - An illustration in adobe animate with color pallets color gradients that were coded and in order to create such beautiful art.

Figure 3.3 –An illustration in adobe animate from a different camera angle.

The camera was zoomed in and shown how the image looks like from a close-up view.

Figure 3.4 - A vector illustration in a video game created and coded using Adobe
Animate and Java Script

It took 2 months to create it and an extra month to code it properly.

Figure 3.5 – A scene in a video game created and coded using Adobe Animate and
Java Script

It shows more interaction with the characters and how the game play looks.
It was an interesting and awesome project to work on. Only time consuming and a
little challenging.

Steps to follow-

The process below explains briefly how to make cartoons and video games using Adobe Animate cc 2018 and these are some steps to follow

Developer/ Producer

• Open adobe animate cc 2019 AND RUN IT. Choose actionscript 3.0.

• Set width to 1280pxls and height to 720pxls which is the normal standard for youtube videos or a proper modern television screen.

• Draw pictures and upload to adobe animate or draw pictures in adobe animate.

• Edit, color, add effects and animate drawings in adobe animate.

• Every frame is necessary if user is animating using frame by frame animation, if not user may smoothen animations after every keyframe. A keyframe is a frame that has the main pose of an animation. The rest are just in betweeners or in between frame to make the animation more smooth or clearer.

• Export cartoon animation or video in 'SWF' file. Which is the normal format for exporting in adobe animate.

• Adobe media encored opens and asks user to convert file to mp4. Click enter and do so.

• After converting is done. user may   WATCH your video

-2nd steps to follow for video game part-

Developer/ Producer

• To turn user animation to a video game click on your fla.file for your project and open an run it.

• Click 'f9' to bring the table for code snippets.

•User can write codes manually in the pannel of code snippets or user can pick templates of codes by linking instances, images, videos or other items on the stage to the codes.

•After done editing and making your video game, user may convert it to HTML Canvas or ActionScript 3.0 and publish it as AIR for Android, Desktop or IOS.

•Please note that user may create games in HTML or WEB GL without needing to open ActionScript 3.0.

•After publishing the game, User may now be able to play it or watch it.

•

3.3 -Few lines of codes for the project

A simple drag and drop game was created using Adobe Animate 2019 and JavaScript. Here are the lines of code. Nothing complicated but just simple and fun.

Here are a few screenshots of it and below them the lines of code, The game its self can be ran on any device or computer with Adobe Animate 2019 or Java script with the ability to project and display the images and frames.
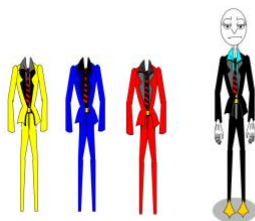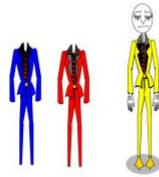

Figure 3.6 - A scene in a video game created and coded using Adobe Animate and Java Script

It shows how the character looks once you drag and drop the **black suit** on the character. The suit can be dragged and dropped using the mouse or any controls on **a phone** or computer.
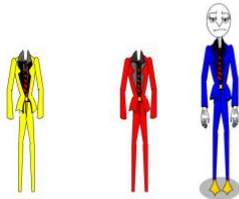
Figure 3.7 - A scene in a video game created and coded using Adobe Animate and Java Script.

It shows how the character looks once you drag and drop the **yellow suit** on the character. Remember the game cannot function without the help of the coding

Figure 3.7 - A scene in a video game created and coded using Adobe Animate and Java Script.

It shows how the character looks once you drag and drop the **blue suit** on the character.
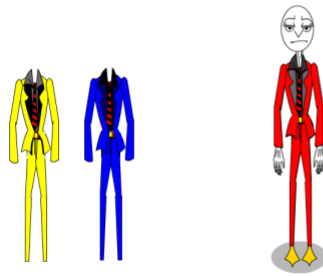
Figure 3.8 - A scene in a video game created and coded using Adobe Animate and Java Script

It shows how the character looks once you drag and drop the **red suit** on the character.

```
/* Drag and Drop
Makes the specified symbol instance moveable with drag and drop.
*/
yellowsuit.addEventListener(MouseEvent.MOUSE_DOWN, fl_ClickToDrag);
function fl_ClickToDrag(event:MouseEvent):void
{
yellowsuit.startDrag();
}
stage.addEventListener(MouseEvent.MOUSE_UP, fl_ReleaseToDrop);
function fl_ReleaseToDrop(event:MouseEvent):void
{
yellowsuit.stopDrag();
}
/* Drag and Drop
```

Makes the specified symbol instance moveable with drag and drop.

*/

bluesit.addEventListener(MouseEvent.MOUSE_DOWN, fl_ClickToDrag_2);

function fl_ClickToDrag_2(event:MouseEvent):void

{

bluesuit.startDrag();

}

stage.addEventListener(MouseEvent.MOUSE_UP, fl_ReleaseToDrop_2);

function fl_ReleaseToDrop_2(event:MouseEvent):void

{

bluesuit.stopDrag();

}

/* Drag and Drop

CONCLUSION

Making cartoons is very useful in today's world. Cartoons are used in education, advertising, entertainment and also in healing people from mental and emotional stress. People often do not realize that 3 quarters of what rules on the earth is mostly programming and a larger part of it goes to cartoons and video games.

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ADDITION

/* Drag and Drop

Makes the specified symbol instance **moveable** with **drag and drop**.

*/

yellowsuit.addEventListener(**MouseEvent.MOUSE_DOWN, fl_ClickToDrag**);

function fl_ClickToDrag(**event:MouseEvent**):void

{

      yellowsuit.startDrag();

}

stage.addEventListener(MouseEvent.MOUSE_UP, fl_ReleaseToDrop);

function fl_ReleaseToDrop(event:MouseEvent):void

{

      yellowsuit.stopDrag();

}

/* Drag and Drop

Makes the specified **symbol instance** moveable with drag and drop.

*/

bluesuit.addEventListener(**MouseEvent.MOUSE_DOWN, fl_ClickToDrag**_2);

function fl_ClickToDrag_2(**event:MouseEvent**):void

{

    bluesuit.startDrag();

}

stage.addEventListener(MouseEvent.MOUSE_UP, fl_ReleaseToDrop_2);

function fl_ReleaseToDrop_2(event:MouseEvent):void

{

    bluesuit.stopDrag();

}

/* Drag and Drop

Makes the specified symbol instance moveable with drag and drop.

```
*/
```

```
redsuit.addEventListener(MouseEvent.MOUSE_DOWN, fl_ClickToDrag_3);

function fl_ClickToDrag_3(event:MouseEvent):void

{

        redsuit.startDrag();

}

stage.addEventListener(MouseEvent.MOUSE_UP, fl_ReleaseToDrop_3);

function fl_ReleaseToDrop_3(event:MouseEvent):void

{redsuit.stopDrag();      }
```