

EDUCATIONAL ANIMAL GAME FOR KINDERGARTEN

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EDUCATIONAL ANIMAL GAME FOR KINDERGARTEN

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A thesis submitted partial fulfillment of requirements for award of the degree of Bachelor
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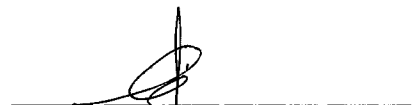
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I hereby declare that the work in this technical report is my own except for quotations and summaries which have been duly acknowledged.


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SUPERVISOR DECLARATION

I hereby declare that I have read this thesis and in my opinion this thesis/report is sufficient in terms of scope and quality for the award of the degree of Bachelor of Computer Science (Computer Graphic & Multimedia).

Signature : 
Supervisor's Name : ABBAS SALIM LUKMAN
Date : 7/1/2015

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Thank You.

EXECUTIVE SUMMARY

With the advancement of digital technology in our world, the paradigm of learning has seen a massive changes with lot of effort and innovation are done in place to promote interactive learning. In this context, game based learning is introduced to promote interactive learning that provides a proper two way communication which is essential in ensuring the intended message is conveyed. Conventional learning materials such as books and newspapers lack interactivity that is essential in engaging as well as motivating students in striving to learn more. The delivery of information and knowledge through those conventional medium is static which requires no interaction or response from user, such scenario triggers a big question of student's understanding regarding the information that he/ she has read. Thus, a newer approach of teaching as well as motivating student in learning more should be introduced. As such, an educational game that demands cognition feedback from student that offers both interactivity and entertainment should be in place to assist the conventional learning material. In addition, with the introduction of an educational game, information and knowledge can be delivered in a crisp, visually powerful manner which could enhance student's understanding while assisting the digestion of information of the respective student.

RINGKASAN EKSEKUTIF

Dengan kemajuan teknologi yang pesat dalam alam digital, perubahan yang besar terhadap paradigma dari segi pembelajaran telah berlaku. Fenomena ini menggalakkan pelbagai usaha mahupun inovasi untuk membentuk suatu paradigma pembelajaran baru yang berorientasikan tema pembelajaran interaktif yang menekankan komunikasi dua hala yang merupakan suatu elemen yang penting dalam memastikan mesej atau pengetahuan tersebut dapat disampaikan. Bahan pembelajaran tradisional seperti buku dan surat khabar tidak dapat memberikan interaksi kepada pelajar yang merupakan inti yang penting dalam menggalakkan pelajar untuk terus berusaha menimba ilmu. Penyampaian ilmu pengetahuan melalui bahan pembelajaran tradisi adalah dalam bentuk statik, penyampaian tersebut tidak dapat memastikan bahawa penyampaian pengetahuan tersebut berkesan. Senario ini dapat diuraikan lagi dengan suatu persoalan besar, adakah pelajar memahami kandungan buku ataupun surat khabar tersebut? Oleh itu, untuk mengatasi masalah tersebut, permainan video yang berorientasikan pembelajaran interaktif mahupun hiburan untuk pelajar untuk membolehkan ilmu pengetahuan tersebut dapat disampaikan secara jelas dan tepat. Kesimpulannya, dengan menggunakan konsep pembelajaran ini, proses pencernaan ilmu dapat dimudahkan untuk pelajar.

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CHAPTER 1: INTRODUCTION

1.1 Project Overview

Playing game is not just for amusement, it also can be used as an entertainment tool. Games can be classify into various type which distinct by the game theme, goals, challenge, rules and interaction. Games generally contain mental neither physical stimulation nor both. Games playing its own role by develop skills practice, performance as an exercise, or serve as educational, simulation, or psychological.^[1] Games fall into set genre such as virtual game for military or occupational training, education game for teaching and learning purpose, artificial intelligence game develop to challenge personal skill, IQ, quick respond when play within the game, role-playing (RPG), real time strategy (RTS) , first person shooters (FPS), massively multiplayer online (MMO) and etc.^[2] Game programming developer has the mission to develop new technology tools and ideas of game that able to fulfill the marketing demands and requires. Playing games is a way for benefits in learning. Challenging game rule such as scoring and awards in order to encourage student play more often by providing the challenging game stage by increase the tasks and complexity. ^[3]

Nowadays, game easily get from many resources such as downloaded or installed via website, app ,android, online playing and so on, it can in the form of payment or free of charge. Games are global, game construct the baring of communication between the particle groups from variety countries while they able to participate in the common game. In addition, games enable to build up confidential of introversion person interact with the world. Besides that, virtual games with contextualized game setting, actions and events will expose gamer with risk that will carry harm in reality world. ^[3] Different games bring different kinds of feedback for user themselves, this feedback depend on how user handle themselves after

playing the game it can be bad or good. Outstanding global Facebook game are Candy Crush, Diamond Dash and etc. Android games famous with Sushi Chop, Mandora, Temple Run, Subway. Guy love online and off line games such as Tower of Saviors, Defense of the Ancients (Dota), Fédération Internationale de Football Association (FIFA) and so on. Games training enable potential users develop in a new way of mindset, improve their literacy, knowledge and skills on the internet. [3]

Conventional study material such as books, tuition classes and newspapers causes students lack of the eagerness and motivation to learn more. The delivery information and knowledge through those static conventional study medium which receive none interaction or none response from user, such scenario triggers a big question of student regarding what actually are they learn within study, do they understand. Thus, a new way of teaching matter as well as motivating student in learning more should be introduced. As such, an educational game that demands cognition feedback from student that offers both interactivity and entertainment should be recommend as an educational tool. Education games designed in educational purpose to help student in their learning process by delivery message in a better understanding way. Educational games present board, card and video games in a visual and entertain manner. [4] In such condition, students are able to receive the feedback message from the game clearly and better understanding. Various game can be program based on the educational market demand, begin with kindergarten syllabus until secondary school subject such as science, math, chemistry, biology, physic and so on. Education games assisting the digestion of information of the respective student. Whenever there's a new technological innovation, kids learn how to use it more quickly than their parent. [5] Thus, the combination of education values and entertainment values proves to be pivotal in today learning environment as visual content as well as interaction in learning make one understand better. In addition, according to 3M Corporation from an online source, "90 % of information transmitted to the brain is visual, and visuals are processed 60,000x faster in the brain than text". [6] All work and no play make Jack a dull boy. Other studies suggest that, there is growing evidence that children showed little interest in reading and writing are now acquiring advanced literacy skills through the text-based communication in online video games. [8]

1.1.1 Problem Statement

There are a lot of educational games nowadays with mainly focuses on core subject such as mathematics and science. Less attention and interest is given to the animal game. Children only learn animal knowledge via book and video. But those materials lack of interest and don't not fully understand by children. In addition, currently animal game is too complicated. Multiple of games in a section easily confuse the message of deliver. Multi game button confusing user especially for those children within four to six years old will feel difficulties to make their option while playing. Scientific term of description delivery no message for the children. In order to produce a learning environment. Interaction game is essential to accomplish the teaching and learning plan. As such, an educational game that demands cognition feedback from student that offers both interactivity and entertainment should be in place to assist the conventional learning materials with enhance the 3D walkthrough zoo environment, animal animation, games and etc. to assisting the digestion of information of the respective student.

Animal game can be delivery neither mainly focus on entertainment value nor educational value. Seldom games contain both equally values. Both essential values should be combine to bring a whole new idea. In order to present that, game need to be well planning. Multiple section of games confusing. As an example children go to the coloring section to explode the color of animal well another section to have a guess of animal details. The connection of the games is too complicated to understand by child.

No scoring mechanism to attractive children while play the game again and again. Children need some encourages and motivates while they playing the game, scoring is the good suggestion to do so. In addition, video games of increase scores on measures of working memory, critical thinking, and problem solving.^[7] With scoring mechanism, children able to compete with the other in order to improve themselves with the others. Besides that, children's parent identify they child level via the score achieve when playing the game. Young children not easily lost themselves when playing game, they will find the balance side of learning and entertainment through the game.

As such, problems statements for this project are defined as follow:

1. Existing educational animal games nowadays are too complex (interface design with too many button, many selection in one game, text or instruction using difficult scientific term/word).
2. Educational and entertainment part of the game is separated.
3. No scoring mechanism that can motivate user/children to play again.

1.1.2 Objective

The objectives of the research are:

1. To develop an educational animal game this is suitable for children within four to six years old.
2. To combine educational and entertainment part of the game.
3. To develop scoring mechanism as a motivation factor for user to play again.

1.1.3 Scope

The project is designed:

1. User
 - a) Within four to six years old children
 - b) Kindergarten's teacher
 - c) Children's parent
2. System
 - a) 2D and 3D platform
 - 3D Zoo environment(mammal)
 - Animals (rabbit, fox, wolf and lion and etc.)
 - 2D platform side scrolling game (feed yourself and prey & predator)
 - b) In personal Computer

1.2 Current System and Limitation

There are multi of animal games promote in market to fulfill customer demand. Five different types of previous system was taken to make a comparison. Those systems can be either play on personal computer, smart phone or tablet. Animal games were program in multi-platform such as in iOS, android or online game. In order to produce better game performance with visual reality, the combination of different type of media such a text, video, sound, computer graphic and animation is essential. Those existing animal game present in 2D animation with animal image to brief descript of the animal characteristic and feature. Slide and touch action as interaction of the games between the user and the devices. In order to implemented game in an interaction way action such as drag and drop, coloring with using controller (mouse, keyboard) or touch pad while playing the game to enhance the game in much more interested and interactive. Interactive games bring much joyful compared with conventional reading materials (books, newspapers). Various platform of existing game are San Diego Zoo Kids, Switch Zoo, AniWorld, Puzzles HD and Animal Game were use as comparison. Improvement will be implement in my Educational Animal Game for Kindergarten game.

1.2.1 San Diego Zoo Kids

San Diego Zoo Kids is a free online game, which also enable install via apple store and android market. San Diego Zoo really exist which located in Balboa Park, San Diego. From the website of San Diego Zoo, it also include the animal game to make the website more on human interactive and creative. San Diego Zoo Kid is a 2D game. San Diego Zoo Kids provides different parts of the game which are Tiger Trail, Your Doodles for painting, drawing, safari park adventure, elephant Odyssey, and Polar Bear Plunge and so on. There contain sub game from each main game in proper arrangement, classification and differentiation. Player can go through the game level by level, with different kind of animal and study animal habitat. The main page contain six button to link with the sub webpage. The buttons list are kids home, animals, games, animal cams & videos, jobs at the zoo and activities. Besides that, animal is category from amphibians, bird, arthropods, mammals and reptiles. This may avoid from confusing. San Diego Zoo Kids is present in animation way. Furthermore, sound effect is displaying to immerse the game with the zoo environment.

GUI of San Diego Zoo Kids is fresh with colorful, that enables attracted children attention from keep on playing. The 2D animals are design in adorable and reality way actually similar with reality animal. All the buttons are differentiate in color to have a clear comparison for children. San Diego Zoo Kids is a human friendly system with the functionality of home icon to back to begin page. Different GUI web page design is carry on to represent different theme of game by photo, 2D image icon or 3D image and etc. Inside the painting and drawing theme of Your Doodles, palette of color, and different of color tool for painting can be easily access from the gallery. GUI of San Diego Zoo Kids design using image and word that bring advance for children to understand and begin to learn while they are playing game.

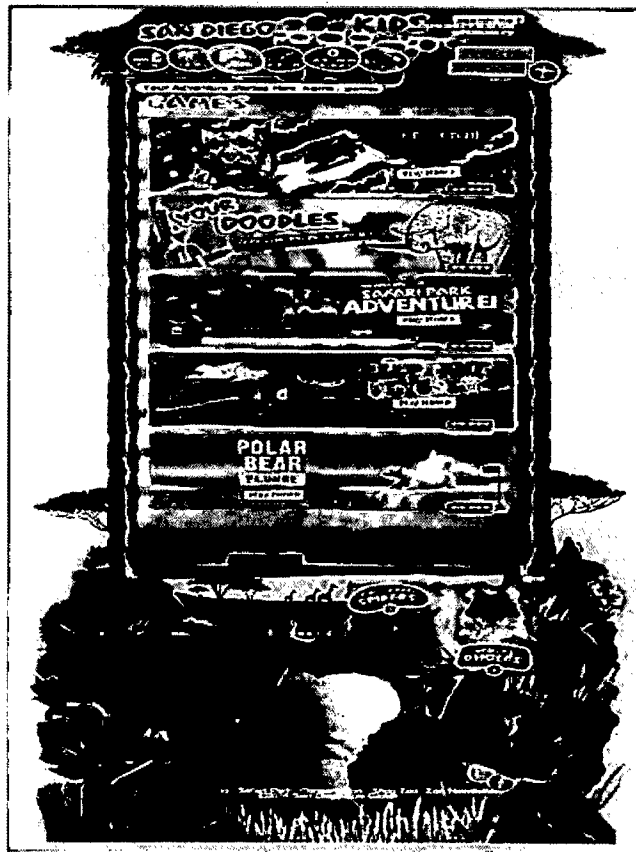


Figure1.1 San Diego Zoo Kids Main Interface

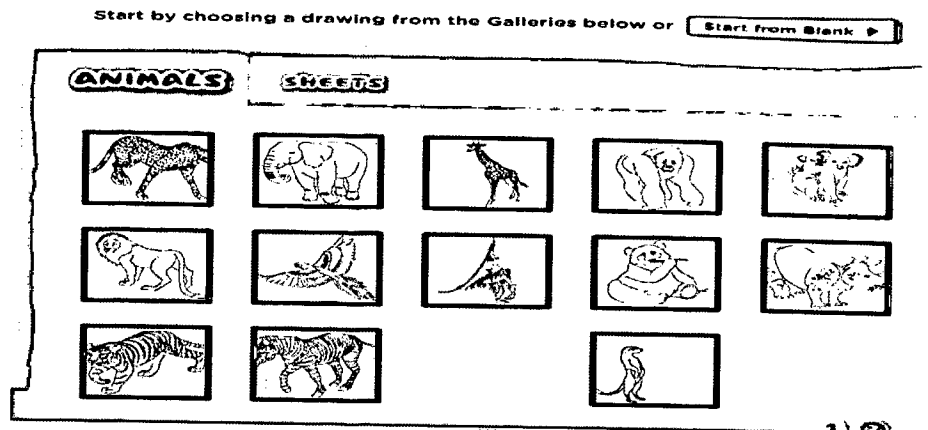


Figure1.2 Your Doogles Interface

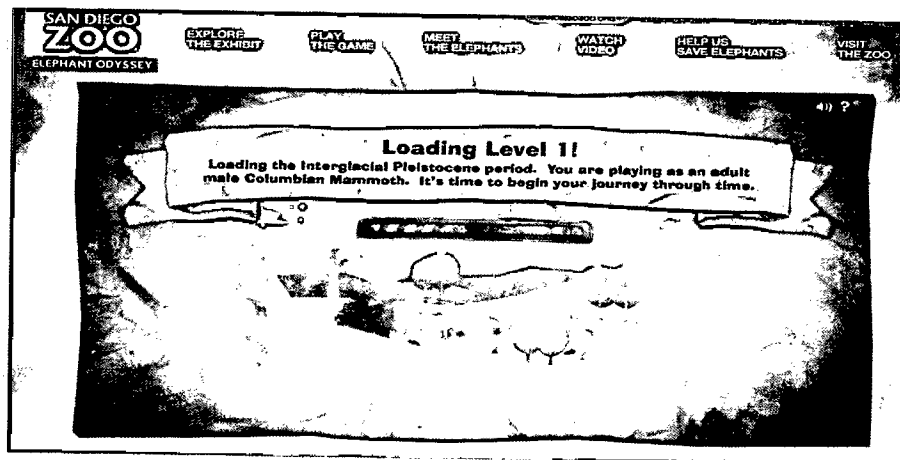


Figure1.3 Elephant Odyssey Interface

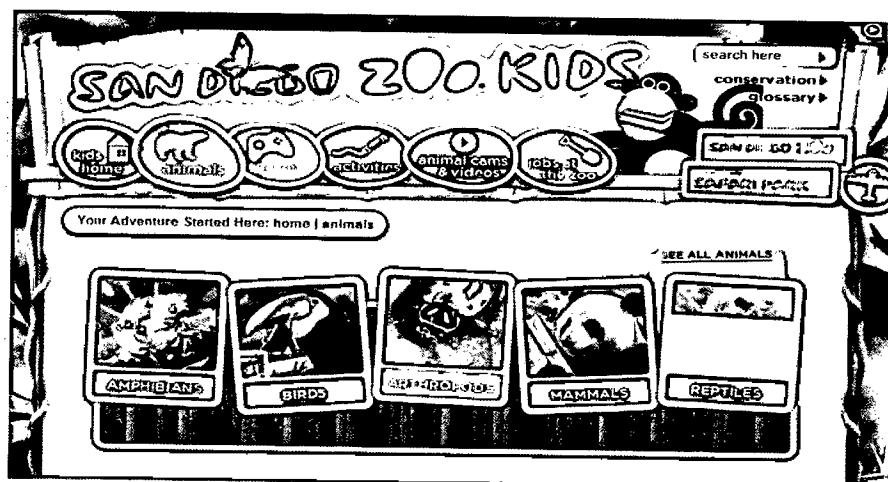


Figure1.4 Animal Home Interface

The attractive of San Diego Zoo Kids graphic can be applied in my project. With proper structure arrangement in word and images, it is convenience for four to six years old children to use the system. Besides that, the 2D images, animation and sound effect are attractive and creative, which can be implementing in current system. This game can be access via <http://kids.sandiegozoo.org/games>.^[9]

1.2.2 Switch Zoo

Switch Zoo provide multi-platforms of installation such as iPod, Android, PC, Mac and Online. Switch Zoo is mainly focus in online game by providing 142 type of free animals, 28 type of free animals is provided for app downloader and payment of \$2.99 is required to purchase whole animal collection. Switch Zoo separate into three parts which are make and play, watch and listen and the last is teach and learn. All the function of learning and teaching are involve in this animal game. Each part of game are used to identify and learn the characteristic of the animal which are present in separately part of sub game such as make new animal, build an online habitat, feeding time, catch the moment, sound match, switch zoo puzzles, switch zoo quest, memory match and where do they live. Switch Zoo is a complete set of education game with divided in multiple part. There separate based on category for ensure the children understand the function of the game with identify more on that animal character and appearance but also the habitat. Besides that, there have reality animal life video with brief description of certain animal detail. In the Teach and Learn section, it contains main four parts of educational games is introduced to learn about animal's characteristics and habitats or even invent new species, Lesson Plans use to spark creativity, Resources is an site for animal research which contain 142 type of animal profile page and Visitors' Pages provides a creativity platform for visitors in animal naming, drawing, stories, poems and comments.

Switch Zoo GUI main on three button to access to main page. Subpage contain of playing game, video display and knowledge learning. Less attractive color is used as GUI interface easily confusing. Identify is difficult to clarify. Besides that, scientific description is hard to understand by children within of four to six years old. This game mainly focus on educational value with providing scientific knowledge. Contain of description is complex

with difficulties word. This formation a view of more word than the image. This scenario cause's user lose the interest to proceed the game after reading the text and description.



Figure1.5 Main page of Switch Zoo

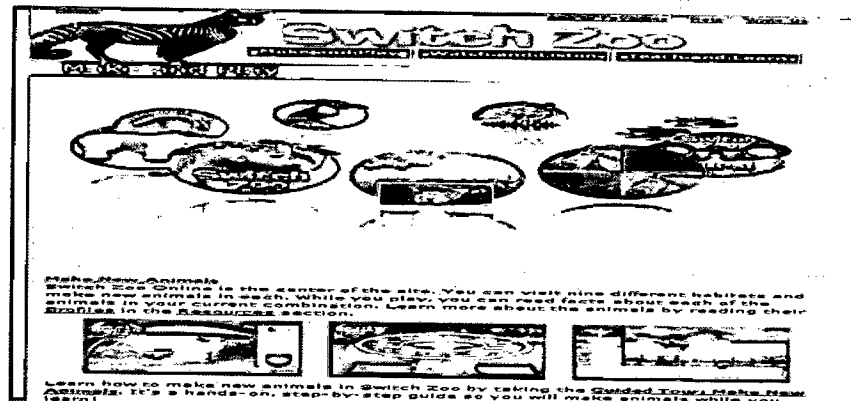


Figure1.6 Make and Play Page of Switch Zoo

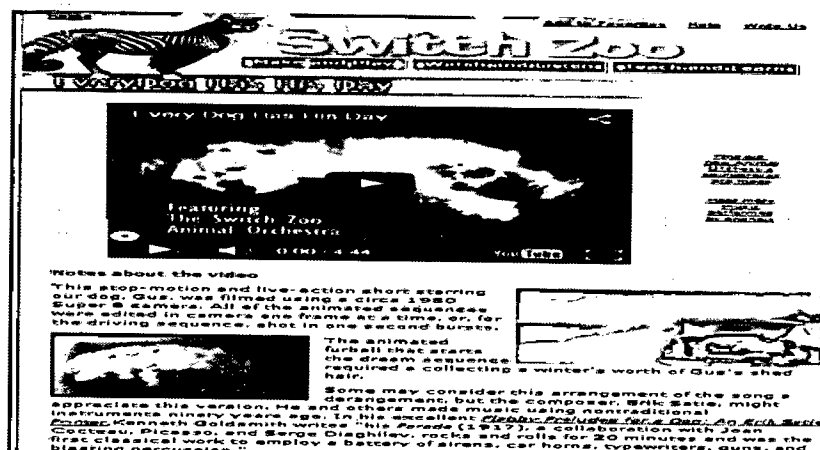


Figure1.7 Watch and Listen page of Switch Zoo



Figure1.8 Make New Animal (one of the switch zoo online)

The content of Switch Zoo can take as a reference, even though it more on learning. Compact with content of knowledge sharing, video show and platform for creativity can give an idea of the flow of the propose project. Switch Zoo is a bit hard to play by children. Advance can be done to make it easier to handle. Font size can be adjusted. Simple and understanding word can be use. Besides that, the image can be more interesting and colorful that able to attract attention from children. This game can be access via <http://www.switchzoo.com/> ^[10]

1.2.3 AniWorld

AniWorld is a free Android game. This is an excellent app that develop mainly for kids aged of one to five. AniWorld is an interactive game for kids to build up the interesting for learning more on animals and their habitat. There have 36 kinds of animal picture to select among of 250 animal photos. Animal name were teaching in this game. Besides that, kids have the opportunity to feed animal food and petting via this game. There have four function providing interaction with the animal which are animal home, feed me, pet me and display the image of animal grows. Animal snoring put as a background sound within natural habitat environment. Three kind of food was provided in feed me, “nooo” sound was display to remind the user wrong food is given, animation of feeding will be display when correct food is provided. Pet me is a game to develop an affection with the pet by touching the device surface. Animal feel comfortable with the interaction, joyful of music will be displayed as a feedback from the interaction. The last button is a display the image of development stage

begin with birth until adult. Children have a small learning of animal grow. This game specialist develop to consult the child.

AniWorld's GUI is in simple reality animal image with four button to access the interactive with the animal. Besides that, sound effect and picture change is the key point of the game to carry out the interaction with the animal. This game mainly focus on amusement value rather than learning. Kids love it when see the funny and sound play on. The function is easy to handle by kids, by just click and drag. The animal game present using actual animal image, to avoid from error recognition when kids face with the real animal character.

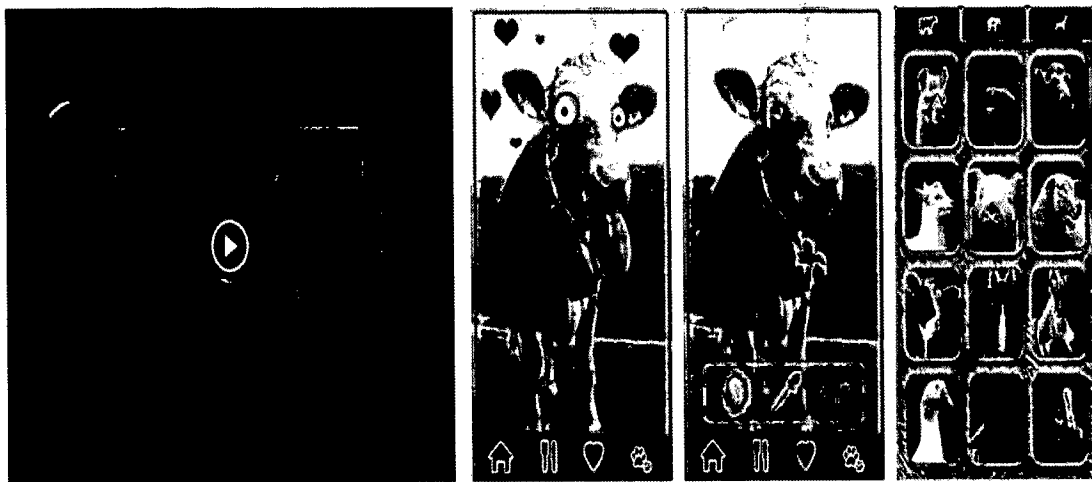


Figure1.9 AniWorld Interface

AniWorld application structure is simple and easily handle. Kids refuse to learn complex thing, with the simple way of fun and the funny output, it make them really want to play and enjoy the game. The advance of using color can be implementing to make the game more visual effect. Besides that, can play 2D effect and add more game for functional. This game can be access via <https://play.google.com/store/apps/details?id=com.aniworld.lite> .^[11]

1.2.4 Puzzles HD

Puzzles HD is an android app that required payment. Puzzles HD is an animated puzzle game for kids within age's two to six. This game contains twelve type of puzzle for kids to play. In order for children to challenge more, level of difficulties become the interesting part of this game. Various cute animals in this puzzle were used such as penguins,

starfish, sharks, whales, bears and so on. Kids sure will love it and feel fun watching the cute animal on the screen when solve the puzzle. Game theme beach, arctic and forest with twelve different of animal puzzles involved in Puzzles HD. Once complete the puzzle, bright and fun animation image will display. A PUZZLE HD is an easy game for kids to use and control. Besides that, it is optimized use for tablets and phone.

Puzzles HD is a 2D image with cartoonist cute animal images character and background. The animal mapping is construct with the specific feature as remind. The color implement is simple and kids make none confuse of that. There have a back button on the bottom of the right hand side to proceed with next game. Different theme in the game is attractive. Furthermore, the display of animation effect as the reward after completing each level of the puzzle, really give positive encouragement for the children to keep on playing the game.

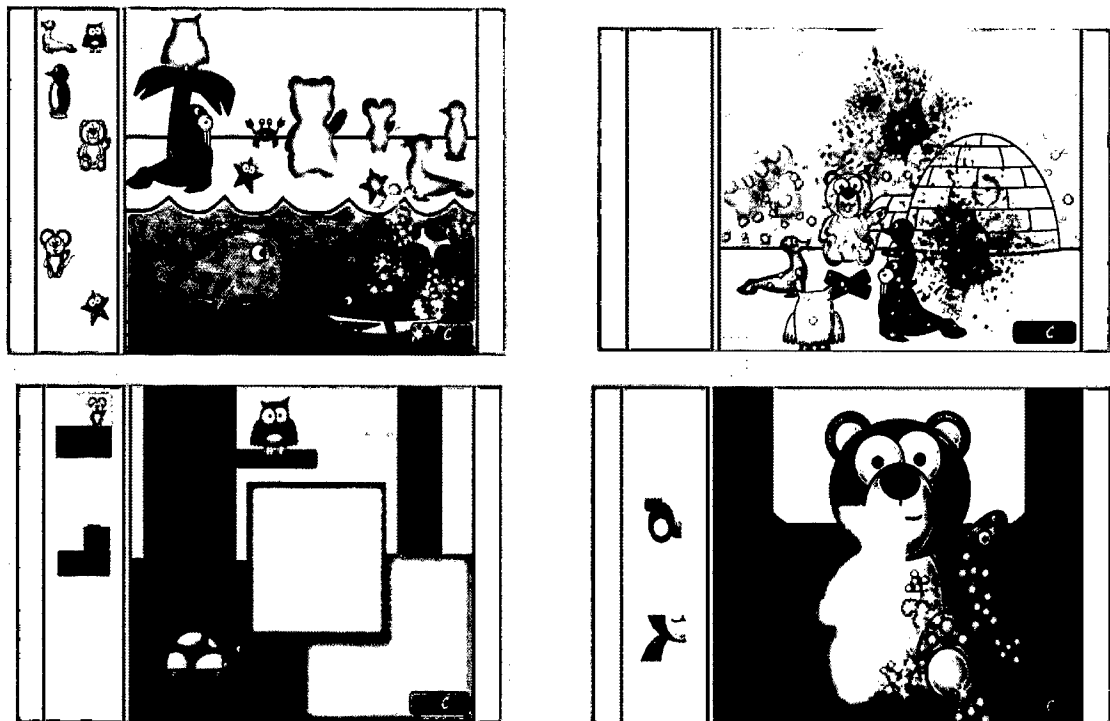


Figure1.10 Puzzles HD interface with beach, arctic and forest theme

A Puzzles HD contain not scoring mechanism. Thus, different level of challenging is recommend to interesting this game in order to build up children interest when play the game.

Puzzle game is none for educational value. It develops to test children responding by observe the quickness of thinking, eye focusing and brain responding. It provided for one to five years old children to assist children grow of nerve of brain. Interactive game enables to stimulate the brain development. This game can be access via

<https://play.google.com/store/apps/details?id=com.orionsmason.animalpuzzlesfree> .^[12]

1.2.5 Animal Game

Animal game is an online website game, it only able to play via the website link of <http://www.animalgame.com/play/index.php>. Animal game carry out in form of Q&A way, few questions will be asked to determine imagine animal character. Players request to answer the question by choosing the answer of yes or no in order to generate the animal name as the game finalist result. The entire question was the same, with the difference answer choosing by the player. The answer was collected to identify and determine the animal feature, attitude and living behavior. From this interactive, children will have better understanding and more interest in learning. No score can achieve but is a fun way to gain knowledge. It is suitable for children as their learning resource, it is easily and convenience to handle and play on.

Animal game GUI is a simple webpage, with plain white as the page background, less colorful and image was used. Four links can be access to the specific page which are restart game, sign in, help and top 10. With the question are given, button of yes or no to collect the data of the player's answer. The name and the image of the animal will display at the end of the game. From the game, player able to learn and imagine the animal character from their view perspective and mind to identify and determine what kind of animal in their mind with the limitation of feature recognized.



Figure1.11 Main page of Animal Game

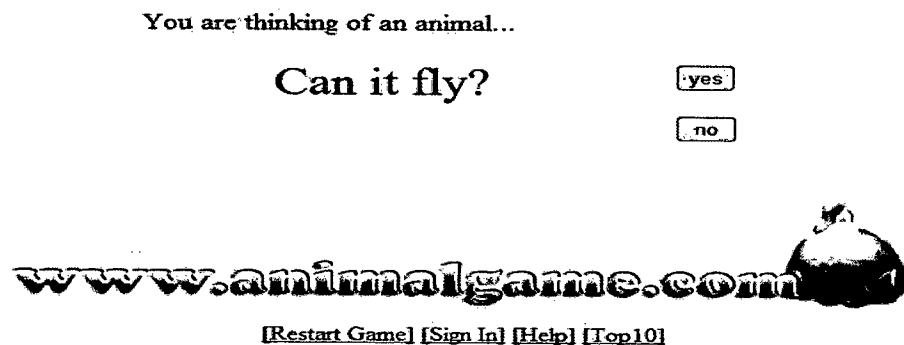


Figure1.12 one of the game question

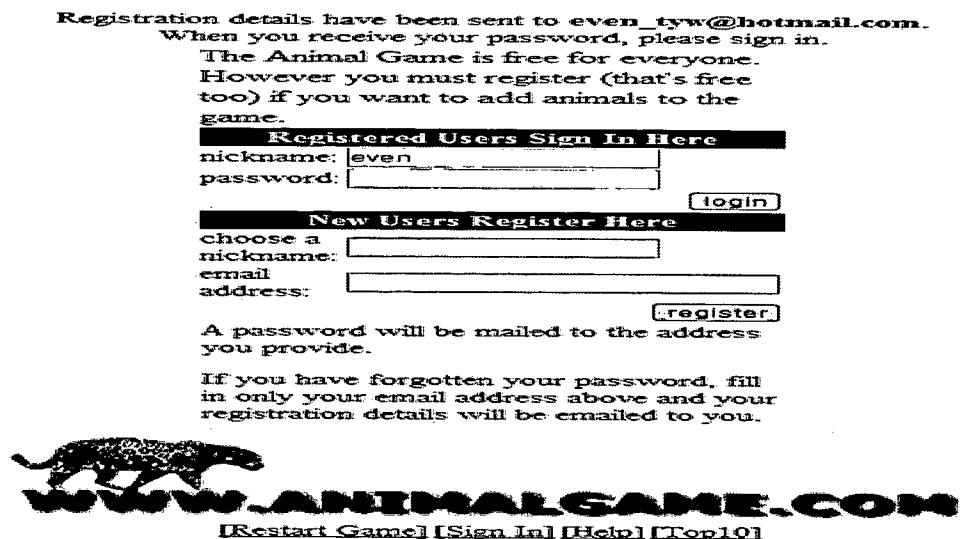


Figure1.13 Page for login and registration

An account has been created for you at the Animal Game
(<http://animalgame.com>) with the following details:

username: even
password: nonreflex97

This email was sent to you because someone entered your
email address at <http://animalgame.com>. If you did not make
this request you may simply ignore this email.

- The GameWarden

Figure1.14 Email receive after register for Animal Game by giving password and username

The question and answer was the main point in this online game. It is very suitable use as a one of the sub game in current system. With the way of render question, it enables to make the game more interesting and challenging. This makes the game not only for educational purpose but also include the fun and challenging. Score mechanism can be implemented as a quiz test. Besides that, children's parent can be review from the score of their children achieve to determine how far the children in their learning progress.

1.2.6 Limitation of Existing Systems

Three type of animal game is used to make a comparison which are San Diego Zoo Kids, Switch Zoo and Animal Game.

Table1.1 Limitation of existing system

		San Diego Zoo Kids	Switch Zoo	Animal Game
1	User Interface	<p>The interface is more on Graphic and 2D animation.</p> <p>Web page contain many button of game option and function(kids home, animals, games, activities, animal cams & video and so on)</p> <p>Less word is use in the interface.</p>	<p>The interface is a 2D image with complicated color mixture.</p> <p>The button is easy find which at the top of the page and in the link form.</p> <p>Focus on scientific term and description.</p>	<p>The interface simple, less color and less image are used.</p> <p>There have yes or no button for answering the question and link to access.</p> <p>Mainly on Q&A form, with button of yes or no to collect the user's answer.</p>
2	Mechanic of the game(education/entertainment)	Main on entertainment(different theme of sub game are develop)	Focus on education use(scientific explanation is given with brief description of explanation)	Is an education game(perform in Q&A matter)
3	Mechanic of the game(scoring mechanism)	Non scoring mechanism	Non scoring mechanism	Non scoring mechanism

1.3 Conclusion

After comparison of existing system, decision had made in order to implement in my Final Year Project system, Educational Animal Game for Kindergarten. Combination of 2D and 3D animal environment can be made. Animation animal can be a high light of this animal game. Besides that, delivery instruction in simple way and better understanding to user should be recommended such as descript in simple word and pop up message. In order to attention getter, interface design should be in more colorful and attractive is essential. In addition, combination of both educational value and entertainment value should be made. Finally, scoring mechanism is enhance the user to play again and again. From the frequently playing, knowledge can be gain.

CHAPTER 2: REPORT BODY

2.1 Methodology / Planning Phase

The methodology utilized in this technical report is represented by SDLC Waterfall model. The waterfall model can be defined as a linear sequential life cycle model in which there is no existence of overlapping phases. This is because in order for a new phase to start, the current phase needed to be completed. The phases of the Waterfall Model contains requirement analysis, system design, implementation, testing, deployment and maintenance respectively

The utilization of methodology of Waterfall model in this development of system is illustrated as below:

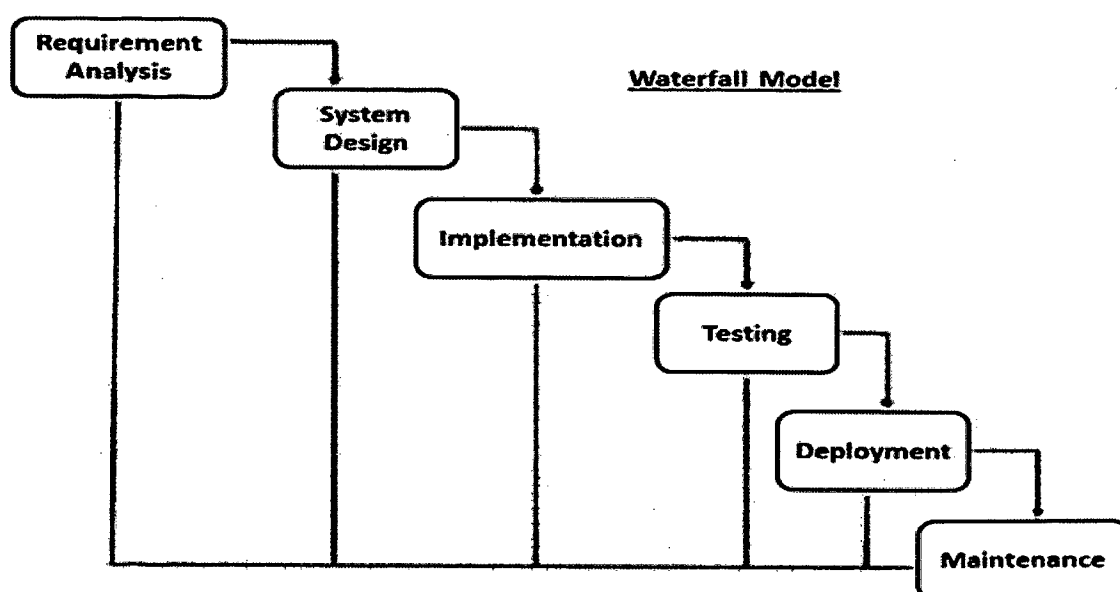


Figure2.1 Methodology Used in Technical Report

2.2 Requirement Analysis

Regarding this phase, requirements are elicited from the client, in this case, the principal of a kindergarten in order to develop the game or system as required by her. Efforts are made to propose the idea to the principal and as well as discussion regarding the suitability of media content to be put into this game. Besides, discussion is also made on how to make use of the existing computer as the main device in playing the developed game rather than deploying the game on mobile platform which requires them to purchase new hardware such as tablet or smartphone. In addition, project goals are analyzed in order to be able to assist in the learning of children regarding animals. After the requirements set in, discussion regarding the feasibility of the project is carried out to ensure the work can be done. Lastly, work is done to make sure the agreement of requirements is in place before proceed to next stages and the result in this stage is represented by the agreement to create a 3D virtual zoo environment assisted by 2D platformer games for learning.

2.2.1 User Requirement

The requirements elicited from client are as below:

- 3D virtual zoos with animals in 3D model as to ensure children are able to recognize their features such as fur color, body shape, size and etc.
- Simple mini games as to ensure children can learn something regarding the animals such as their eating habits as well as the prey and predator system.

2.3 System Design

In this phase, the design of the system is taken seriously to match the requirements agreed by both parties. Firstly, work is done to create a storyboard regarding how the game should be played. Brainstorm on game mechanics as well as game content is carried out to determine what is appropriate and suitable to be put into the game in order to foster the learning as well as interaction between system and user. Next, user interface is designed to cater the ability of children in term of their interpretation regarding those button, menus and etc.

In addition, a simple prototype is created to ensure the game mechanic is in place for further work of progress. Besides, efforts were made to define the functionalities as well as the logics required by the game mechanics.

2.3.1 Storyboard

This system is design mainly for children within four to six years old. This age is the beginner stage of educational journey. Before children start their proper education syllabus, children should involve themselves with the natural knowledge. First Person Controller (FP) animal game is a natural animal game that design as an ordinary and simple game mainly for children. This is a combination of 3D and 2D interaction games. The 3D is use to create the scene of zoo, animal and surrounding view. In addition, the 3D scene provides walkthrough to visit the zoo. Four animals are introduced in these games which are rabbit, fox, lion and tiger. They are herbivores and carnivores animal which are one of the study material for identify animal feeding character. Sign board is use as an animal explanation and introduction. The sign board contains scientific name, area, habitat, food, size and babies as the based animal information. Other than that, two types of mini games, Feed Yourself and Prey and Predator are design as game play. This is a platform side scrolling game which design in 2D platform with scoring mechanism. In Feed Yourself, player represent as an animal character. Character only gain score when feed the correct food else the live will be deduced among of three. Invincible and morphing is added to increase the fun when the games play. Otherwise, player has to participate until end of the game if the live still left. Children learn to classify herbivore and carnivore animal character from the animal food. In Prey and Predator, morphing is implementing to make the game more challenging and interesting, the animal will replace as the other character when eat or eat by those animal. From this game, children able to identify which kind of animal can be eaten be and can't be eaten. Deduced of live is counting when hunting wrong animal. Scoring able to achieve when the animal collect the coin during the game.

• 3D Virtual Zoo

This is a 3D virtual zoo that representing in 3D platform with four type of 3D animal which are rabbit, fox, lion and tiger. Player enables to walkthrough the zoo environment. Animal information is display using sign board with contain of some briefly information about the animal background. Besides that, 3D animal is display to identify and recognize the animal feature such as the animal size, fur, body shape and etc.

• Prey and Predator

Prey and Predator is another 2D game mainly on morphing function. Four animal enable to exchange their current character to another character when collide with the animal. The condition only able to fulfil when the current animal character determine either it is prey or predator of the other animal character. From this game, play is able to identify the strong and the weakness among the animal. This is a common prey and predator life cycle which rabbit is the prey among of the animal game. Fox is the prey of wolf and lion. Lion is the predator of wolf. Lion is the predator of rabbit, fox and wolf.

• Feed Yourself

Feed Yourself is kind of 2D platform side scrolling game. This game is about what kind of food they eat to identify either they are herbivore or carnivore characteristic. Rabbit is an herbivore animal, vegetable can feed by them only. Score only be achieve when feed the correct food. Life will be deducted when collide wrong food. Invincible can be implement when collide with the star icon. Star icon use to avoid from deduct of life when collide with wrong food within 5 seconds. Morphing function can be applied when current animal character collides with the other animal character.

2.3.2 GUI Design

The image shows below represent the scene inside the gameplay

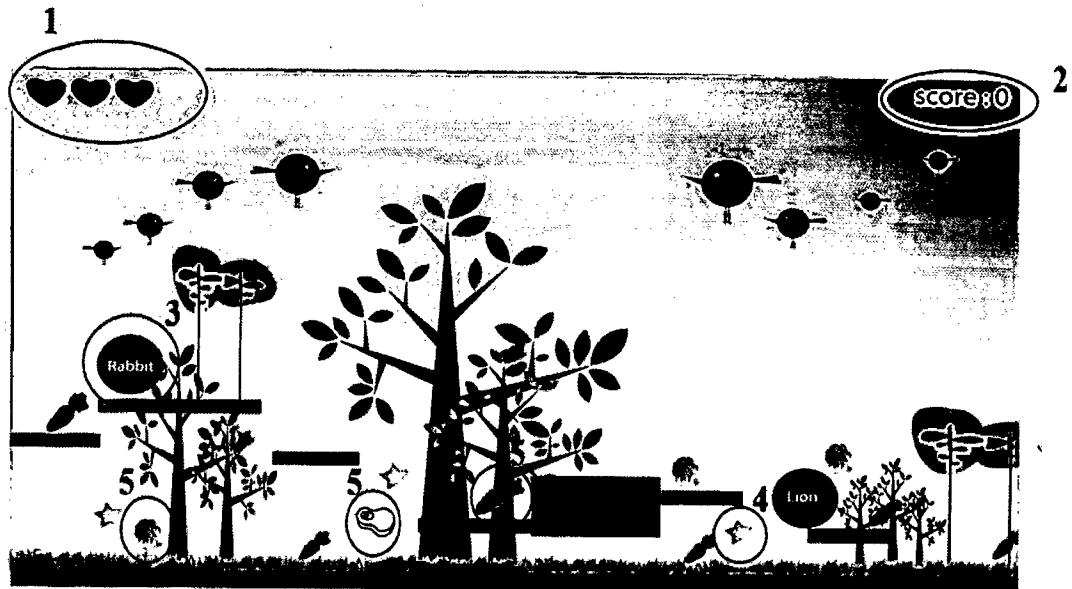


Figure2.2 Feed Yourself GUI design



Figure2.3 Prey and Predator GUI design

- **Live**

Each game contains max three charge of live, one heart shape represent one live. Live only deduct when animal feed with wrong food icon in game of Feed Yourself. In Prey and Predator, live deduct when current animal eat their predator animal.

- **Score**

In Feed Yourself, score can be gain when current animal eat correct food. For example, 100 marks can be score when rabbit collide with vegetable icon. Score in Prey and Predator able increase from time to time. Coin 1 can score 100 marks and 200 marks for coin 2 when current animal collide with the coin.

- **Animal icon**

In each game contain four type of mammal animal which are rabbit, fox, lion and tiger. Each animal contain it personal character of what they eat to classify whether it is either type of herbivore or carnivore animal. Besides that, current animal need to identify whether they are either prey or predator in side of other animal.

- **Invincible**

In Feed Yourself, star icon is design to defense any obstacle. Within 5 second, invincible function is perform once collide with star icon. This is the skill and technique when need to pass through to the other platform without collide with the wrong food.

- **Food Type**

Vegetable and meat are design as a correct food item which only can be eaten by herbivore and carnivore animal.

- **Coin**

In game of Prey and Predator, coin is design to gain the score with 100 marks for coin 1 and coin 2 for 200 marks.

• Jumping Platform

Platforms contain 2D rigid body for support the state poster remain at the platform side in order to wait for the other input performance from the player.

2.3.3 Flowchart

• Zoo Input

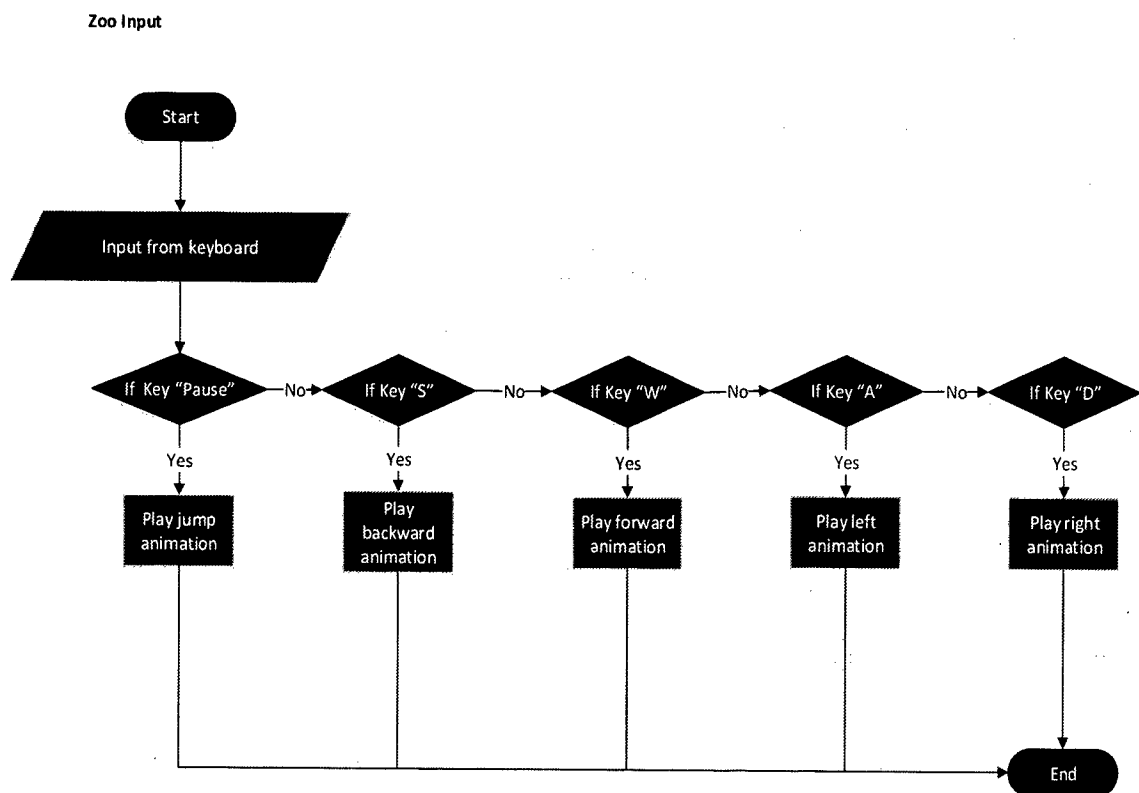


Figure2.4 Flowchart of Zoo Input

This is a device input from game pad; three interactions are control by the player. Player able control upward, move left or moves right. Each time of input only one animation will be perform. If input "up", jump animation will be display. If input "left", the output will move backward. The last is the "right" input, it play forward animation as the output.

• Loading Scene Feed Yourself

Loading Scene Feed Yourself

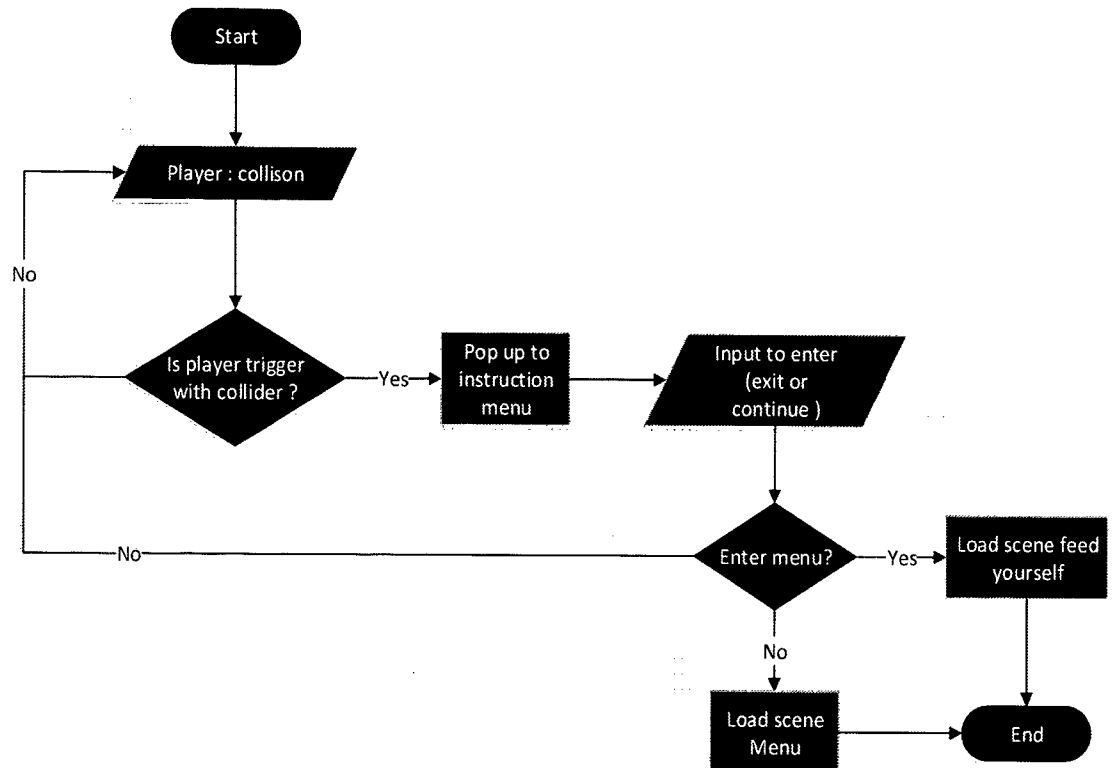


Figure2.5 Flowchart of Loading Scene Feed Yourself

This is the flowchart of loading 2D scene of Feed Yourself from the 3D zoo platform. Before entrance to the new scene, player requires to collide with the collider. Ensure for entrance, popup menu will be display for player to select the input either to enter or esc from the scene. If the enter is yes for confirmation, process of loading scene is displacing and the Feed Yourself scene is displaying. Otherwise, the collider waits for player to do collision on it.

• Loading Scene Prey and Predator

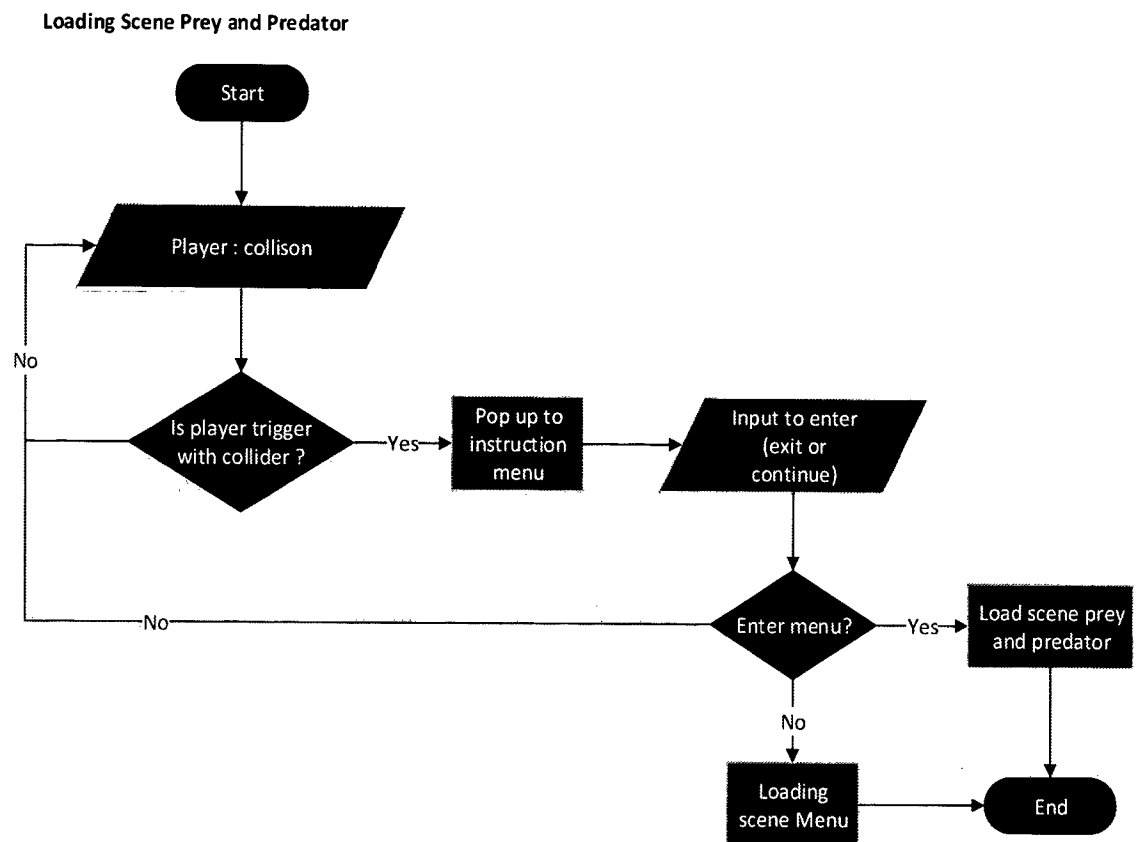


Figure2.6 Flowchart of Loading Scene Prey and Predator

This is the flowchart of loading 2D scene of Prey and Predator from the 3D zoo platform. Before entrance to the new scene, player requires to collide with the collider. Ensure for entrance, popup menu will be display for player to select the input either to enter or esc from the scene. If the enter is yes for confirmation, process of loading scene is displacing and the Feed Yourself scene is displaying. Otherwise, the colliders need to wait for collision.

• Kill and Score Function of Feed Yourself (Vege and Meat)

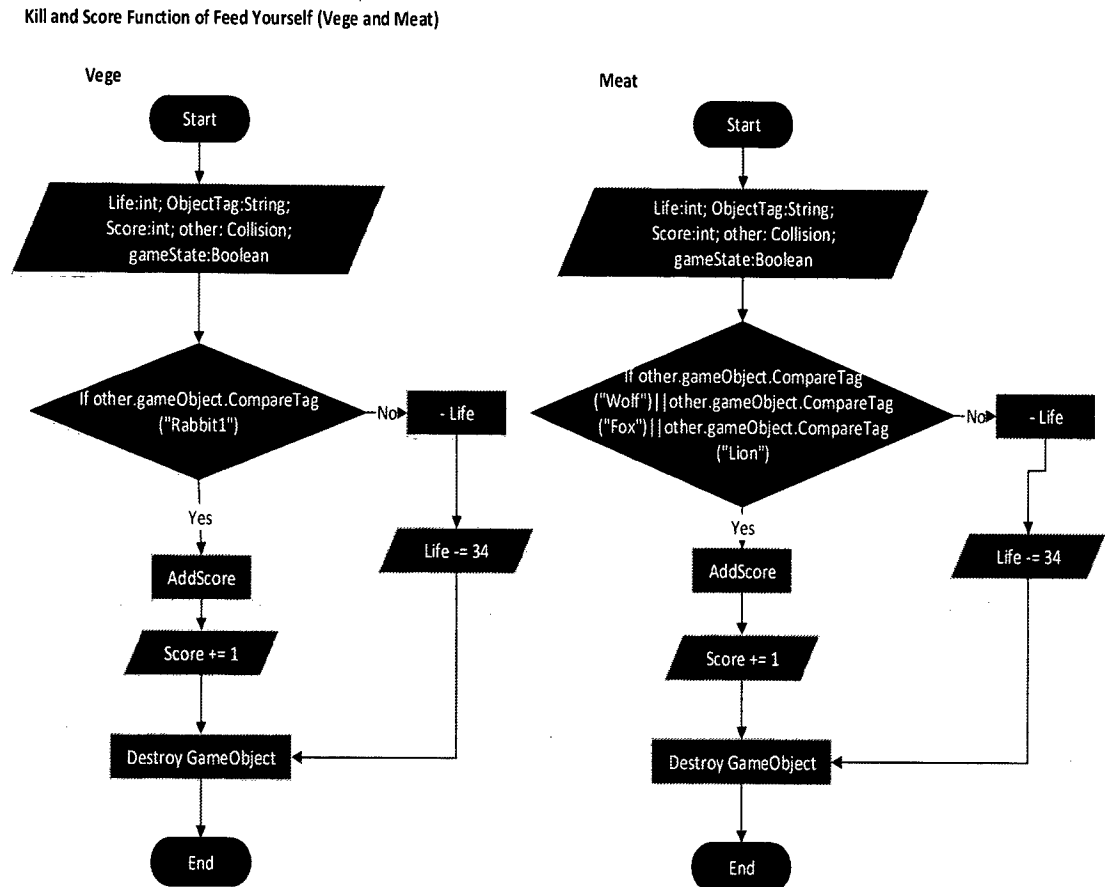


Figure2.7 Flowchart of Kill and Score Function of Feed Yourself (Vege and Meat)

This is combination of kill and score function in game of Feed Yourself. When the game state ongoing that mean the game is playing. In order to gain the score or lose the live certain criteria is needed to fulfil. During the collision of “vegetable”, the checking of the game object is needed to determine the object is either “herbivore” or “carnivore”. Both condition is fulfil 100 marks can be scored otherwise one of the live will be taken. There only three live chances once the live if finish the animal character is destroy and the game will come to the end. If the game is not play the score will remain in the state of zero.

• Prey and Predator Kill Function

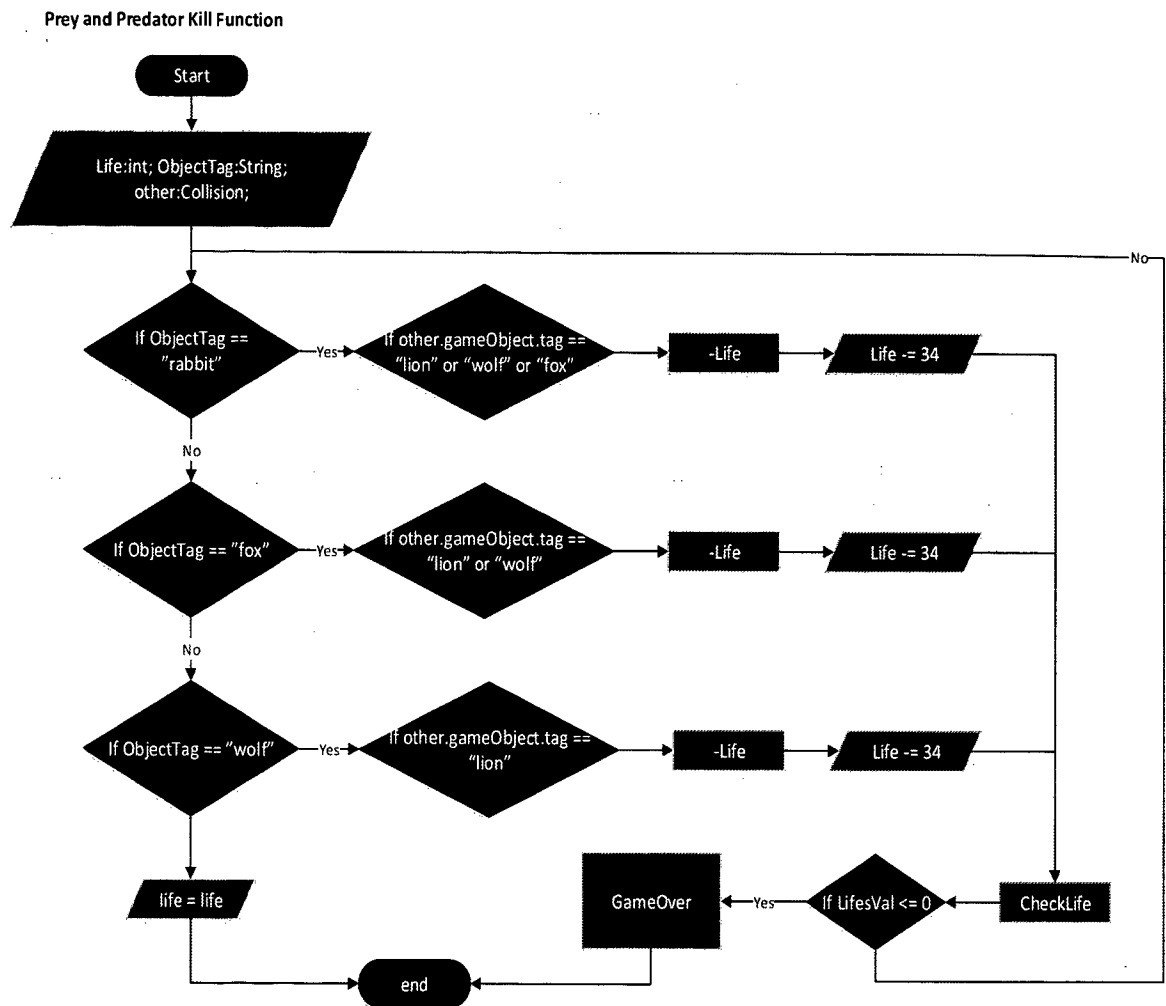


Figure2.8 Flowchart of Prey and Predator Kill Function

This is the kill function in prey and predator. In order to determine the prey animal of the predator, conditions are state. In such condition, predator is state when it meet with prey for example predator of rabbit is lion, wolf and fox. If the rabbit eat its own predator, the live will be deduct. This is wrong prey and predator cycle. Three live is taken then the game is over.

- Prey and Predator Scoring (Coin and Gold Bar)

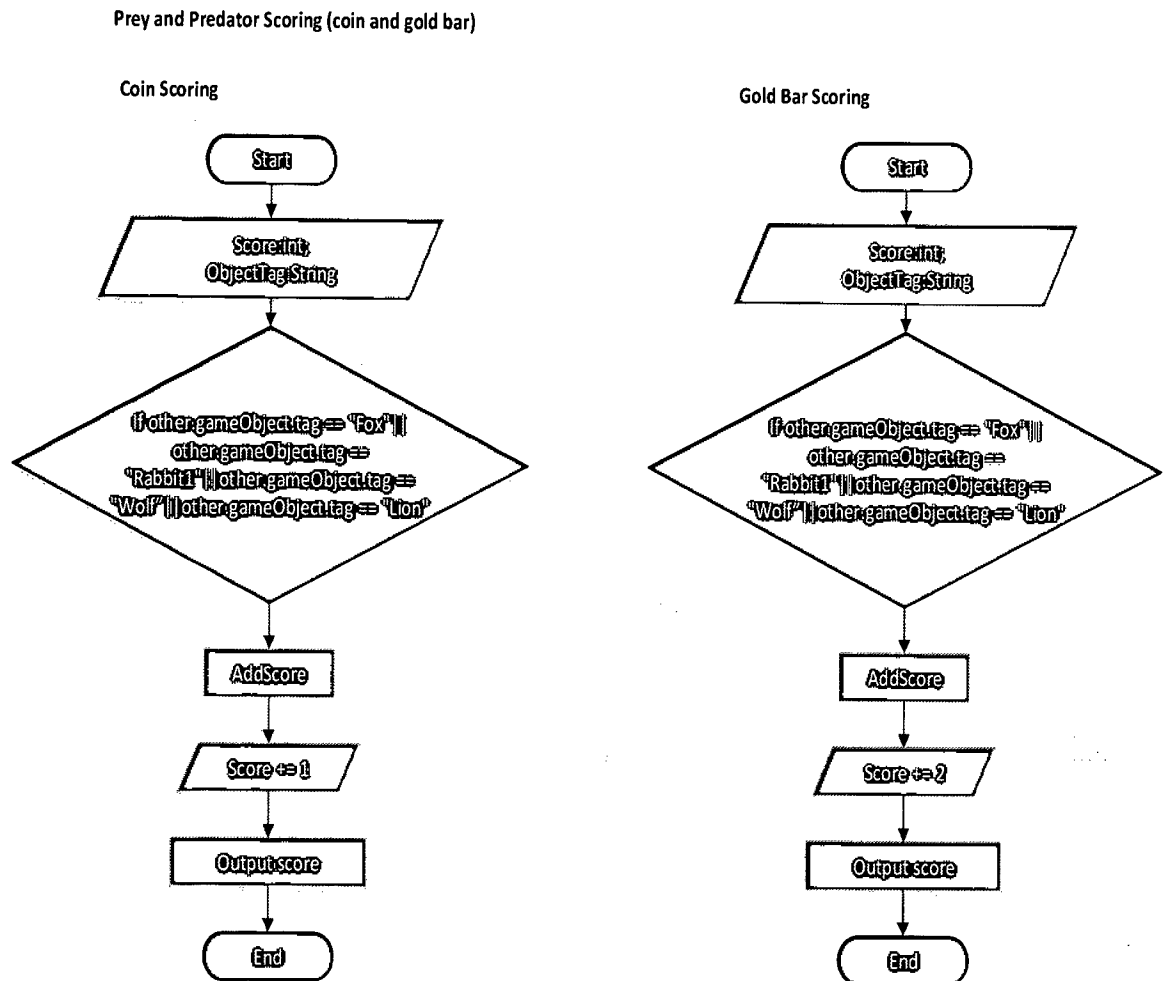


Figure2.9 Flowchart of Prey and Predator Scoring (Coin and Gold Bar)

This is score function of game prey and predator. During the game state of ongoing, condition will be detected to calculate the output of total score. Contain two types of coin 1 and coin 2. Collision with coin 1, 100 marks will be gain. Collision with coin 2, 200 marks is added in final total score. If no coin is collision the score will remain zero as the final score at the end of the game.

• Morphing Function

Morphing

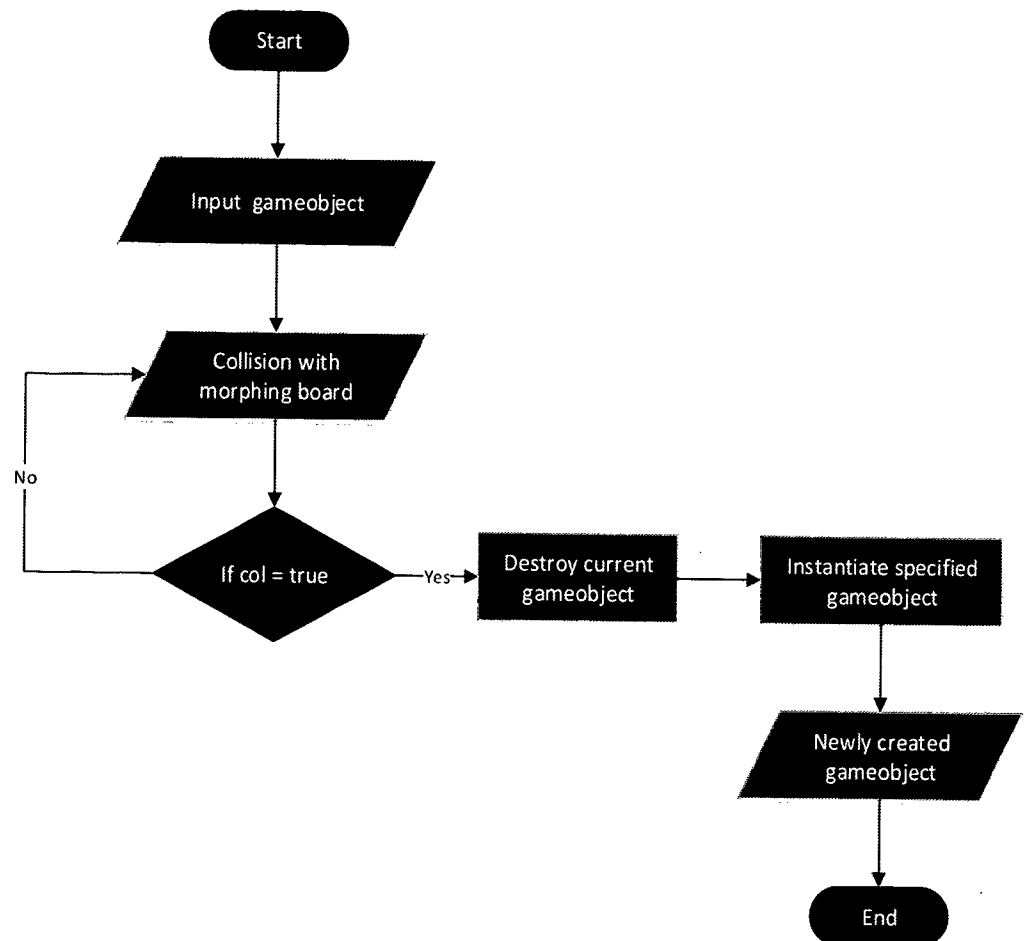


Figure2.10 Flowchart of Morphing Function

Morphing is like special effects that change to other character from current character. Game of Feed Yourself and Prey and Predator perform morphing function. Once the current object collision with another object, morphing function will be take place by destroy the current object at the same time create new game object by instantiate specified game object. Otherwise, no morphing changes when the current object no collides with the animal game object.

- Add Live (Snowflake)

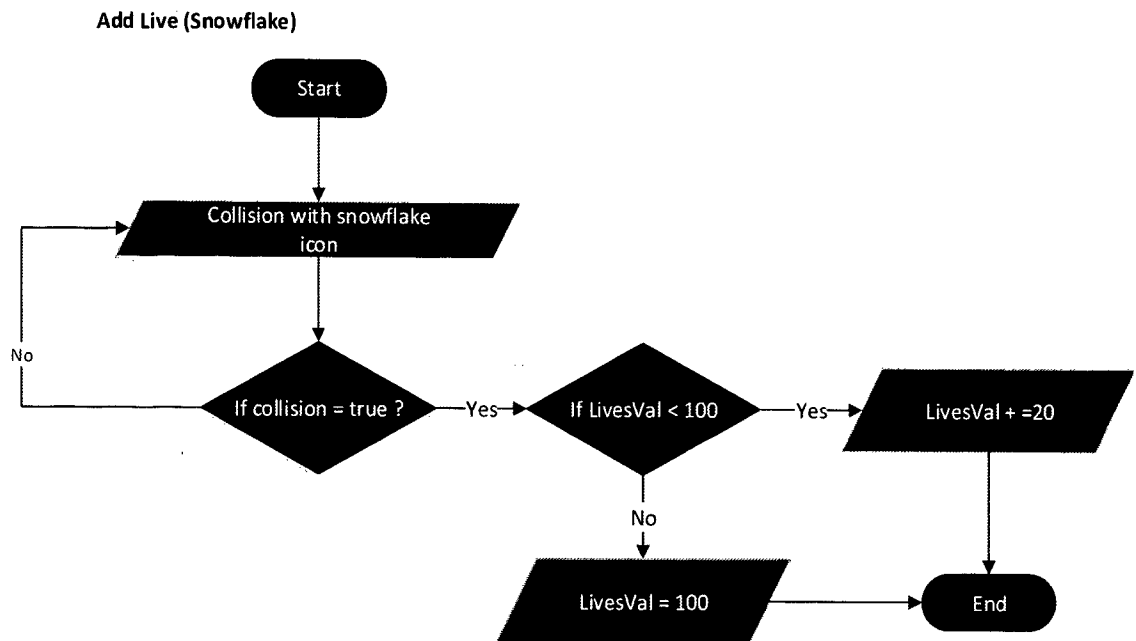


Figure2.11 Flowchart of Add Live (Snowflake)

Once the current animal collide with the snowflake icon, 20 lives will be added each time. But the lives will only be added when the live value is less than 100, else the live value will remain as 100.

2.3.4 Hardware and Software

- **Hardware**

- a. **Personal Computer**

- A PC with typical graphics card that is capable of supporting 3D rendering and high graphic performance

- **Software**

- a. **Unity3D**

- Unity is one of the platform mainly use to develop game project. Unity provides terrain sculpting tools that easily to add and drop object and texture. Script is program to perform the function by drop the script to the object that needs the function.

- b. **Maya Autodesk**

- Maya Autodesk is use to develop the 3D model of the system. Maya® 3D animation, modeling, simulation, rendering, and compositing software offers a comprehensive creative feature set on a highly extensible production platform. Maya provides high-end character and effects toolsets along with increased productivity for modeling, texturing, and shade creation tasks.

2.4 Implementation

In this phase, the required functionalities and logics are being translated into actual programming or scripting to be used inside the targeted game engine of Unity3D.

Functionalities such as the scoring mechanisms, input system and etc. are coded to be used in the game engine.

Next, effort is made to develop the game or system as according to the requirements agreed by both parties. This is represented by a system or game that comprised of a 3D virtual zoo as well as two 2D platformer games in form of “Feed Yourself” and “Prey and Predator” to assist the understanding of children regarding animals.

Last but not least, the developed product is delivered to client to verify the requirements as well as the correctness of the system.

2.4.1 3D Virtual Zoo

In this context, a 3D environment of zoo is liven up with the introduction of 3D animals model such as lion, elephant, zebra, wolf, fox and etc. The virtual zoo is designed or built in order to introduce animals to children in term of their features as well as appearances. With 3D model, children will be able to recognize or learn about the animals as they are available in 3D which makes understanding of children regarding the animals easier.

In this case, a character controller is integrated into the scene which enable user to navigate to every part of the zoo like the way we would visit a zoo in real life. In addition, the virtual zoo is enhanced by incorporating animation on the animals, this undoubtedly liven up the environment as children could see the interaction of animals other than just a static lifeless 3D model.

Furthermore, other than having a look on the animals, the children are afforded the chance to better understand the animals by the introduction of related information of the corresponding animals in order to offer an intuitive as well as interactive virtual zoo experience to the children.



Figure2.12 Top view of entire zoo environment

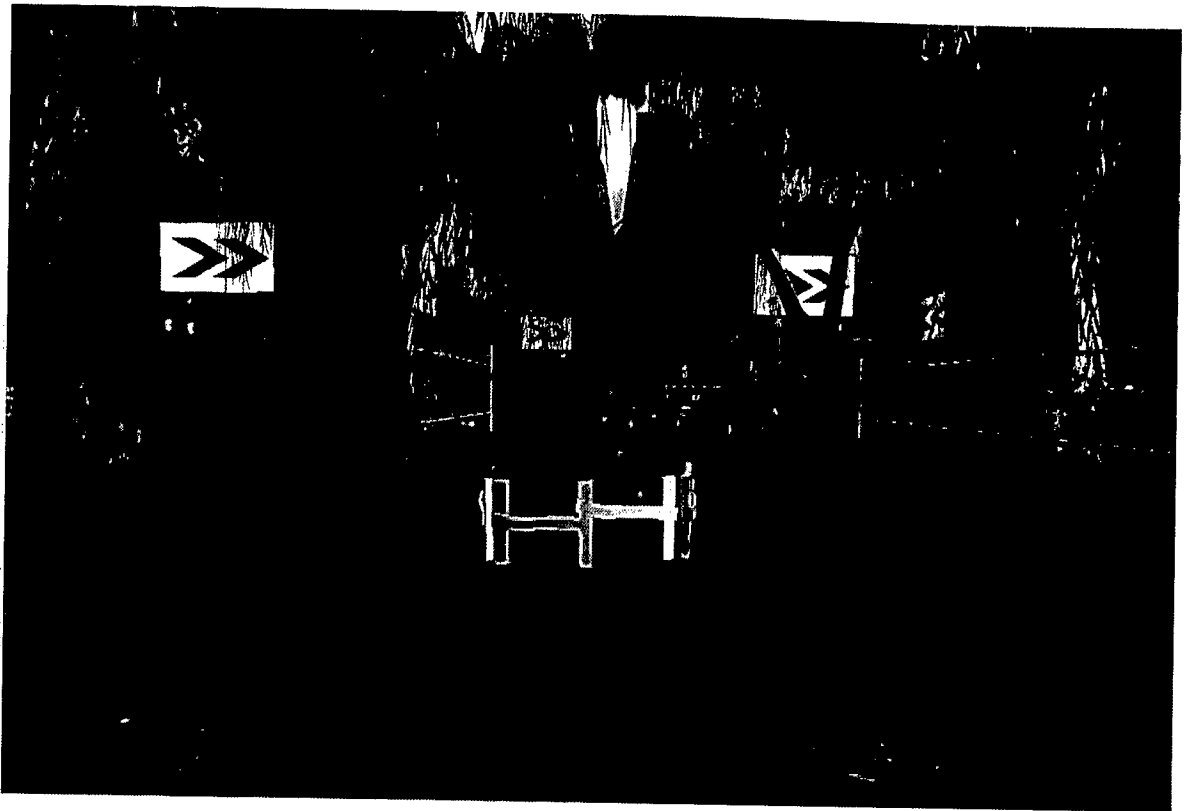


Figure2.13 Internal view of the zoo

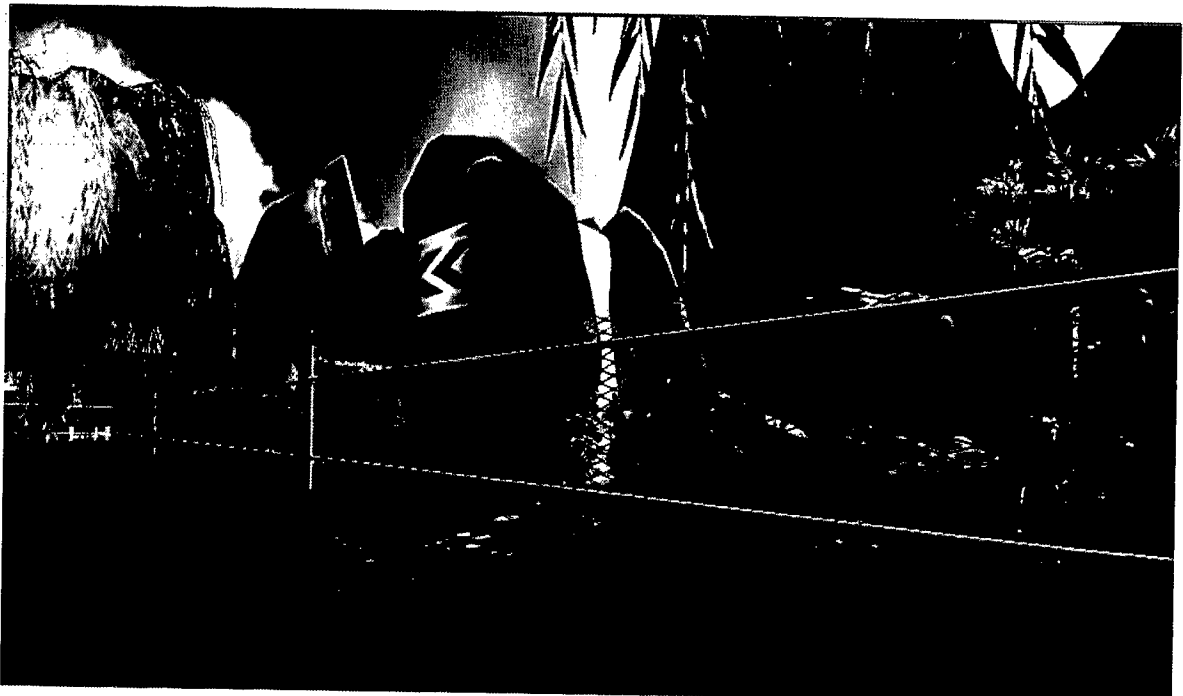


Figure2.14 One of the animation animal character within of 13 of animal

• Display Animal Information



Figure 2.15 Display of animal information on top of right hand-side

Related codes are as below:

This code is used to pop up animal detail while the player gets closer to the animal cage. Animal description only displays on the top of the right hand-side while the player triggers the animal cage. Once the player is away from the animal cage, the animal description will automatically disappear. Several animal details are included inside the animal description such as scientific name, habitat, diet, lifespan, height, and weight. Other than that, a reality animal image will also display at the top to ensure the animal species are clarified by the user.

```
using UnityEngine;
using UnityEngine.UI;
using System.Collections;

public class animalInfo : MonoBehaviour {

    public RawImage image;
    public Text animalDescription;
    public Canvas canvas;
    public Texture animalImage;
    public string description;

    void Start () {
```

```
        canvas.enabled = false;
    }

    void OnTriggerEnter(Collider col)
    {
        if(col.gameObject.CompareTag ("Player"))
        {
            DisplayInformation();
        }
    }

    void OnTriggerExit(Collider col){
        if(col.gameObject.CompareTag ("Player"))
        {
            clearInformation();
        }
    }

    void DisplayInformation(){
        canvas.enabled = true;
        image.texture = animalImage;
        animalDescription.text = description;
        animalDescription.fontSize = 16;
    }

    void clearInformation(){
        canvas.enabled = false;
        image.texture = null;
        animalDescription.text = null;
    }
}
```

• Loading Scene

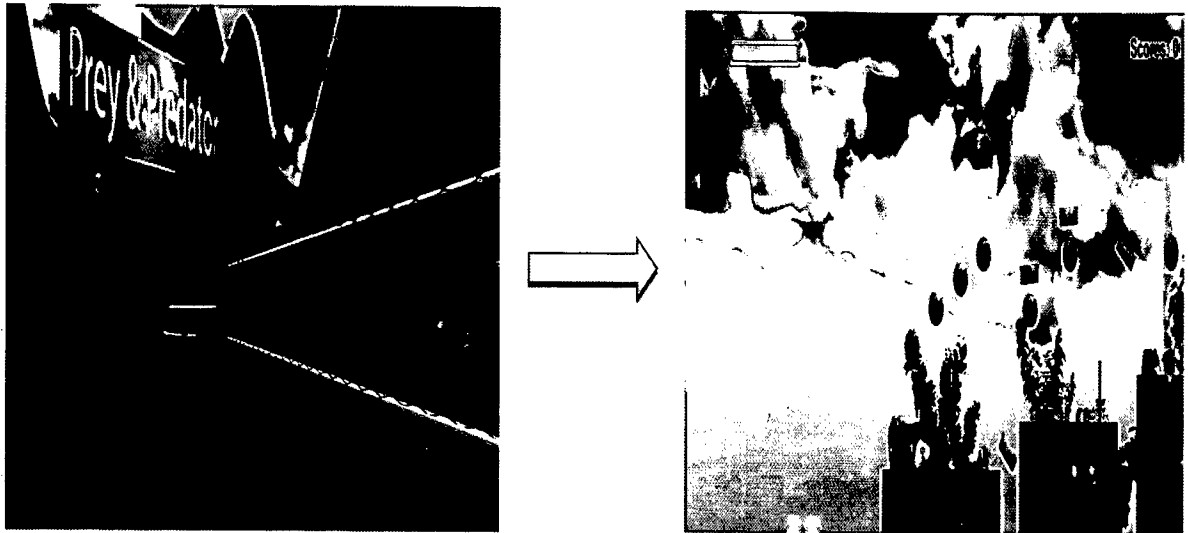


Figure2.16 Loading scene to Prey and Predator game

Related codes are as below:

Once player trigger on the building of prey and predator, loading level will be launched to the level that have stated inside the script. But firstly, the game will load to the instruction page before the game loading to the game itself.

```
using UnityEngine;
using UnityEngine.UI;
using System.Collections;

public class LoadingScenPreyAndPredator : MonoBehaviour {
    // Use this for initialization
    void Start () {

    }

    // Update is called once per frame
    void Update () {

    }

    void OnTriggerEnter(Collider col)
    {
        if(col.gameObject.CompareTag ("Player"))
        {
            Application.LoadLevel("InstructionPreyAndPredator");
        }
    }
}
```

2.4.2 Prey and Predator

In this context, the Prey and Predator is a game in the form of the classic 2D platformer which offer children an intuitive or rather easy way to engage in a game as 3D gaming would represent a quite steep learning curve for children.

In this game, the children will control an avatar or in this case a randomly generated animal; the user or children would have to navigate the character in order to avoid animals from higher food chain from eating him or technically it. For example, if the character is fox, then it must avoid from colliding or meeting with lion.

In addition, there is pick up in this game in form of coins to enable user to accumulate the score in order to make it competitive for them.



Figure2.17 Prey and Predator platform

• Gain Score

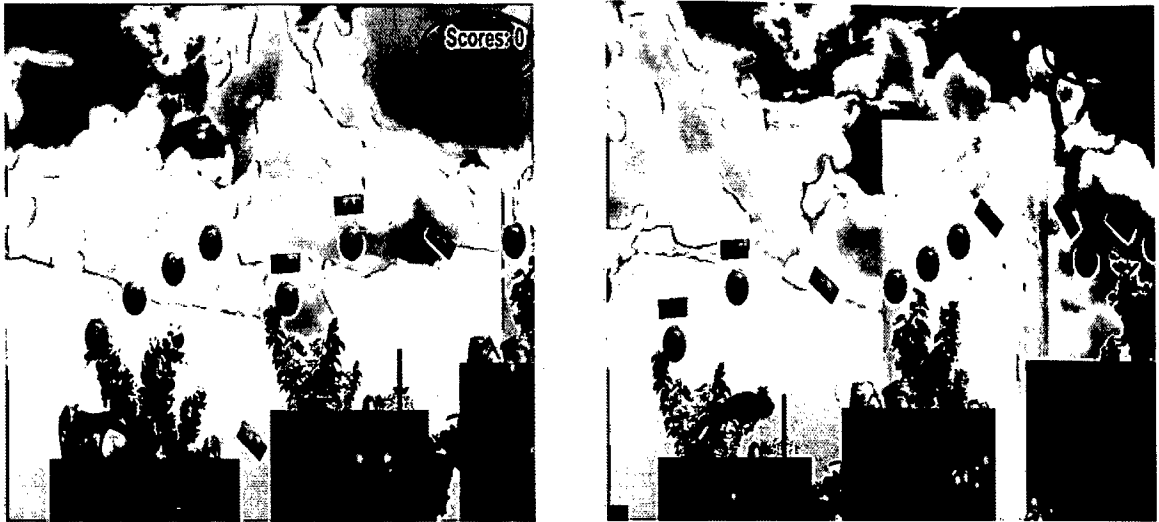


Figure2.18 Score gaining while animal character collide with coin and gold bar asset

Related codes are as below:

Two game asset functioning in score scoring which are the coin and gold bar. Each coin represent one score while each gold bar represent of two score. Scoring only able to increase the value once the animal character trigger with the scoring asset. Since animal character will frequently change the character itself, score function is required to modify the value in order to public in score board.

```
using UnityEngine;
using System.Collections;
public class coin : MonoBehaviour {

    private bool crash = false;
    private GameObject dummy;
    void Start () {
    }
    void OnTriggerEnter(Collider other) {
        if (other.gameObject.tag == "Fox" || other.gameObject.tag ==
"Lion" || other.gameObject.tag == "Rabbit1" || other.gameObject.tag == "Wolf") {
            Destroy(gameObject);
            dummy = GameObject.Find ("ScoreBoard");
            dummy.GetComponent<ScoreFunction>().score +=1;
        }
    }
}
```

- Lose Live

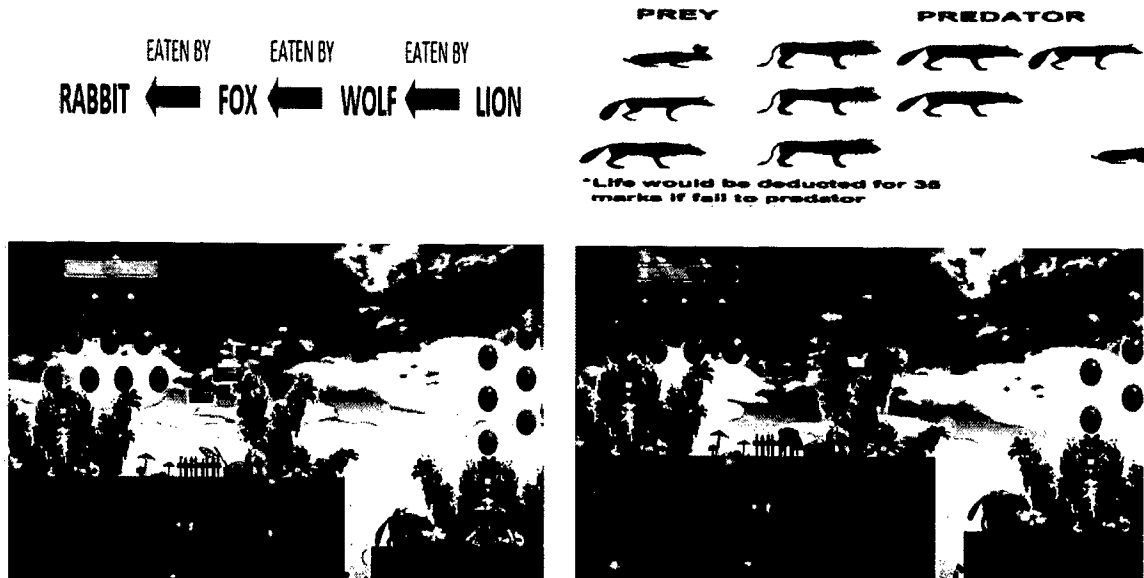


Figure2.19 Deduct of live value when predator eat the prey

Related codes are as below:

Live value will be deduct 34 from the total amount of 100, while the pray fail to avoid from it predator. Lion, fox and wolf will be display with AI animation to meet it prey or predator in order for the animal character to do further action either avoid it or attack it as meal.

```
using UnityEngine;
using System.Collections;
public class LionKill : MonoBehaviour {
    private TotalLives lives;
    void Start(){
        lives = GameObject.Find ("Lives").GetComponent<TotalLives>();
    }
    void OnCollisionEnter(Collision col){
        if (col.gameObject.CompareTag
("Rabbit1")||col.gameObject.CompareTag ("Fox")||col.gameObject.CompareTag
("Wolf")) {
            lives.livesVal -= 34;
            Destroy (this.gameObject);
        }
    }
}
```


- **Generate AI animation**



Figure2.20 AI animation movement of lion, fox and wolf

Related codes are as below:

A basic enemy AI movement. While the enemy animal trigger with left and right side of the platform trigger cube, enemy animal will automatically change it self-position to 180 angle.

```
using UnityEngine;
using System.Collections;

public class AIAnimation : MonoBehaviour {
    //use this for ai animation
    private bool turnleft = false;
    // Update is called once per frame
    void FixedUpdate () {
        //this.rigidbody.AddForce(new Vector3(0,0,1),
        ForceMode.VelocityChange);
        if(!turnleft)
        {
            transform.Translate (transform.right * -1 * Time.deltaTime);
        }
        else if(turnleft)
        {
            transform.Translate (transform.right * 1 * Time.deltaTime);
        }
    }
    void OnTriggerEnter(Collider col)
```

```
{
    if (col.gameObject.tag == "goRight")
    {
        Debug.Log("turnRight");
        transform.Rotate (0,-180,0);
        turnleft = false;
    }
    else if (col.gameObject.CompareTag("goLeft"))
    {
        Debug.Log("turnLeft");
        transform.Rotate (0,180,0);
        turnleft = true;
    }
}
```

2.4.3 Feed Yourself

In this context, Feed Yourself is a game in the form of classic 2D plat former which offer children a rather interesting way to play a game, in other words, a bit easier compared to 3D gaming considering their ages.

In this game, the children would have to control or navigate a character in form of randomly generated animals. The objectives of this game is to expose children of the eating habits of the corresponding animals. For example, rabbit could only eat vegetables related food such as carrot and cucumber, yet, if the rabbit happens to collide or eat meat related food; this will result in a loss of the character life.



Figure2.21 Feed Yourself platform

- Gain score

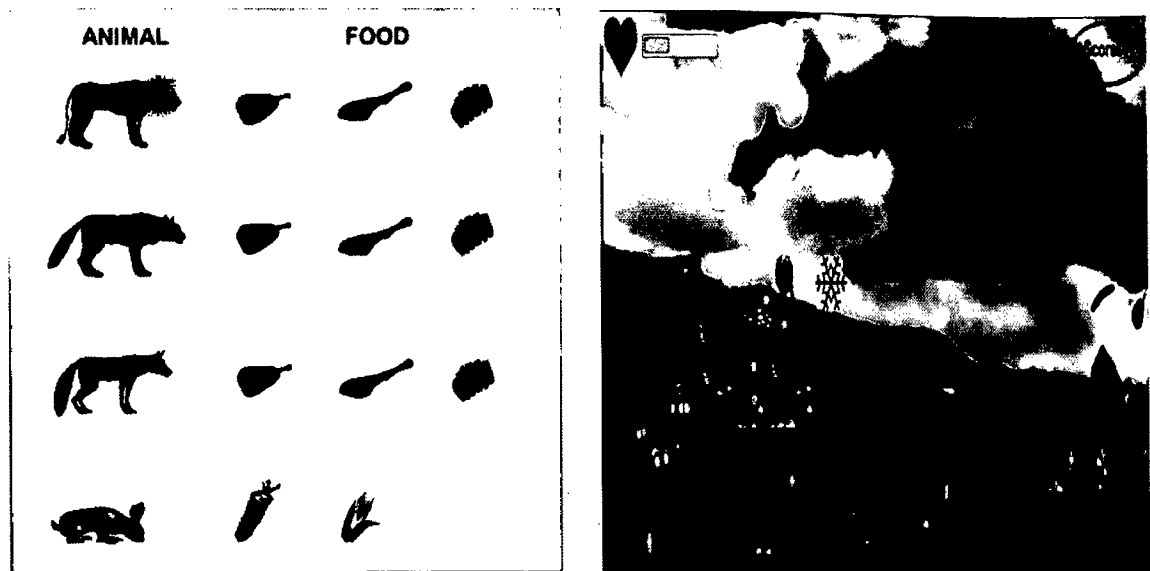


Figure2.22 animal character gain score while feed the right food

Related codes are as below:

In game of feed yourself, there have two type of food optional which are Vega and meat. Score only can be acquired once the animal trigger with right food one score will be added. In order to do that, the script is put inside the food icon to identify which animal is eaten the food.

```
{
    if (other.gameObject.CompareTag ("Lion")) ||
    other.gameObject.CompareTag ("Fox") || other.gameObject.CompareTag ("Wolf")) {
        GameObject.Find("ScoreBoard").GetComponent<ScoreFunction>
        ().score += 1;
        Destroy (gameObject);
    }
}
```

- Lose live

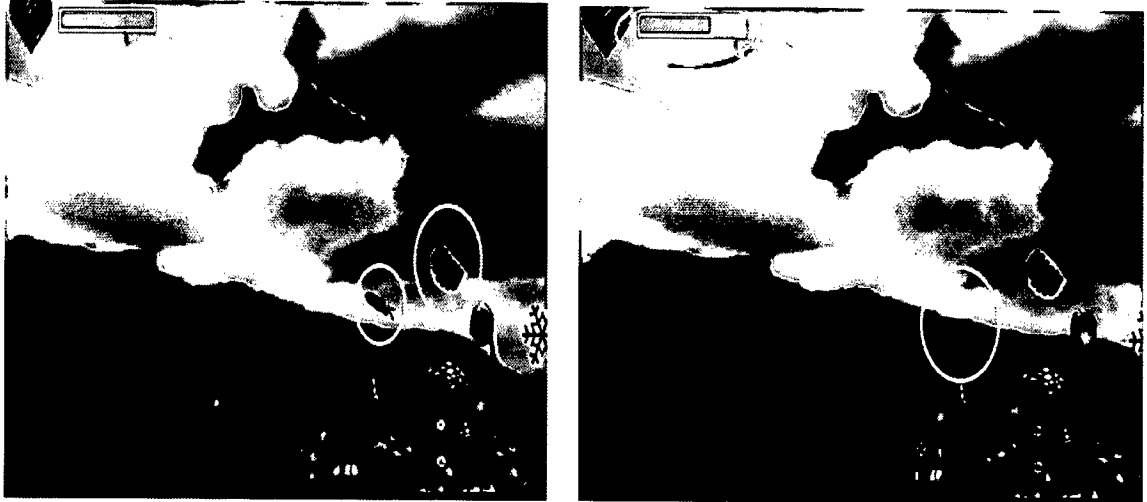


Figure2.23 live is deduct when the animal character trigger wrong food icon

Related codes are as below:

Live will be deduct for 34 lives each when animal character trigger with wrong icon of food. In the script of the food icon itself detect the character name that not support consume the food, the lives will be deduct automatically.

```
else if (other.gameObject.CompareTag ("Rabbit1")) {
    GameObject.Find ("Lives").GetComponent<TotalLives>
().livesVal -= 34;
    Destroy (gameObject);
}
```

- Add live

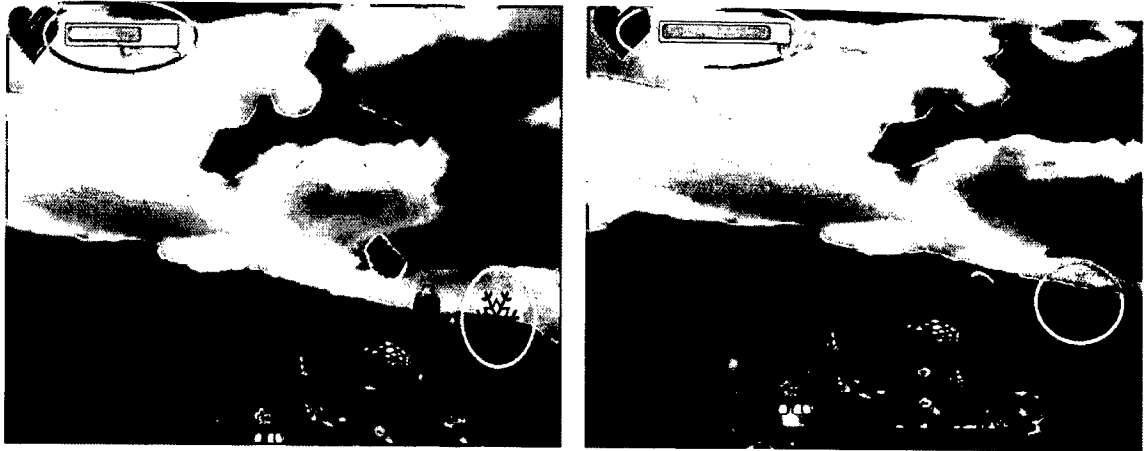


Figure2.24 snowflake icon

Related codes are as below:

Free live of 20 will be added once the animal character trigger with add live icon (snowflake). In order to gain the 20 live, live will only be added once the live is less than 100 else the live of 100 will be remain as 100.

```
using UnityEngine;
using System.Collections;

public class AddLives : MonoBehaviour {
    //Throw this inside snowflake to increase lives

    void Start(){

    }

    void OnTriggerEnter(Collider col){
        if(col.gameObject.CompareTag ("Fox")||col.gameObject.CompareTag ("Rabbit1")||col.gameObject.CompareTag ("Wolf")||col.gameObject.CompareTag ("Lion")){

            GameObject.Find
            ("Lives").GetComponent<TotalLives>().livesVal+=20;
            Destroy (this.gameObject);

        }
    }
}
```

2.4.4 Generic Code

Code that will implement inside the both game of Prey and Predator and Feed Yourself.

- **Morphing**

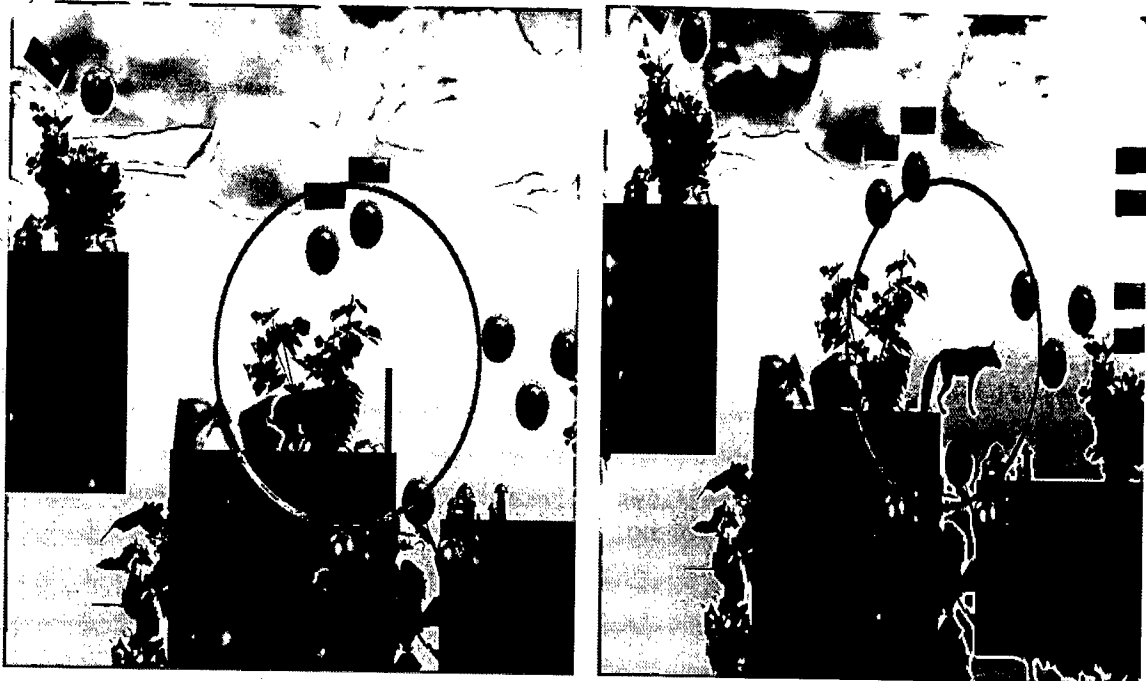


Figure2.25 Morphing function

Related codes are as below:

Morphing function only activate while animal character trigger with the morphing board. Once animal trigger, random will be taken to change the character between among of four type of animal character which are rabbit, fox, wolf and lion. Destroy morphing board, once animal trigger with it.

```
#pragma strict

var lion: GameObject;
var fox: GameObject;
var rabbit:GameObject;
var wolf: GameObject;

var count: int;

function OnTriggerEnter(other: Collider) {
```

```

        if(other.gameObject.tag=="Lion" || other.gameObject.tag == "Fox" ||
other.gameObject.tag == "Wolf" || other.gameObject.tag == "Rabbit1")
        {
            GameObject.Find("smoothFollow").transform.parent = null;
            Destroy(other.gameObject);
            RandomSpawnCharacter();
            Destroy(gameObject);
        }
    }
}

function RandomSpawnCharacter(){

//count = 3;

count = Random.Range(0,3);
var clone : GameObject;
switch (count)
{
    case 3:
        //clone = Instantiate (lion, transform.position, Quaternion.identity);
        var change1 = Instantiate (lion, transform.position, Quaternion.Euler(0,90,0));
        GameObject.Find("smoothFollow").transform.parent
change1.transform;
        break;
    case 2:
        //clone = Instantiate (rabbit, transform.position, Quaternion.identity);
        var change2 = Instantiate (rabbit, transform.position, Quaternion.Euler(0,90,0));
        GameObject.Find("smoothFollow").transform.parent
change2.transform;
        break;
    case 1:
        //clone = Instantiate (wolf, transform.position, Quaternion.identity);
        var change3 = Instantiate (wolf, transform.position, Quaternion.Euler(0,90,0));
        GameObject.Find("smoothFollow").transform.parent
change3.transform;
        break;
    case 0:
        //clone = Instantiate (fox, transform.position, Quaternion.identity);
        var change4 = Instantiate (fox, transform.position, Quaternion.Euler(0,90,0));
        GameObject.Find("smoothFollow").transform.parent
change4.transform;
        break;
    default:
        break;
}
}
}

```


• SpawnFirst

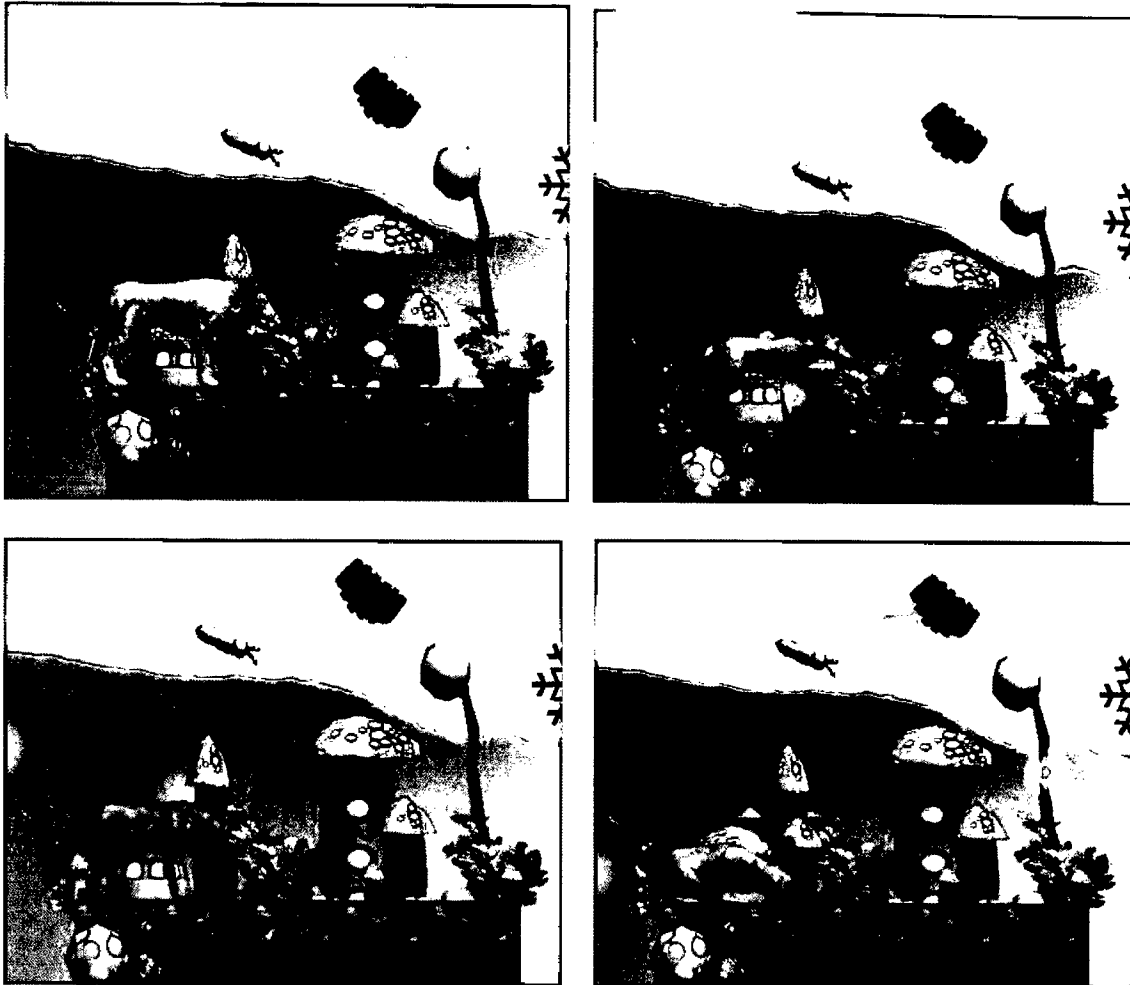


Figure2.26 Random spawn first at the beginning of the game

Related codes are as below:

Every beginning of the game, new character will be generate. SpawnFirst is launching is to ensure children have a new begin while they playing the same game by generate randomly character among of rabbit, fox, wolf and lion at the begining to starting the game.

```
using UnityEngine;
using System.Collections;

public class SpawnFirst : MonoBehaviour {
    public GameObject[] animals;
    private int randomNum;
    // Use this for initialization
```

```
void Start () {  
    GameObject animal = (GameObject)Instantiate (animals  
[RandomGenerator()], transform.position, Quaternion.Euler (0,90,0));  
    GameObject.Find ("smoothFollow").transform.parent = animal.transform;  
}  
  
// Update is called once per frame  
void Update () {  
  
}  
  
public int RandomGenerator(){  
    randomNum = Random.Range (0, animals.Length);  
    return randomNum;  
}  
}
```

• Root Motion

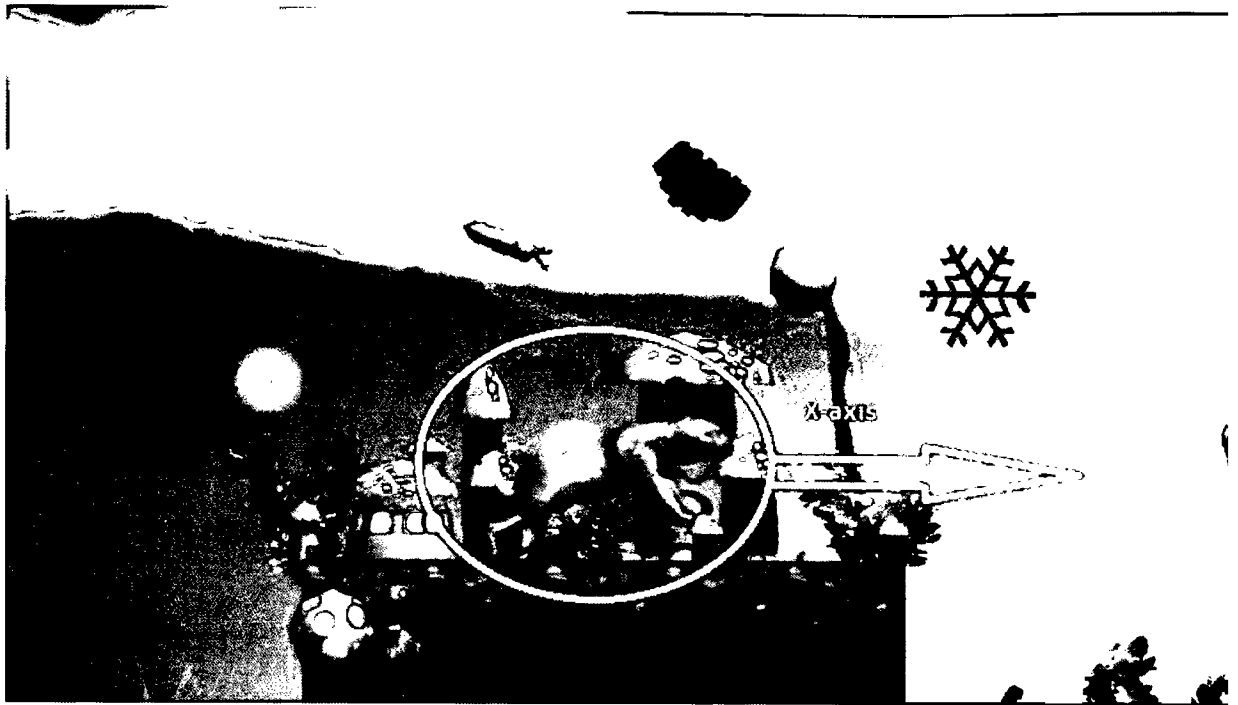


Figure2.27 X-axis root motion animation

Related codes are as below:

Animation of character while moving toward x axis by control motion of character according to the speed set by horizontal axis.

```
using UnityEngine;
using System.Collections;
[RequireComponent(typeof(Animator))]
public class RootMotionScript : MonoBehaviour {
    //control motion of character according to the speed set by horizontal axis
    void OnAnimatorMove()
    {
        Animator animator = GetComponent<Animator>();
        if (animator)
        {
            Vector3 newPosition = transform.position;
            newPosition.x += animator.GetFloat("Speed") * 2 *
Time.deltaTime;
            transform.position = newPosition;
        }
    }
}
```

• Jumping Motion



Figure2.28 Jumping motion perform by pressing pause and key “D” at the same time

Related codes are as below:

Jumping animation only can be apply while the animal character doing the root motion action at the same time. In order to do that, pause and key “D” is necessary click together to performance jumping motion.

```
using UnityEngine;
using System.Collections;

public class Jumpingscript : MonoBehaviour {
    public float jumpPower = 10.0f;
    private Animator anim;
    void Start () {
        anim = GetComponent<Animator>();
    }
    // Update is called once per frame
    void Update () {
        Vector3 velocity = this.rigidbody.velocity;
        if(Input.GetKeyDown("space") && anim.GetFloat ("Speed")>0.1f){
            transform.Translate (0,jumpPower,0);
        }
    }
}
```

- Game Over Manager

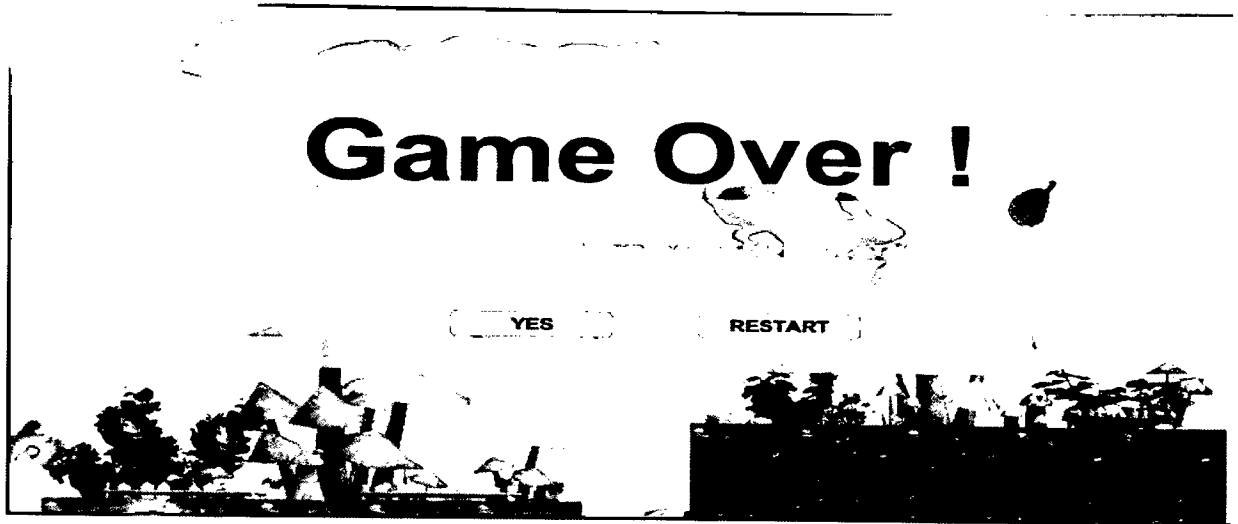


Figure2.29 pop up of text game over once lives is equal to zero

Related codes are as below:

Once live deduct until zero result, text of game over will be appear. While panel contain of two button is needed to click for further selection either quit the game to loading level back to the zoo scene or restart the game to play once again.

```
using UnityEngine;
using System.Collections;
using UnityEngine.UI;
public class GameOverManager : MonoBehaviour {
    public Slider sliderLives;
    public Text text;
    public GameObject panel;
    void Start () {
        Time.timeScale = 1.0f;
        text.enabled = false;
        panel.SetActive(false);
    }
    void Update () {
        if (sliderLives.value <= 0) {
            Time.timeScale = 0;
            text.enabled = true;
            text.text = "Game Over !";
            panel.SetActive(true);
        }
    }
}
```

• Success Manager

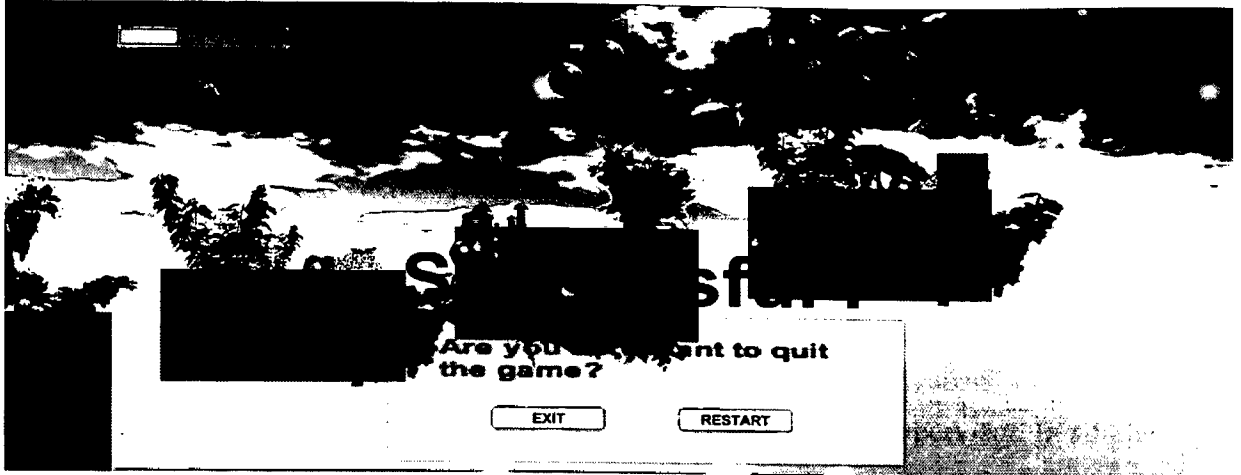


Figure2.30 Success text appear once animal character trigger the treasure box

Related codes are as below:

Trigger of treasure box is use to notify the player successfully reach the end stage of the game. Once the animal character trigger the treasure box, successful text will be appear with the panel of two button of selection either to continue play the game or quit the game to the zoo scene.

```
using UnityEngine;
using UnityEngine.UI;
using System.Collections;
public class SuccessManager : MonoBehaviour {
    public Text text;
    public GameObject panel;
    void Start () {
        Time.timeScale = 1.0f;
        text.enabled = false;
        panel.SetActive(false);
    }
    void OnTriggerEnter(Collider col) {
        if (col.gameObject.CompareTag ("Lion")||col.gameObject.CompareTag
("Fox")||col.gameObject.CompareTag ("Wolf")||col.gameObject.CompareTag
("Rabbit1")) {
            Time.timeScale = 0;
            text.enabled = true;
            text.text ="Successful !";
            panel.SetActive(true);
        }
    }
}
```

2.5 Testing

In this phase, evaluation is carried out to verify the overall system correctness. Besides, possible or potential errors and bugs are identified to reinforce the stability of the system. Lastly, testing is conducted to test the usability as well as user friendliness.

System testing is conducted after completing the system to evaluate and to ensure the system's compliance with the user requirement and objective achieve. Functionality acceptance test and user test is carry on the entire system by project supervisor and children within four to six years old. Functional acceptance testing would be carried out to ensure every functionalities of system works and is verified by my project supervisor. In addition, user testing would be conducted by real user/ children to test the understanding on the system.

2.5.1 Functionality Acceptance Testing

Refer appendix D: Functionality Acceptance Form

1. Functionality

Purpose	
Pre-Condition	
Test Steps	
Expected Results	
Result	<input type="checkbox"/> Pass <input type="checkbox"/> Pass with condition <input type="checkbox"/> Fail
Tester Comments	

Tested by: _____

Date: _____

Figure2.31 Functional Acceptance Testing Form

1. Zoo

a) Motion Input

Motion input of character is needed to walkthrough the 3D zoo environment. User need to press the WASD key to enable the character to move forward, backward left and right side of the zoo environment. Movement the camera with mouse is essential. In order to visit the zoo from different perspective view.

b) Display Animal Information

Pop up of animal information is needed to introduce the detail of certain type of animal such as scientific name, the habitat, they diet, lifespan and etc. Image of current animal and the detail at the top of the right-hand corner. The animal detail will only display while the character is get close to the animal cage. Once, character is away from the cage, animal information will be disappear.

c) Loading Scene of Prey and Predator

Loading scene is an action to change the current scene to another scene. In order to do that, collide of Prey and Predator building is needed to access the loading level. Once the scene is changing to clarify the successful loading.

d) Loading Scene of Feed Yourself

Success loading of scene feed yourself once the current scene is change to the feed yourself scene. Before that, collide of feed yourself building is needed to access to the loading scene.

2. Prey and Predator

a) Motion Input

Motion input is carry out when user press the key “D” to navigation. This enable the current character to move in x-axis direction. In this Prey and Predator game, the character is not able to moving backward, only one direction can be proceed.

b) Jumping Input

In order to move to higher platform or collide with the scoring asset, jumping motion is needed in this game. Jump motion only activate when the character is moving. Press space key while the animal was moving to perform jumping movement.

c) Morphing

Morphing is changing character action when the current character collide with the morphing board. In this game, totally got four type of animal character will be change randomly from each other which are rabbit, fox, wolf and lion in order to proceed with the game.

d) Score Function

In game of Prey and Predator, scoring able to gain while the current character collide with the scoring assets which are the coin and the gold bar. 1 point would be added to score if the character has collide with the coin while 2 points would be awarded if the character has collided with the gold bar.

e) Live Function

There have totally 100 lives in the live bar. In this Prey and Predator game, 34 live will be deducted while current character collide with it predator.

f) Success Manager

Once the character collide with the treasure box, a success window with options of existing or restarting the game will pop up. This represent the character have finishes the level.

g) Game Over Manager

In Prey and Predator game, a game over window with options of exiting or restarting the game will pop up. Once the current animal collide with its predator until live bar reaching zero this represent the game is over.

3. Feed Yourself

a) Motion Input

Motion input is carry out when user press the key “D” to navigation. This enable the current character to move in x-axis direction. In this Feed Yourself game, the character is not able to moving backward, only one direction can be proceed.

b) Jumping Input

In order to move to higher platform or collide with the scoring asset, jumping motion is needed in this game. Jump motion only activate when the character is moving. Press space key while the animal was moving to perform jumping movement.

c) Morphing

Morphing is changing character action when the current character collide with the morphing board. In this game, totally got four type of animal character will be change randomly from each other which are rabbit, fox, wolf and lion in order to proceed with the game.

d) Score Function

In game of Feed Yourself, scoring able to gain while the current character collide with the scoring assets which are the vegetable and the meat. 1 point would be giving once the correct character collide with right food. In this game, three types of meat and two types of vegetables is prepared to ensure the carnivore and herbivore character correctly choosing their food.

e) Live Function

There have totally 100 lives in the live bar. In this Feed Yourself game, 34 live will be deducted while current character collide with its wrong food.

f) Add Live Function

In game of Feed Yourself, character will easily lose their live. Add live function is needed in order to proceed the game further. Once, the current animal collide with

snowflake icon 20 lives will be added under the condition of the value of life bar is below of 100.

g) Success Manager

Once the character collide with the treasure box, a success window with options of existing or restarting the game will pop up. This represent the character have finishes the level.

h) Game Over Manager

In Feed Yourself game, a game over window with options of exiting or restarting the game will pop up. Once the current animal collide with its wrong food until live bar reaching zero this represent the game is over.

2.5.2 User Testing

According to the comparison of the existing system, few improvement have been done in this system. User testing form will be evaluate by the user of this scope which are the children within four to six years old, kindergarten's teacher and children's parent. Few questions according to this system will be asked to ensure the system achieved user requirement. Question will be asked separate among of Zoo, Prey and Predator and Feed Yourself scene.

User Testing Form (Teacher/Parent)		<u>Game</u>
Name : _____		
Age : _____		
Gender: Male / Female		
<u>System</u>		
1. Do you think that the game is suitable as a learning material in teaching kindergarten student (In this case, learning of animal species and their behavior) 4-6 years old?		1. Do you understand the instruction given in order to play the game?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
2. Do you agree that game is more interactive and engaging compared to the traditional learning material/tool (book, newspaper and etc)?		2. Do you know how to play the game according to the instruction?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
3. Do you feel that the game is immersive?		3. Do you learn the following topics while playing this game?
<input type="checkbox"/> Yes	<input type="checkbox"/> No	a. Feed Yourself (the eating habits of animal – Carnivore & Herbivore)
4. Do you feel that the designation of the game mechanics could assist student in learning?		<input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/> Yes	<input type="checkbox"/> No	b. Prey and Predator (the food chain of animals)
5. Do you feel that the graphics integrated in the gameplay is interesting?		<input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/> Yes	<input type="checkbox"/> No	4. In your opinion, is this game suitable to assist in learning of student regarding of animal topic?
6. Do you feel that the scoring mechanism integrated in this system will motivate student in playing this game as well as learning more of regarding the information of this animals?		<input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/> Yes	<input type="checkbox"/> No	

Figure2.32 User Testing Form (Teacher / Parent)

User Testing Form (children within 4 – 6 years old)

Name : _____

Age : _____

Gender: Male / Female

Zoo

1. Do you feel that the zoo environment is attractive?
☐ Yes ☐ No
2. Do you feel this zoo is more interactive compare to the traditional learning material (book, newspapers and etc)?
☐ Yes ☐ No
3. Do you feel this zoo is immersive?
☐ Yes ☐ No
4. Is the delivery of instruction simple and clear?
☐ Yes ☐ No
5. Does the colors and graphics designed in this project interesting?
☐ Yes ☐ No
6. Do you feel that the system is intuitive and easily operated?
☐ Yes ☐ No

Prey and Predator

1. Do you feel the "Prey and Predator" environment is interactive?
☐ Yes ☐ No
2. Do you understand the game instruction?
☐ Yes ☐ No
3. Do you learn about animal food chains from this game?
☐ Yes ☐ No

4. Do you feel entertained from playing this game?
☐ Yes ☐ No
5. Are you satisfied with your score?
☐ Yes ☐ No
6. Do you want to play the game again?
☐ Yes ☐ No

Feed Yourself

1. Do you feel the "Feed Yourself" game environment is interactive?
☐ Yes ☐ No
2. Do you understand the game instruction?
☐ Yes ☐ No
3. Do you learn about animals eating habits from this game?
☐ Yes ☐ No
4. Do you feel entertained from playing this game?
☐ Yes ☐ No
5. Are you satisfied with your score?
☐ Yes ☐ No
6. Do you want to play the game again?
☐ Yes ☐ No

Figure2.33 User Testing Form (children within 4 – 6 years old)

• Zoo

In this system, the colors and graphic designed is different from previous system which the color is not attractive and mostly implement 2D graphics designed. In order to develop the system in more interactive way, interaction is needed. 3D environment is created for user to walk around to visit the environment, this enable the user immersive with the environment easily. Other than that, animal information is delivery in an interactive way while only appear when user get close to the animal cage. Delivery message in more interesting way compare to the traditional learning materials.

• Prey and Predator

The test is conducted to examine the understanding of user in regards of the animal food chains system. The game will be tested on its ability to deliver an interactive experience to user as well as capability to offer the information in form of gameplay in a visually powerful way. Besides, the game will be tested regarding their motivation level, in other words, would the user have the urge to play the game again and keeps breaking scores. Finally, user will asked whether they enjoy the experience of learning information in this game.

• Feed Yourself

The test is conducted to examine the understanding of user in regards of the animal eating habits. The game will be tested on its capability to deliver an interactive experience to user as well as ability to offer the information in form of gameplay in a visually powerful way. In addition, the game would be tested regarding its intuitiveness in instructing the user on the game mechanics as well as how to play the game. Besides, the game will be tested regarding its ability to attract user to replay the game and keeps breaking scores. Finally, user will asked whether they enjoy the experience of learning information in this game.

2.5.3 Result of User Testing Form (Teacher / Parent)

This is the analysis of data collected from 3 people who represents parent and teacher.

Refer appendix E: User Testing Form (Teacher / Parent)

Table 2.1 Result of User Testing Form (Teacher / Parent)

QUESTION	YES	NO
System		
4. Do you think that the game is suitable as a learning material in teaching kindergarten student (In this case, learning of animal species and their behaviour) 4-6 years old?	100%	0%
5. Do you agree that game is more interactive and engaging compared to the traditional learning material / tool (book, newspaper and etc.)?	100%	0%
6. Do you feel that the game is immersive?	100%	0%
7. Do you feel that the designation of the game mechanics could assist student in learning?	100%	0%
8. Do you feel that the graphics integrated in the gameplay is interesting?	100%	0%

9. Do you feel that the scoring mechanism integrated in this system will motivate student in playing this game as well as learning more of regarding the information of this animals?	100%	0%
Game		
1. Do you understand the instruction given in order to play the game?	100%	0%
2. Do you know how to play the game according to the instruction?	100%	0%
3. Do you learn the following topics while playing the game?		
a. Feed Yourself (the eating habits of animal – Carnivore & Herbivore)	100%	0%
b. prey and Predator (the food chain of animals)	100%	0%
4. In your opinion, is this game suitable to assist in learning of student regarding of animal topic?	100%	0%

2.5.4 Result of User Testing Form (children within 4 – 6 years old)

This is the analysis of data collected from 7 people who children within four to six years old girls and boys.

Refer appendix F: User Testing Form (Children within 4 – 6 Years Old)

Table 2.2 Result of User Testing Form (Children within 4 – 6 Years Old)

QUESTION	YES	NO
Zoo		
1. Do you feel that the zoo environment is attractive?	85.71%	14.29%
2. Do you feel this zoo is more attractive compare to the traditional learning materials (book, newspaper and etc.)?	71.43%	28.57%
3. Do you feel this zoo is immersive?	85.71%	14.29%
4. Is the delivery of instruction simple and clear?	85.71%	14.29%
5. Does the colors and graphics designed in this project interesting?	71.43%	28.57%
6. Do you feel that the system is intuitive and easily operated?	85.71%	14.29%
Prey and Predator		
1. Do you feel the “Prey and Predator” environment is interactive?	100%	0%
2. Do you understand the game instruction?	85.71%	14.29%
3. Do you learn about animal food chains from this game?	100%	0%
4. Do you feel entertained from playing this game?	85.71%	14.29%
5. Are you satisfy with your score?	71.43%	28.57%
6. Do you want to play the game again?	85.71%	14.29%
Feed Yourself		
1. Do you feel the “Feed Yourself” game environment is interactive?	100%	0%
2. Do you understand the game instruction?	100%	0%
3. Do you learn about animal eating habits from this game?	85.71%	14.29%
4. Do you feel entertained from playing this game?	85.71%	14.29%
5. Are you satisfy with your score?	57.14%	42.86%
6. Do you want to play the game again?	100%	0%

2.5.5 Result Conclusion

From the conducted testing, it is shown that teacher and parent satisfy with this Educational Animal Game for Kindergarten. While, Children much more prefer the game of Feed Yourself compared with the game of Prey and Predator. Prey and Predator game a bit difficulties for the children to understand, but they learn when they play the game. The scoring mechanism really attractive the children to play again and again. The children feel fresh when they walk through the zoo environment, see the animal animation. They also learn the information for the zoo. Children feel entertain and learn at the same time when playing the game. This able to help them in their learning process.

2.5.6 Improvement from Existing System

Regarding to the existing system that have been made comparison, improvement of the game will be implement in my project of Educational Animal Game for Children to achieve the object of this system which are user interface, mechanic of the game (education / entertainment) and mechanics of the game (scoring mechanism).

Table 2.3 Improvement from Existing Systems

Educational Animal Game for Kindergarten		
1	User Interface	3D and 2D interface, animation animal. Less word use in instruction. Few Button is develop to access the system. Instruction is delivery in simple form, pop up message. More focus of the animal game interface design. (condition 1)
2	Mechanic of the game(education/entertainment)	Combination of education game and entertainment game (condition 2)
3	Mechanic of the game(scoring mechanism)	Scoring mechanism (condition 3)

2.6 Deployment

In this phase, the system is deployed for real life implementation by installing the executables in the personal computer available in kindergarten. The deployment is done by putting the executables with all the necessary resource file into physical DVD.

Next, the target users or children are trained to use and familiarize themselves with the input to enable them to play the developed game. User manual for this system will be provided as a guideline for user when play the game. Refer appendix C: User Manual / Guide.

2.7 Maintenance

In this phase, maintenance will be carried out to improve the qualities of gameplay as well as system responsiveness as to optimize the game from being hogging too much resources.

CHAPTER 3: CONCLUSION

3.1 Conclusion

Conventional learning materials such as books and newspaper lacks interactivity, an essential or important element in today education. Interaction of between system and user is crucial in motivating student in striving to get more information and knowledge. In other words, interaction represents a motivation that keeps user or children in this case in putting effort in learning. Thus, interaction in learning is the emphasis of today learning paradigm. In addition, the delivery of information and knowledge through traditional learning material leaves no clue regarding whether the information conveyed is received, in other words, children's understanding regarding the information or knowledge delivered to them remains a big doubt. This is because of lacking of interactivity in those materials, a book or a newspaper cannot give user feedback on what he/she is learning, and the information conveyed might be misinterpreted. Thus, a new way or alternative needed to be introduced to assist the learning of children alongside the usage of conventional learning materials.

As such, an interactive educational game that demands cognition interaction from user while offering them an entertainment should be in place. With the utilization of such educational game, information and knowledge is no longer delivered in a dull and boring way; rather, the information can be afforded to be delivered in a crisp not to mention visually powerful manner which could possibly foster children interests in exploring more and more about the information conveyed. For example, instead of a flat and dull 2D images of animals, lifelike 3D models equipped with animation and textures could give user or children a vividly information regarding those particular animals. Such approach could undoubtedly assists in digestion of information of children. The combination of both educational values as well as

entertainment could be the game changer in today learning environment. In fact, according to 3M Corporation from an online source, “90% of information transmitted to the brain is visual, and visuals are processed 60,000X faster in the brain than text.

In addition, the methodology chosen in this research is SDLC waterfall model which enables stable and steady progress from a phase to another phase albeit limiting the flexibility that is offered in other methodology; yet, waterfall guarantees results or deliverables at each phase and most importantly, there is no overlapping of phases which is definitely easier to be managed.

In conclusion, the system represents an alternative learning materials that is intended to provide an engaging experience to children while having fun in learning new things. However, the system could be further enhanced to provide a more engaging and knowledgeable experience to children in order to maximize the potential of this learning material in their learning. For example, the system could be improved by adopting more levels or gameplays, the ability to challenge their peers in order to bring the best out of them while polishing up the visual aspects of the game. Lastly, the game could be ported to mobile platform for easy access as mobile devices have becoming a norm in today society.

3.2 Achievement Towards Objective

The result of this project is none other but an educational animal game for children that is designed to cater the requirement that is needed in assisting children in learning. By determining the limitation of existing system namely cluttered interface, lacks of interactivity, limited on 2D graphics and etc., the system set out on a path to rectify those limitation to provide children a better learning materials that offers information and at the same time, enjoying the learning process. In addition, in order to motivate children in keeping playing at the same time learning information, scoring mechanism is introduced to provide an engaging experience that motivate user to learn the information and apply it in the game to get better scores. This result of this project consists of a 3D virtual Zoo and two platform based game that teach children knowledge regarding the animals' eating habits as well as their food chains. Thus, fulfilling objectives of create an educational game that is suitable for

children and at the same time offers both educational values as well as entertainment with scoring mechanisms integrated.

3.3 Future Improvement

In order to improve the Educational Animal Game for Kindergarten in more interesting way. This system can refer the kindergarten syllabus according what kind of animal there feel much more interesting to develop inside the system. This enable to assist the children in learning process. Besides that, more animal game can be develop in this system which are more focus on 3D platform game. Other than that, the zoo environment can be enhance with adding audio and video material. Children can learn faster from the material compared with using word as the instruction of the system. Children will feel much more entertain while playing the system with using devices such as gamepad to make the interest to play again and again.

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APPENDIX A

LETTER OF AGREEMENT

LETTER OF AGREEMENT

Tan Yi Wen
Faculty of Computer System & Software Engineering
Universiti Malaysia Pahang,
Lebuhraya Tun Razak,
26300 Kuantan, Pahang.

15th December 2014

Mrs. Grace
Supervisor
Rapha Children's Home
No 1, Lorong Air Putih 68,
25300 Kuantan,
Pahang.

Dear Grace:

This letter serves as a formal agreement between supervisor of Rapha Children's Home (User) and Tan Yi Wen from Universiti Malaysia Pahang (Developer) verified by Mr. Abbas Saliimi Bin Lokman (Project Supervisor). The user responsibilities is to become a tester in User Acceptance Test (UAT) phase, whereby the Developer will develop a system according to client's requirements and to provide the complete system for UAT phase.

Please sign this agreement as a provident.



Supervisor's Signature

17/12/14
Date

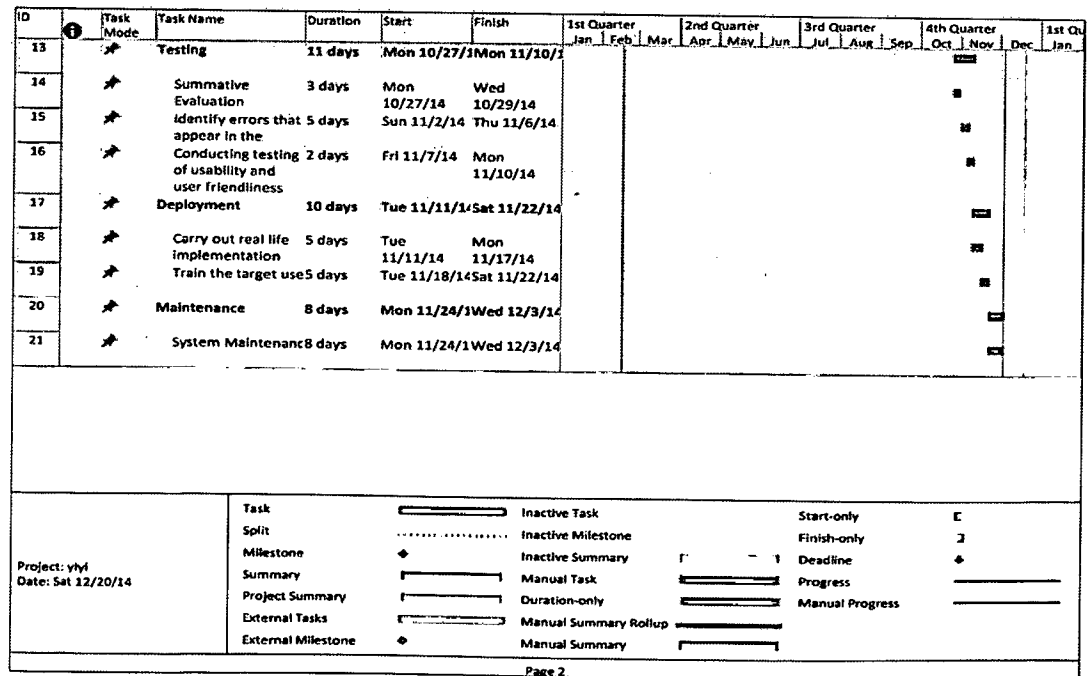
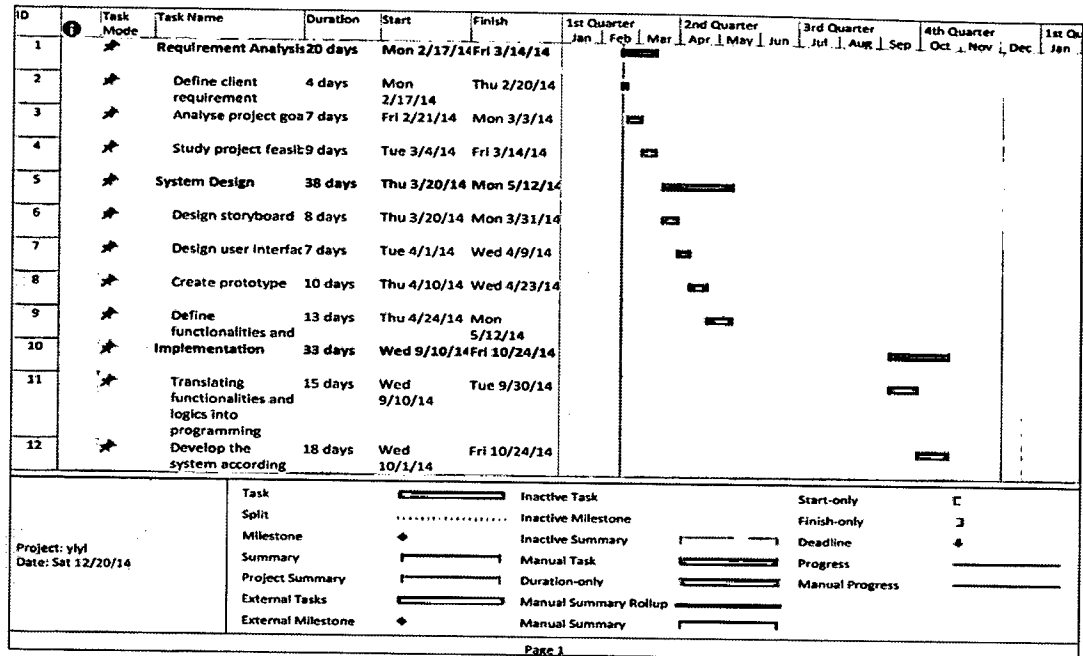
Project Supervisor's Signature

17/12/2014
Date

ABBAS SALIMI BIN LOKMAN
Lecturer
Faculty of Computer Systems & Software Engineering
Universiti Malaysia Pahang
Lebuhraya Tun Razak, 26300 Gambang, Kuantan, Pahang.
Tel: 09-649 2423 Fax: 09-649 2144

APPENDIX B

GANTT CHART





APPENDIX C

USER MANUAL / GUIDE

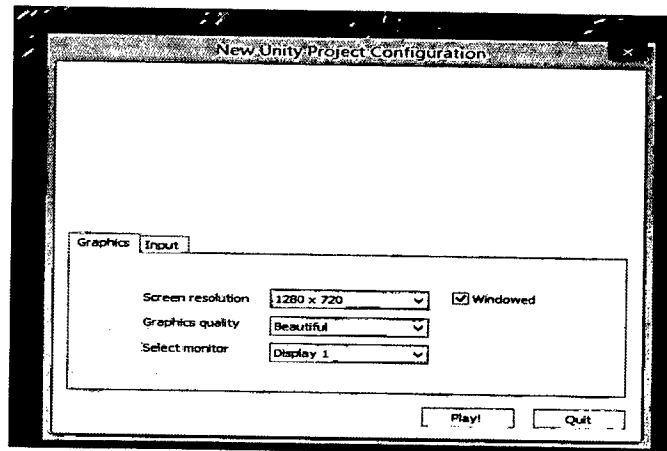
Step 1:

Double click the file that have the Unity Icon to run the system.

Name	Date modified	Type	Size
 Educational Animal Game for Kindergart...	12/19/2014 10:07 ...	File folder	
 Educational Animal Game for Kindergarten	8/14/2014 2:37 AM	Application	14,515 KB

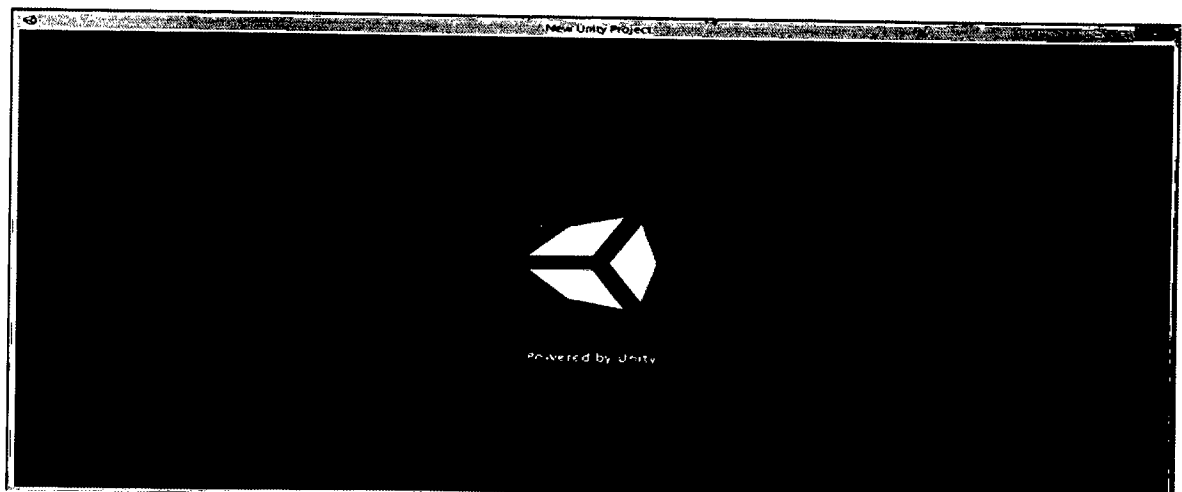
Step 2:

User can change the setting inside the configuration before click the play button.



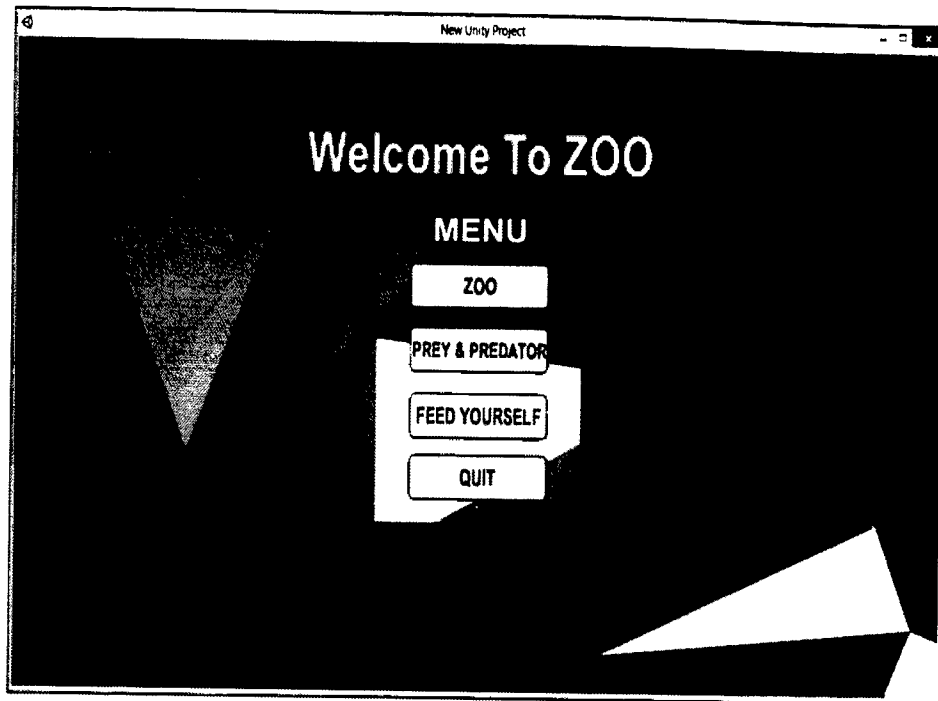
Step 3:

User need to waiting loading scene.



Step 4:

User can choose the place they want to visit from the menu. Quit button to end the system.

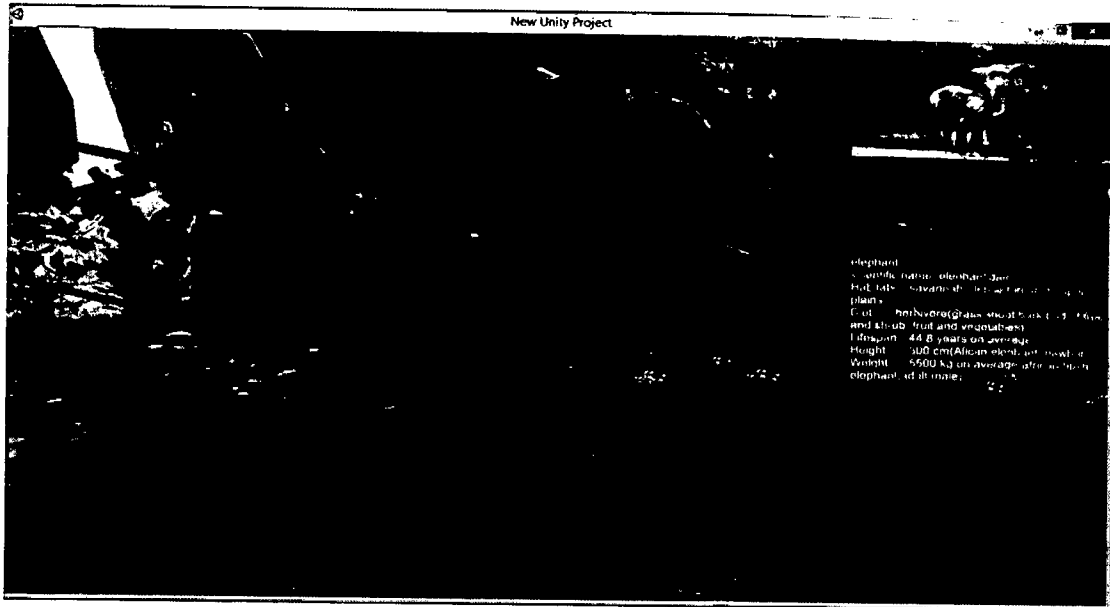
**Step 5:**

This is the Zoo Scene. User press WASD key to navigate and move the camera with mouse.

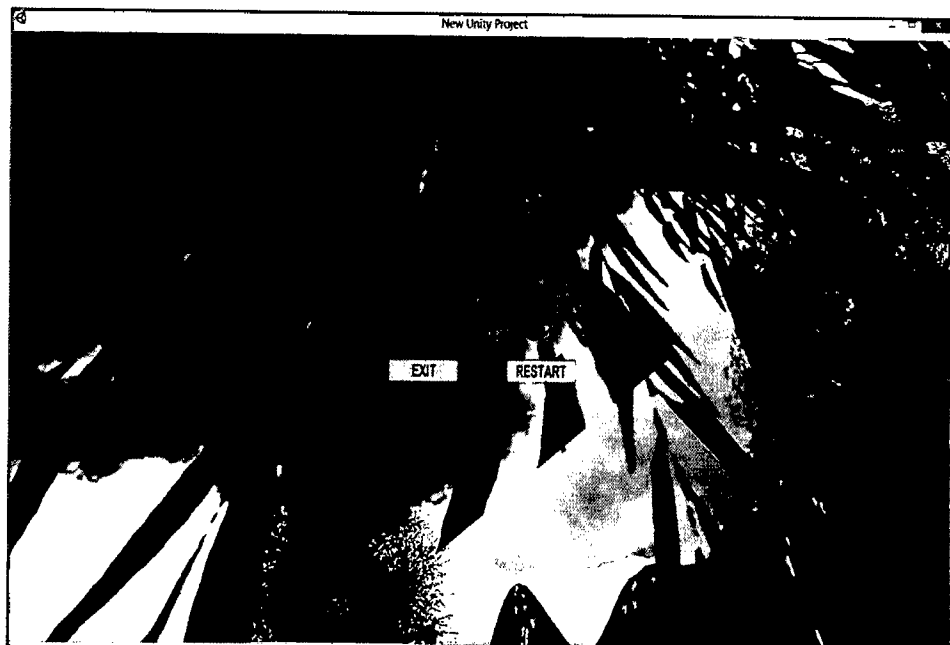


Step 6:

User is needed to get close to the animal cage. In order, the animal information able pop up at the top of the right hand side of the scene.

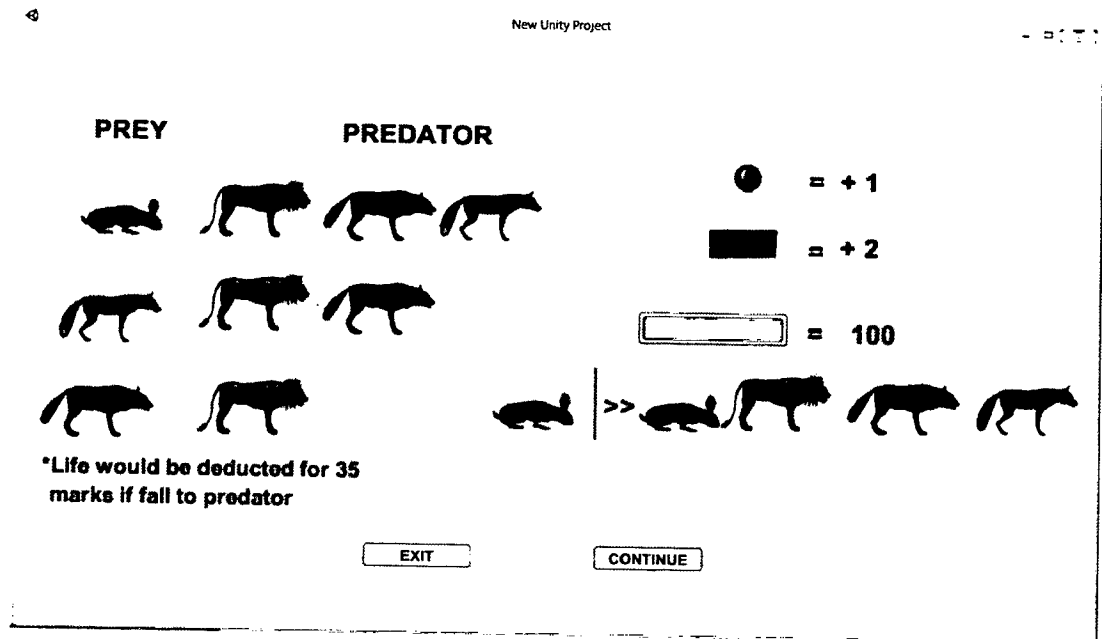
**Step 7:**

Every game play scene can be exit by pressing "ESC". Panel of exit and restart button can be click.



Step 8:

Before go to the prey and predator game, instruction of the game will be display. Exit and continue button to do the user decision. Click continue to loading scene of prey and predator and exit to the menu page.

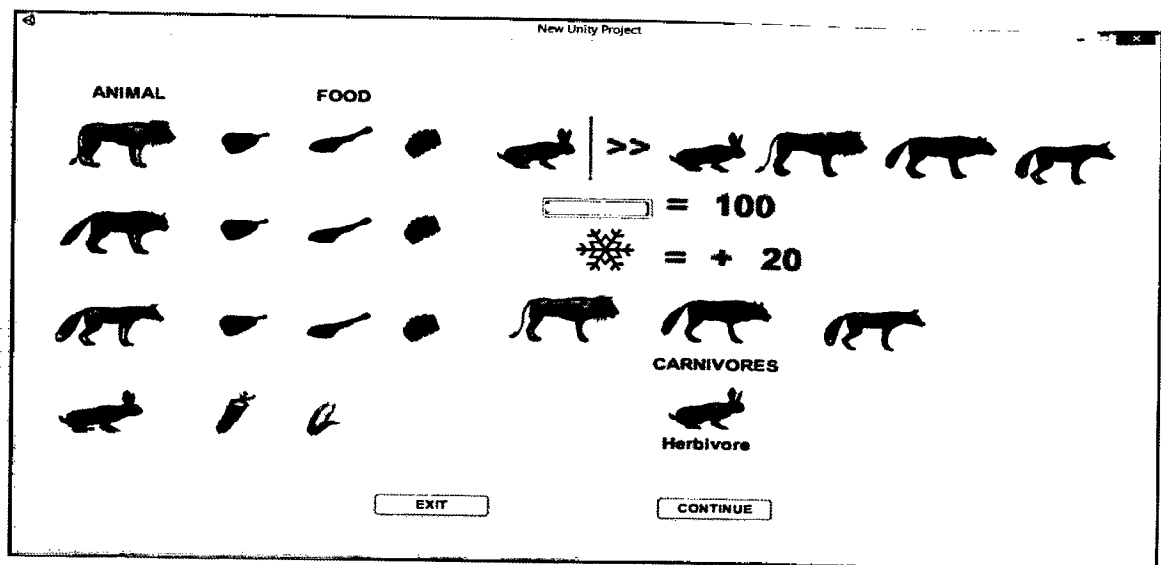
**Step 9:**

Click continue button to go the prey and predator game. User can press "ESC" to end the game. User need to press "D" to move the character into x-axis direction. In order to perform jump motion, user need to press "D" and pause to complete the action.



Step 10:

Before go to the feed yourself game, instruction of the game will be display. Exit and continue button to do the user decision. Click continue to loading scene of prey and predator and exit to the menu page.

**Step 11:**

Click continue button to go the feed yourself game. User can press "ESC" to end the game. User need to press "D" to move the character into x-axis direction. In order to perform jump motion, user need to press "D" and pause to complete the action.



APPENDIX D
FUNCTIONALITY ACCEPTENCE FORM

EDUCATIONAL ANIMAL GAME
FOR KINDERGARTEN

FUNCTIONALITY ACCEPTENCE TESTING

FUNCTIONALITY ACCEPTANCE TEST

ABBAS SALIMI BIN LOKMAN
Lecturer
Faculty of Computer Systems & Software Engineering
Universiti Malaysia Pahang
Lebuhraya Tun Razak, 26300 Gambang, Kuantan, Pahang
Tel: 09-549 2423 Fax: 09-549 2144

Tested by:

Date:

13/12/2014

Result

:

☒

Pass

☐

Pass with condition

☐

Fail

Overall Comment

:

2nd environment is nice.
game can be improved by
41
- controls

Zoo

1. Motion Input

Purpose	To test the character motion in zoo scene.
Pre-Condition	none
Test Steps	1. Move the camera with mouse. 2. Use WASD key to navigate.
Expected Results	Able to move the camera to view different parts in the scene. Able to move forward, backward, left and right inside the zoo environment.
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Pass with condition <input type="checkbox"/> Fail
Tester Comments	Accurate.

Tested by:

DT

Date:

18/12/2024

2. Display Animal Information

Purpose	To test the animal information able pop up at the top of right hand side of the scene.
Pre-Condition	none
Test Steps	1. Character is needed to get close to the animal cage.
Expected Results	Animal information will be display at the top of right corner of the scene.
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Pass with condition <input type="checkbox"/> Fail
Tester Comments	Character is located nicely along the fence.

Tested by:

SPJ

Date:

18/12/2014

3. Loading Scene of Prey and Predator

Purpose	To go to Prey and Predator from current scene.
Pre-Condition	none
Test Steps	1. Character is needed to collide with the prey and predator building.
Expected Results	Successfully loading to Prey and Predator scene.
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Pass with condition <input type="checkbox"/> Fail
Tester Comments	Ok.

Tested by:

Date:

[Signature]
18/12/2014

4. Loading Scene of Feed Yourself

Purpose	To go to Feed Yourself from current scene.
Pre-Condition	None
Test Steps	1. Character is needed to collide with the Feed Yourself building.
Expected Results	Successfully loading to Feed Yourself scene.
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Pass with condition <input type="checkbox"/> Fail
Tester Comments	pu.

Tested by:



Date:

18/12/2014

Prey and Predator

1. Motion Input

Purpose	To test the character motion in Prey and Predator scene.
Pre-Condition	none
Test Steps	1. Use key "D" to navigate.
Expected Results	Animal character able moving in x-axis direction.
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Pass with condition <input type="checkbox"/> Fail
Tester Comments	Press D to accelerate.

Tested by:

[Signature]

Date:

18/12/2014

2. Jumping Input

Purpose	To test whether the animal can perform jump motion.
Pre-Condition	Character must be moving.
Test Steps	1. Press space bar key while the animal was moving.
Expected Results	Jumping motion is perform.
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Pass with condition <input type="checkbox"/> Fail
Tester Comments	Need to constantly press

Tested by:

Date: 18/12/2014

3. Morphing

Purpose	To test whether the character is changed after colliding with the morphing board. (Same character will be appear as well).
Pre-Condition	none
Test Steps	1. Character need to collide with morphing board.
Expected Results	Current animal able to change for another character such as rabbit, fox, wolf or lion.
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Pass with condition <input type="checkbox"/> Fail
Tester Comments	Randomly changed character

Tested by:

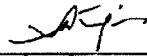
Date:

15/12/2014

4. Score Function

Purpose	To test whether character is able to gain the score by colliding with coin and gold bar.
Pre-Condition	none
Test Steps	1. Current animal need to collide with coin and gold bar.
Expected Results	1 point would be added to score if the character has collided with coin while 2 points would be awarded if the character has collided with gold bar.
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Pass with condition <input type="checkbox"/> Fail
Tester Comments	ok.

Tested by:



Date:

18/12/2014

5. Live Function

Purpose	To test whether the character loses its live if it collides with its predator.
Pre-Condition	none
Test Steps	1. Collide with predator.
Expected Results	34 live will be deducted while the prey collide with it predator.
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Pass with condition <input type="checkbox"/> Fail
Tester Comments	34/lv is deducted equal to 3 lives

Tested by:

SP7

Date:

18/12/2014

6. Success Manager

Purpose	To test whether the character finishes the level.
Pre-Condition	none
Test Steps	1. Character collide with the treasure box.
Expected Results	A success window with options of exiting or restarting the game will pop up.
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Pass with condition <input type="checkbox"/> Fail
Tester Comments	ok.

Tested by:

ADY.

Date:

18/12/2021

7. Game Over Manager

Purpose	To test whether game is over while the live bar reaching zero.
Pre-Condition	none
Test Steps	1. Current animal collide with its predator until live bar reaching zero.
Expected Results	A game over window with options of exiting or restarting the game will pop up.
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Pass with condition <input type="checkbox"/> Fail
Tester Comments	Ok

Tested by:

Signature

Date:

18/12/2014

Feed Yourself

1. Motion Input

Purpose	To test the character motion in Feed Yourself scene.
Pre-Condition	none
Test Steps	1. Use key "D" to navigate.
Expected Results	Animal character able to moving in x-axis direction.
Result	<input checked="checked" type="checkbox"/> Pass <input type="checkbox"/> Pass with condition <input type="checkbox"/> Fail
Tester Comments	ok. Need to be carefully pressed.

Tested by:

Shi

Date:

18/12/2014

2. Jumping Input

Purpose	To test whether the animal can perform jump motion.
Pre-Condition	Character must be moving.
Test Steps	1. Press space bar key while the animal was moving.
Expected Results	Jumping motion is perform.
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Pass with condition <input type="checkbox"/> Fail
Tester Comments	Ok .

Tested by:

Date:

18/12/2024

3. Morphing

Purpose	To test whether the character is changed after colliding with morphing board. (Same character will be appear as well).
Pre-Condition	none
Test Steps	1. Character need to collide with morphing board.
Expected Results	Current animal able to change for another character such as rabbit, fox, wolf or lion.
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Pass with condition <input type="checkbox"/> Fail
Tester Comments	Random morph

Tested by:

Ady.

Date:

18/12/2014

4. Score Function

Purpose	To test whether the character is able to gain the score by colliding with correct food.
Pre-Condition	none
Test Steps	1. Current animal need to collide with correct food.
Expected Results	1 point would be added to score if the character has collide with correct food.
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Pass with condition <input type="checkbox"/> Fail
Tester Comments	ok .

Tested by:

AF

Date:

18/1/2014

5. Live Function

Purpose	To test whether the character lose its live if it collide with wrong food.
Pre-Condition	none
Test Steps	1. Collide with wrong food.
Expected Results	34 live will be deducted while the character collide with wrong food.
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Pass with condition <input type="checkbox"/> Fail
Tester Comments	100 = 3 lives

Tested by:



Date:

18/12/2014

6. Add Lives Function

Purpose	To test whether 20 lives will be added when character collide with snowflake icon.
Pre-Condition	none
Test Steps	1. Current animal need to collide with snowflake.
Expected Results	20 lives will be added while current animal collide with snowflake icon.
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Pass with condition <input type="checkbox"/> Fail
Tester Comments	ok.

Tested by:



Date:

18/12/2018

7. Success Manager

Purpose	To test whether the character finishes the level.
Pre-Condition	none
Test Steps	1. Character collide with treasure box.
Expected Results	A success window with options of exiting and restarting the game will pop up.
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Pass with condition <input type="checkbox"/> Fail
Tester Comments	ok.

Tested by:

DT

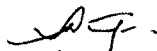
Date:

12/12/2014

8. Game Over Manager

Purpose	To test whether game is over when the live bar reaching zero.
Pre-Condition	none
Test Steps	1. Collide with predator until live bar reaching zero.
Expected Results	A game over window with options of exiting or restarting the game will pop up.
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Pass with condition <input type="checkbox"/> Fail
Tester Comments	su.

Tested by:



Date:

18/12/2014

APPENDIX E

USER TESTING FORM (TEACHER / PARENT)

User Testing Form (Teacher/Parent)

Name : ROZIANA A/P Kiyop

Age : 30

Gender: Male / Female

System

1. Do you think that the game is suitable as a learning material in teaching kindergarten student (in this case, learning of animal species and their behavior) 4-6 years old?
☒ Yes ☐ No
2. Do you agree that game is more interactive and engaging compared to the traditional learning material/tool (book, newspaper and etc)?
☒ Yes ☐ No
3. Do you feel that the game is immersive?
☒ Yes ☐ No
4. Do you feel that the designation of the game mechanics could assist student in learning?
☒ Yes ☐ No
5. Do you feel that the graphics integrated in the gameplay is interesting?
☒ Yes ☐ No
6. Do you feel that the scoring mechanism integrated in this system will motivate student in playing this game as well as learning more of regarding the information of this animals?
☒ Yes ☐ No

Game

1. Do you understand the instruction given in order to play the game?
☒ Yes ☐ No
2. Do you know how to play the game according to the instruction?
☒ Yes ☐ No
3. Do you learn the following topics while playing this game?
 - a. Feed Yourself (the eating habits of animal – Carnivore & Herbivore)
☒ Yes ☐ No
 - b. Prey and Predator (the food chain of animals)
☒ Yes ☐ No
4. In your opinion, is this game suitable to assist in learning of student regarding of animal topic?
☒ Yes ☐ No

User Testing Form (Teacher/Parent)

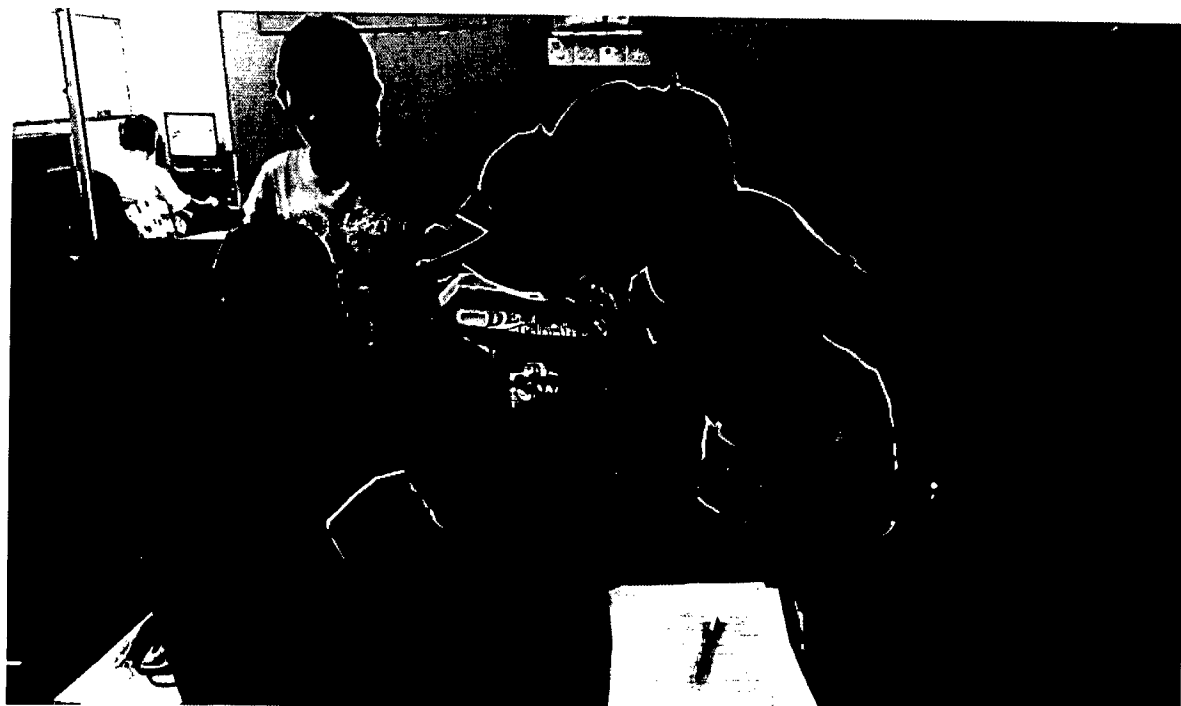
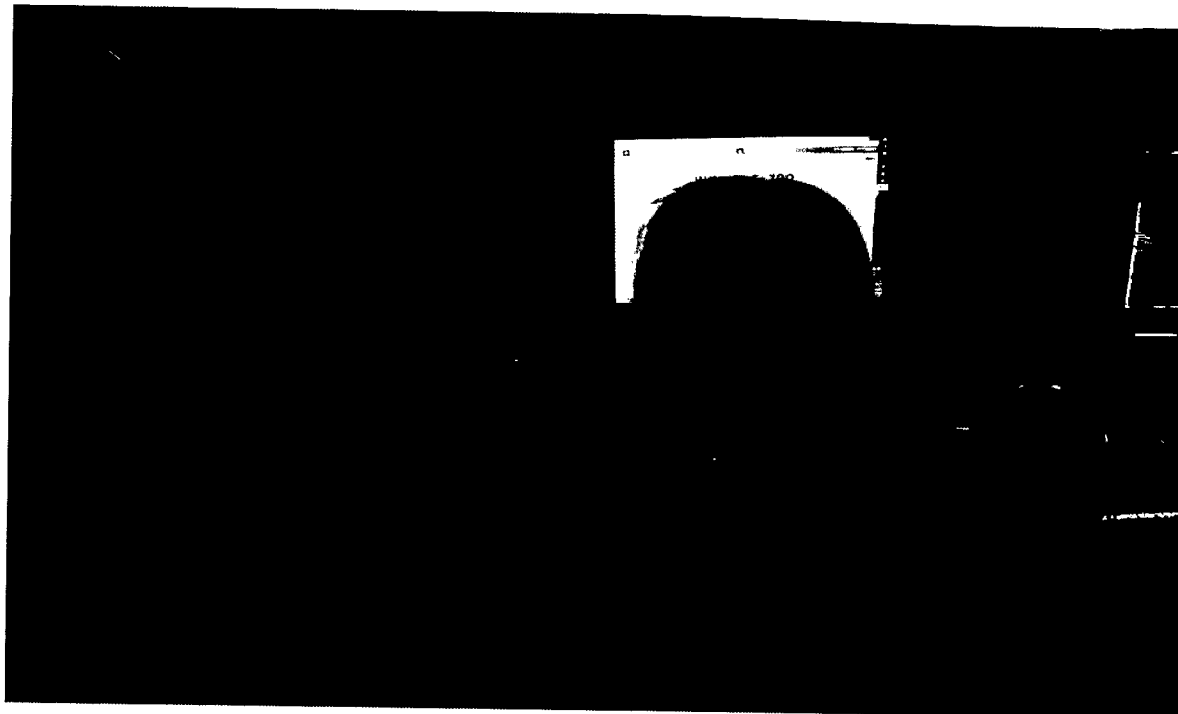
Name : SOMAP BUNYAge : 45Gender: Male / FemaleSystem

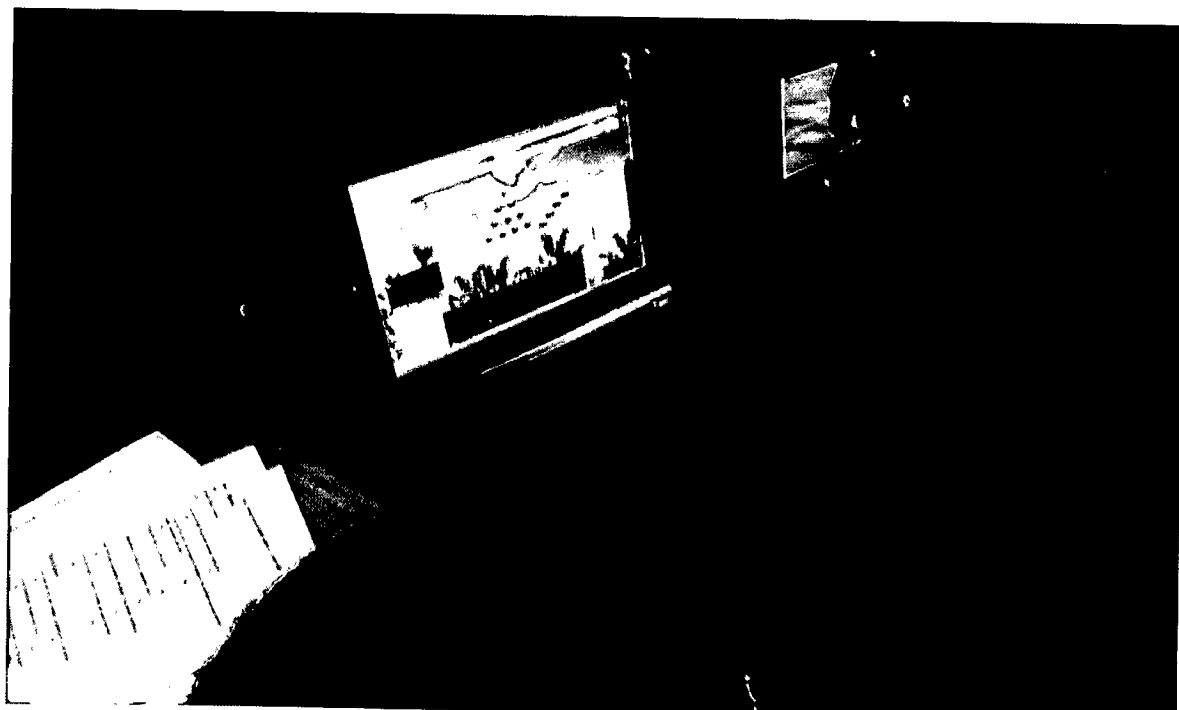
1. Do you think that the game is suitable as a learning material in teaching kindergarten student (In this case, learning of animal species and their behavior) 4-6 years old?
☒ Yes ☐ No
2. Do you agree that game is more interactive and engaging compared to the traditional learning material/tool (book, newspaper and etc)?
☒ Yes ☐ No
3. Do you feel that the game is immersive?
☒ Yes ☐ No
4. Do you feel that the designation of the game mechanics could assist student in learning?
☒ Yes ☐ No
5. Do you feel that the graphics integrated in the gameplay is interesting?
☒ Yes ☐ No
6. Do you feel that the scoring mechanism integrated in this system will motivate student in playing this game as well as learning more of regarding the information of this animals?
☒ Yes ☐ No

Game

1. Do you understand the instruction given in order to play the game?
☒ Yes ☐ No
2. Do you know how to play the game according to the instruction?
☒ Yes ☐ No
3. Do you learn the following topics while playing this game?
 - a. Feed Yourself (the eating habits of animal – Carnivore & Herbivore)
☒ Yes ☐ No
 - b. Prey and Predator (the food chain of animals)
☒ Yes ☐ No
4. In your opinion, is this game suitable to assist in learning of student regarding of animal topic?
☒ Yes ☐ No

APPENDIX F
USER TESTING FORM (CHILDREN WITHIN 4-6 YEARS OLD)







User Testing Form (children within 4 – 6 years old)

Name : AgnesAge : 5Gender: Male / FemaleZoo

1. Do you feel that the zoo environment is attractive?
☒ Yes ☐ No
2. Do you feel this zoo is more interactive compare to the traditional learning material (book, newspapers and etc)?
☒ Yes ☐ No
3. Do you feel this zoo is immersive?
☒ Yes ☐ No
4. Is the delivery of instruction simple and clear?
☒ Yes ☐ No
5. Does the colors and graphics designed in this project interesting?
☒ Yes ☐ No
6. Do you feel that the system is intuitive and easily operated?
☒ Yes ☐ No

Prey and Predator

1. Do you feel the "Prey and Predator" environment is interactive?
☒ Yes ☐ No
2. Do you understand the game instruction?
☒ Yes ☐ No
3. Do you learn about animal food chains from this game?
☒ Yes ☐ No

4. Do you feel entertained from playing this game?
☒ Yes ☐ No
5. Are you satisfied with your score?
☒ Yes ☐ No
6. Do you want to play the game again?
☒ Yes ☐ No

Feed Yourself

1. Do you feel the "Feed Yourself" game environment is interactive?
☒ Yes ☐ No
2. Do you understand the game instruction?
☒ Yes ☐ No
3. Do you learn about animals eating habits from this game?
☒ Yes ☐ No
4. Do you feel entertained from playing this game?
☒ Yes ☐ No
5. Are you satisfied with your score?
☒ Yes ☐ No
6. Do you want to play the game again?
☒ Yes ☐ No

User Testing Form (children within 4 – 6 years old)

Name : K. IvanAge : 5

Gender: Male / Female

Zoo

1. Do you feel that the zoo environment is attractive?
☒ Yes ☐ No
2. Do you feel this zoo is more interactive compare to the traditional learning material (book, newspapers and etc)?
☒ Yes ☐ No
3. Do you feel this zoo is immersive?
☒ Yes ☐ No
4. Is the delivery of instruction simple and clear?
☒ Yes ☐ No
5. Does the colors and graphics designed in this project interesting?
☒ Yes ☐ No
6. Do you feel that the system is intuitive and easily operated?
☒ Yes ☐ No

Prey and Predator

1. Do you feel the "Prey and Predator" environment is interactive?
☒ Yes ☐ No
2. Do you understand the game instruction?
☒ Yes ☐ No
3. Do you learn about animal food chains from this game?
☒ Yes ☐ No

4. Do you feel entertained from playing this game?
☒ Yes ☐ No
5. Are you satisfied with your score?
☒ Yes ☐ No
6. Do you want to play the game again?
☒ Yes ☐ No

Feed Yourself

1. Do you feel the "Feed Yourself" game environment is interactive?
☒ Yes ☐ No
2. Do you understand the game instruction?
☒ Yes ☐ No
3. Do you learn about animals eating habits from this game?
☒ Yes ☐ No
4. Do you feel entertained from playing this game?
☒ Yes ☐ No
5. Are you satisfied with your score?
☐ Yes ☒ No
6. Do you want to play the game again?
☒ Yes ☐ No

User Testing Form (children within 4 – 6 years old)

Name : Nicol

Age : 6

Gender: Male / Female

Zoo

1. Do you feel that the zoo environment is attractive?
☒ Yes ☐ No
2. Do you feel this zoo is more interactive compare to the traditional learning material (book, newspapers and etc)?
☒ Yes ☐ No
3. Do you feel this zoo is immersive?
☐ Yes ☒ No
4. Is the delivery of instruction simple and clear?
☒ Yes ☐ No
5. Does the colors and graphics designed in this project interesting?
☒ Yes ☐ No
6. Do you feel that the system is intuitive and easily operated?
☒ Yes ☐ No

Prey and Predator

1. Do you feel the "Prey and Predator" environment is interactive?
☒ Yes ☐ No
2. Do you understand the game instruction?
☒ Yes ☐ No
3. Do you learn about animal food chains from this game?
☒ Yes ☐ No

4. Do you feel entertained from playing this game?
☐ Yes ☒ No
5. Are you satisfied with your score?
☒ Yes ☐ No
6. Do you want to play the game again?
☐ Yes ☒ No

Feed Yourself

1. Do you feel the "Feed Yourself" game environment is interactive?
☒ Yes ☐ No
2. Do you understand the game instruction?
☒ Yes ☐ No
3. Do you learn about animals eating habits from this game?
☒ Yes ☐ No
4. Do you feel entertained from playing this game?
☒ Yes ☐ No
5. Are you satisfied with your score?
☒ Yes ☐ No
6. Do you want to play the game again?
☒ Yes ☐ No

APPENDIX G

PLAGIARISM CHECK

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