A Project Report

On

Computer Graphics Lab Project

STAR WARS GAME

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ABSTRACT

In recent years, educational video games have been ineffective as educational tools. This has been mainly due to players being aware that they are learning whilst playing these video games. This leads to players being bored and not learning whilst playing the video games. This project tries to answer the academic question, which is "Can video games teach basic educational principles to primary school children without them being aware that they are learning?" The project starts with discussing if video games are effective tools to teach students. The project continues by inspecting what role motivation plays when students play video games. This led to consider whether different learner styles can affect students on how much they can learn from playing video games. Using this information, research was conducted into a suitable design methodology on how to effectively implement educational content into video games.

The research showed that students tend to prefer learning by using video games. This was because video games tend to intrinsically motivate students to keep playing and learning. But this only occurred if the educational content was well implemented in the video game. To ensure that the educational content was well implemented, it had to be closely related to the game's narrative. The research also showed that video games can teach different learner styles equally. A video game was created using the research conducted on the design methodology for implementing educational principles into video games. To develop the video game, background research had to be conducted on modern video games teaching educational principles, appropriate tools for coding video games and suitable testing methods. The testing was done on twenty final-year university students using a quiz and questionnaire. The results of the test were used to answer the academic question, which showed that video games can be used to teach basic educational principles to primary school children without them being aware that they are learning. The project concludes with what has been achieved and a critical evaluation of the methods and tools used during the project.

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AIM & INTRODUCTION

In general, video games have been used for several decades. Some of the earliest video games, such as The Oregon Trail (1971), were stimulating and got players learning. However, in recent years educational video games have not been effective, as players have felt like they were learning instead of playing a video game.

A video game was created with its main criteria being that it was educational so that users would learn whilst playing. This report presents the video game development from the requirements specification stage to the implementation stage. The report then continues on to the development cycle, where the video game was developed. After the development of the video game, it was tested by twenty final-year university students. The results from these tests were then used to answer the academic question. The report concludes with how it met all the aims and objectives of the project and a critical evaluation of the methods and tools used to develop the video game. Game developers will find this project interesting as it provides a suitable game development process for the creation of educational video games.

Whilst creating the video game, the following criteria were considered and answered:

- Selecting appropriate software to develop the video game.
- Choosing suitable educational principles to be implemented in the video game.
- Ensuring the video game was suitable for primary school children.

In addition to answering the academic question, this project also intended on achieving four aims.

1. To evaluate the use of video games as primary tools.
2. Investigate general video games.
3. Evaluate the video game development process.
4. Develop knowledge in a scripting language.

OBJECTIVE

In the fast growing field of software engineering and development and even more rapidly growing sector of game development the future is hard to predict. We are building this game as our COMPUTER GRAPHICS PROJECT. In general a software project is a project focusing on the creation of software. Consequently, success can be measured by taking a look at the resulting software. In a game project, the product is a game. But here comes the point: a game is much more than just its software. It has to provide content to become enjoyable. Just like a web server without content the server is useless, and the quality cannot be measured. This has an important effect on the game project as a whole. The software part of the project is not the only one, and it must be considered in connection to all other parts: The environment of the game, the story, characters, game plays, the artwork, and soon.
There are certain aims were then broken down into several objectives which were:

- Complete a literature survey and literature review on how video games are being used as entertainment tools.
- Identify and evaluate game design of existing video games and develop a suitable video game.
- Evaluate the effectiveness of the video game using appropriate tests.
- Identify video game development approaches suitable for modelling educational video games.
- To learn and develop skills in a scripting language dependent on the tools used to develop the video game.

ABOUT THE GAME

Introduction

It is an educational game completely based on building strategies in order to win. The game consists of an Alien who is the main character played by the user itself. The Alien comes from a very different planet and came to their neighbourhood planet, the Earth, on a vacation with his family. During his vacation on Earth, he was separated from his parents.

Now, the Alien is alone by himself and his very dear spaceship. Unfortunately, the fuel in his spaceship is limited. On his way back to his planet, he needs to travel several thousands of kilometers. This task wouldn't have been challenging if there were no enemy spaceships from the rest of the planets.

Since the Alien is afraid of enemy spaceships and hasn't adopted many fuel guarantees, it needs to travel carefully and keep himself hidden at all circumstances. It is extremely difficult for it to face the enemy spaceships, firings and meteors with the limited amount of fuel in his spaceship. Now, the Alien must find a way to travel as far as possible to reach his home planet while earning points and collect fuel in its way. The Alien must keep itself hidden in a crowded space to keep himself away from his enemies.

The main mission of the gamer is to use logic and build strategies to travel safely and and save the Alien to reach his home Planet. To compete with other players around the World trying to save the Alien, the game also includes a Scoresheet to rank players and store the user's performance.

Scope

The purpose of this project report is to provide a virtual image for the combination of both structured and unstructured information of our project "STAR WARS". Star Wars is a single-player strategy game on the Web App platform. The player will progress through scores which require precise manipulation of the environment, though the game encourages creativity and daring via branching pathways.

The structure of the game facilitates the pace of the story. We demonstrate the action flow between inputs, script, display (output). We are working mainly with story, levels, object, animation, graphics, scripts, game engine facilities.

GAME RULES

The game starts when the user clicks on the “Start Game” button. The following are the rules of the Game which a player must know before starting to play the game.

1. The player begins to move by using W, A, S, D keys for moving Up, Left, Down and Right respectively. To shoot the enemy, the Space Bar is used.
2. The fuel in the fuel tank decreases by 1 litre per second.
3. Initially, the game begins with the spaceship’s tank at 15 litres of capacity. Make sure that the fuel tank doesn’t get empty i.e reaches 0 litres.
4. Collect more fuel bottles to increase points upto a maximum of 30 points.
5. Add 5 points to hit enemy ships. The planets need to be hit twice and you can earn 10 points. However, hitting friendly deducts 10 points.
6. Remember that when hitting the enemy, 15 points of fuel is lost. Similarly, 10 points are decremented on hitting your friend.
7. Beware of negative points.
8. You are allowed to pause the game by pressing “P” and mute the sound by pressing “M”.
9. Let’s begin!

Characters

	**Your Alien spaceship**
	**Enemy spaceship**
	**Enemy planets**

TECHNOLOGIES USED

The Web Application is created and designed using HTML5, CSS and JavaScript. The following features and functions were used in creation of the application.

deathAnimation()
initCanvas()
draw()
rotateDraw()
initData() & initPlayer()
updateTime()
collision()
bulletCollision()
playerCollision()

GAME FLOW

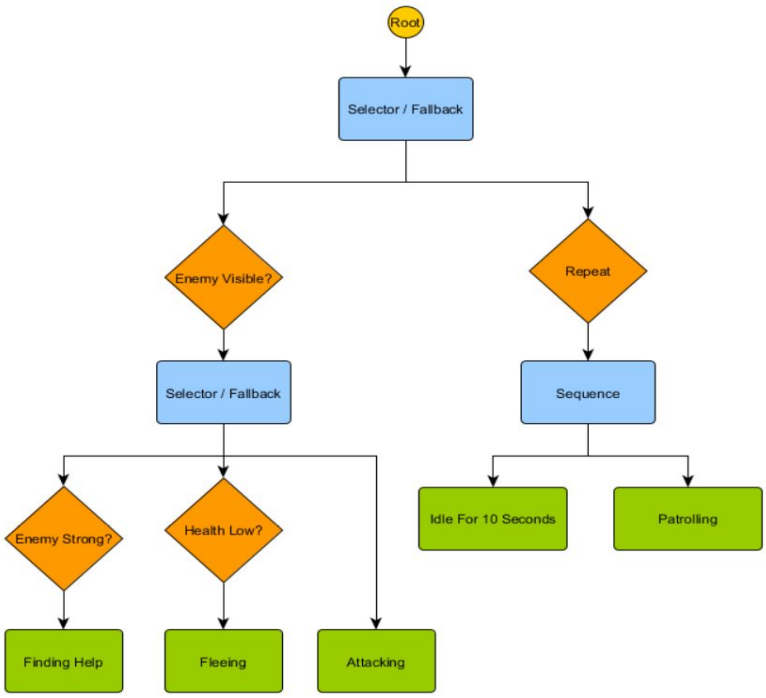

Fig-01

CODE SNIPPETS

Click here to play the game in your browser or follow the link below:
https://kashishmadan.github.io/star-wars/

enemy.js

```
class Enemy extends Plane{

    setup() {
        const { w, h } = config.game;
        super.setup('enemy');
        this.y = random(0, h-this.h);
        this.initBullet('enemyBullet', this.scene.enemyBullets);
    }

    update() {
        if (this.run) {
            this.move();
            if (this.isEnter()) {
                this.fire();
            }
        }
       super.update();

   }

}
```

bullet.js

```
class Bullet extends Element{
    setup(bulletType) {
        super.setup(bulletType);
        this.deathAnimation = new Animation(config.bulletDeathAnimation,
this.scene);
    }

    update() {
        if (this.run) {
            this.move();
```

```
        }
        super.update();
    }

    move() {
        this.x += this.speed;
    }

    deathing() {
        this.deathAnimation.play({
            x: this.x,
            y: this.y,
            w: this.w,
            h : this.h * 1.5,
        }).end(() => {
            this.isDeath = true;
        });
    }
}
```

Star.js

```
class Star extends Element{

    setup() {
        const { w, h } = config.game;
        super.setup('star');
        const size = this.img.width > 100 ? random(10,30)*0.01 : 1;
        this.w = this.img.width * size;
        this.h = this.img.height * size;
        this.speed = -this.w * 0.05;
        this.x = w + this.w;
        this.y = random(0, h - this.h);
        // this.rotateState = true;
        // this.rotateSpeed = -0.4;
    }

    move() {
        this.x += this.speed;
    }

    update() {
        this.move();
        super.update();
    }
}
```

FUTURE SCOPE

The Web App is currently in its basic version. Due to time constraints, the basic structure of the game is done and there are many possibilities for further development and improvement, such as:

1. The interface of the application can be improved to make it become more friendly
2. The algorithms that are more efficient can be used in the fighter spaceships to shorten the time for recognizing the moves and incoming creatures, and retrieving from memory.
3. More algorithms can be implemented in game to make it more interesting.
4. The pictures in fighter spaceships can be adjusted to make them fit for the game.
5. The spaceship game can allow the user to select the area of the web page he/she wants to convert to the game.
6. Improved portability into Mobile Web Browsers to have a better gaming experience.

CONCLUSION

The successful deployment of the Web Application with game marks the Creative goal of the project which has been accomplished. With the aid of the project 'STAR WARS', we have managed to develop a web application that transforms a web page into a game. The users can absorb information by playing the games.

During the progress of the development, we tackled some challenges, such as cutting the paragraphs in blocks, changing them into images, integrating resources of a web page into the games, reading and writing in mobile, etc.

Although the games are simple and the effect is not attractive enough, with the successful deployment of the web application, it means we have already implemented the idea and the project reflects an efficient method to achieve knowledge. What is more, the project has followed the trend of internet business. It is built on the web, which could also be a powerful platform for spreading the core idea of the project.

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