Tribhuvan University

Faculty of Humanities and Social Sciences

"Cave Escape"

A PROJECT REPORT

Submitted to

Department of Computer Application Kathmandu

BernHardt College

Bafal, Kathmandu Nepal

In partial fulfilment of requirements for the Bachelors in Computer Application

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September, 2021

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ACKNOWLEDGEMENT

We express our gratitude to Tribhuvan University for including provision of major project in the syllabus of BCA 4TH sem. Also, we are thankful to the management of Kathmandu BernHardt College for providing us the chance to build software during the major project and managing the resources and specialists to assist our project. We are grateful to our Project coordinator **Er. Kumar Prasun** who has helped us with his assistance, advices and suggestions in all the ways he could. Last but not the least we would like to thank all our friends for their support and feedback for this project.

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ABSTRACT

The project titled “CAVE ESCAPE” is a web based single and multiplayer game for the players to experience the good old day’s games. The main objective of the project is to build multiplayer web based game.

In this game, player can play different difficulty level in single player. This is the web-based project which is supported on desktop only.

Key Words : VScode, JS

Table of Contents

Title **Page no.**

LIST OF FIGURES

Title **Page no.**

LIST OF TABLES

Title **Page no.**

LIST OF ABBREVIATIONS

CSS	:	Cascading Stylesheet
DFD	:	Data Flow Diagram
HTML	:	Hypertext Markup language
JS	:	JavaScript
MYSQL	:	My Structured Query language
PHP	:	Hypertext Pre-processor
WWW	:	World Wide Web

Chapter 1: Introduction

1.1 Introduction

The project title is called Cave Escape, and is based on the 2000s arcade mobile game. Similar game was released for android on 2013 and gained a popularity on 2014 and also topped the chart on the google play store and as well as the app store. Nowadays in the market there are many games which require high graphics and a more reliable pc, introducing you the simple cave escape game that gives the experience on playing on a big screen with more frames. This game category is arcade. The game is very simple, the aim of the game is by tapping any key, make the bird fly up and fly between obstacles without touching them. The bird will be flying until its collisions with an obstacle or it fall on lava. It's simple game with limited levels as per the moment. It's challenging game for all. This cave escape game is implemented for only desktops.

1.2 Problem Statement

In the current scenario the game is just a basic arcade game with no multiplayer services to the players.

1.3 Objective

- To build multiplayer web based cave escape.
- To show the games difficulty level database connectivity.

1.4 Scope and Limitation

1.4.1 Scope

When we talk about videogame development, we often read that the rate of project abandonment is very high. And it's true; developing a videogame is about putting forward a basic and fundamental concept: it is a computer project that requires many hours of work, dedication, effort and sacrifice. Based on prototypes, some personal touches, upload it to Steam. Create a game that

is fun, attractive, with the right functionality, and with enough marketing to be seen among the many games that are published every day. Later version may be developed for Android.

1.4.2 Limitation

- Since it is a browser game it requires internet connectivity.
- No settings panel.
- Not eligible in android.

1.5 Organization of Report

Chapter 1 consists of instructions, problem statements, objectives, scope and limitations regarding the project

Chapter 2 describes the fundamental theories and concept as well as information about existing system, journals and references.

Chapter 3 summarizes the keynote on system analysis and design where description of use case diagram, performance & reliability, diagrams, database and architectural design.

Chapter 4 summarize on implementing and testing, tools used for preparation of the project. Test case as well as integration testing are done.

Chapter 5 summaries of outcome of the project, conclusion, reviews as well as future recommendations, improvements that can be done on upcoming days and feedback system.

Chapter 2: Background Study and Literature Review

2.1 Background Study

Actually, game is entertaining for anybody and in leisure time people can relax playing a game. The flappy bird game implemented for only desktop. Concept of the game is that the bird will be flying until it collides with an obstacle or it fall on lava. The bird can be controlled by the user using the left click of mouse.

2.2 Literature Review

According to the study of existing project by 'The Binary Fools', the project was created using JAVA on an IDE (Integrated Development Environment) in 9thMay 2019.The Binary fools included three members, 'Al Adnan Sami', 'Moonmoon Das', 'Akash Chandra Dev Nath'. Binary Fools were student of BSSE 1st Batch, Indian institute of technology, Noakhali Science and Technology University [1].

According to 'Drew Tisdelle' of WORCESTER POLYTECHNIC INSTITUTE who studied Interactive Media and Game Development, created a JavaScript library hybrid physical/digital board games using JavaScript libraries. The library started with the idea of creating a board game playable on standard mass-market tablets that would demonstrate that specialized hardware is not needed to create hybrid physical/digital games. The library was named Minotaur's Labyrinth library shortly it was called Minotauros library. The Minotauros Library has been released publicly on the online software hosting platform GitHub. Once posted, the library will continue to be updated and improved based on user feedback. It is hoped that the library will encourage the wider development of tablet-based board games, without the need for specialized hardware. The library is named after both the game concept as well as the Minotaur itself, the mythological blend of man and bull, just as the library is meant to help blend physical and digital game. According to their testing phase of the project the library was indeed working as intended. The game was correctly registering pieces at the start and was able to accurately detect the pieces when they were placed down on the screen [2].

As studying JavaScript and html canvas, physic for JavaScript game book by 'Dev Ramtal and Adrian Dobre' they explained about the physic used in a JavaScript game with an example of a

bouncing ball. Physic is the study of natural laws that defines how the things behave. The laws are simple and can be coded. The canvas drawing API helps in draw things using only tools combined with math and physics. Canvas helps in rendering graphics and adding aminations objects like 2d in web browsers without any external plugins such as flash player [3].

Flappy Bird has been around since mid-2013, but this game has only emerged in the past week on Apple's Appstore and Android's Google Play store and created a trend on social networks.

Nguyen Ha Dong's decision is surprising to netizens, because just on February 7, Flappy Bird also upgraded the interface and adjusted some technical details so that the game can have a smoother frame. .On Friday, February 7, a Windows Phone version of Flappy Bird also appeared, although the author said there is not a version for Windows Phone devices yet.Asked by the BBC about the matter, a Microsoft spokesperson said the company was investigating the incident.On the same day, February 7, Mr. Ha Dong wrote on Twitter: "I would like to apologize to Windows Phone users for the delay of a version for Windows Phone. I'm doing my best to make that happen."

Flappy Bird uses a simple graphic style, with bright colors, like games from the 90s [4].

Chapter 3: System Analysis and Design

3.1 System Analysis

3.1.1 Requirement Analysis

A requirement is a singular documented physical or functional need that a particular design, product or process aims to safety. It can be divided into functional requirements and non-functional requirements.

3.1.1.1 Functional Requirement

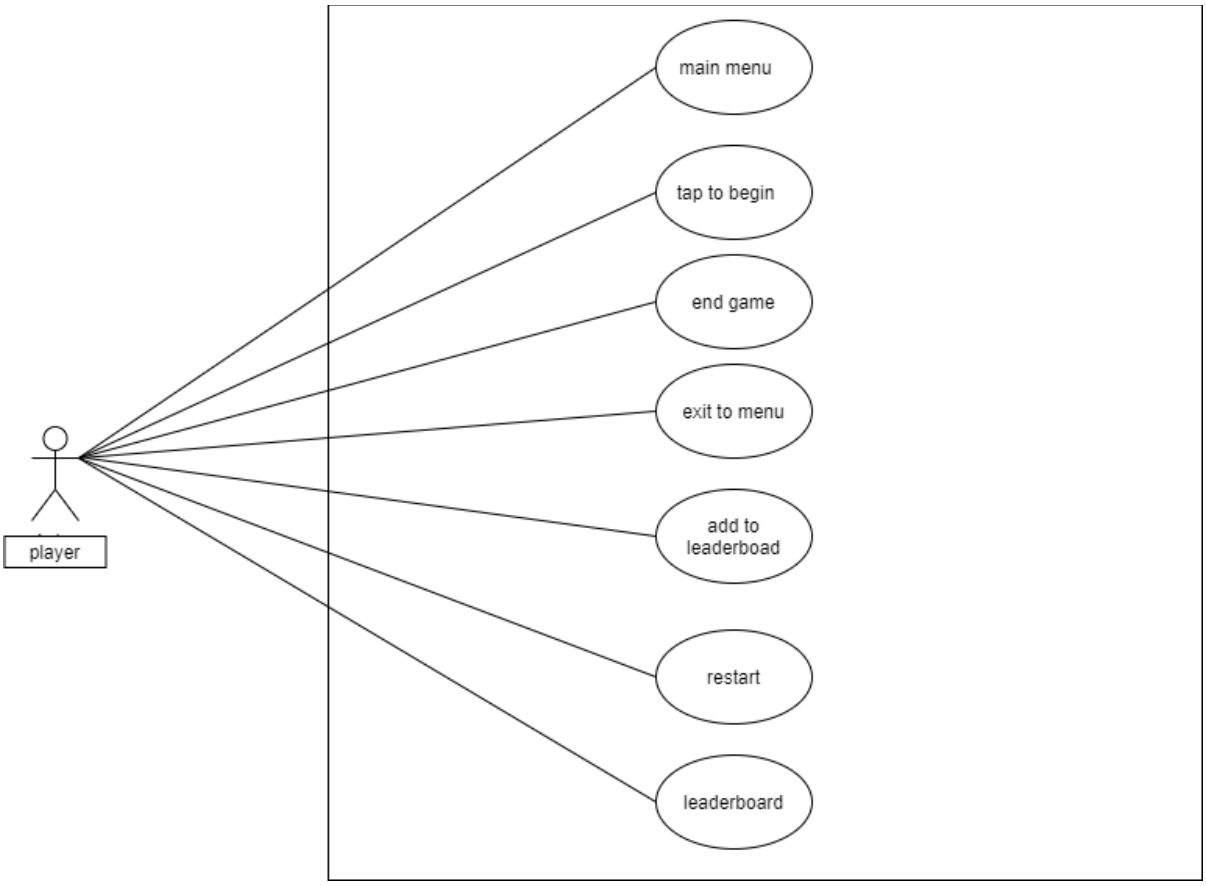

Figure 1 Use case diagram of player

- 2D Animation
- Objective Selection: It have a bird object which is flying until any collision occurred and the bird is flying in the wall objectives which are begin from top and bottom of the screen.
- Moving wall: The wall moving on and it will come randomly in size and distances. The bird is flying in the middle of the wall.

- Collision Detection: When the bird touches the anywhere of a wall it causes a collision. If the bird touches any wall(pipes) the game will end
- Moving Background: The picture used as background image is moving analogously. We used two same image which are coming one after another regularly.
- Counting score

3.1.1.2 Non-Functional Requirement

I) Performance

- Best performance even with minimum hardware spec.
- Performance depends upon on web browsers version and plugins

II) Security

- Not related with any privacy theft or any special user access
- Does not require any personal information.

III) Economical requirements

- This game is based and created using a free and open-source platform.

3.1.2 Feasibility Analysis

A detailed investigation and analysis conducted to determine the financial, economic, technical, or other advisability of a proposed project. Part of the systems development life cycle which aims to determine whether it is sensible to develop some system.

I. Technical feasibility
   - It is technically feasible in terms of many factors. It has been within the limit of current technology. Can run on minimum pc spec. The system has been developed using open-source tools and platform. Performance may differ from web browser versions, specification to run the JavaScript.

II. Economic feasibility
   - It is economically feasible because it is developed using open-source tools.
   - No paid software of third-party tools is used.

III. Operational feasibility
   - It is supposed to be a free open-source application so will be easily available to all the users.

3.1.3 Data Modeling

For the data to be stored in database, the data models of the project are created on the basis of ER model and unified modelling language. All data required by the database are accurately represented. For the designing of the application, entity relationship diagram has been used.

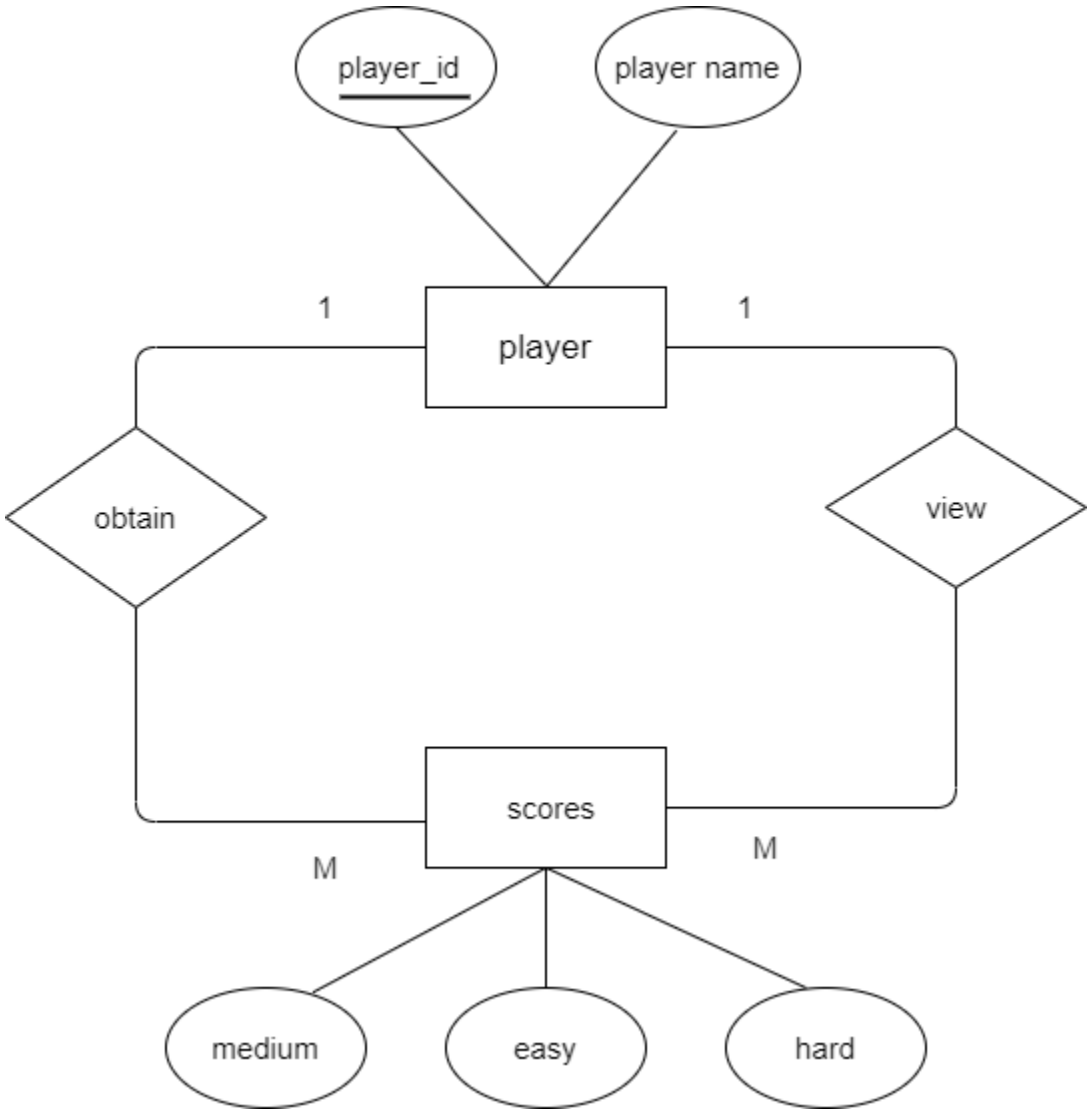

Figure 2 ER diagram of cave escape

Cave Escape entities and their attributes:

- Player Entity: Attributes of player is player id.
- Score Entity: Attributes of Scores are easy, medium and hard.

This ER (Entity Relationship) Diagram represents the model of Video Game. The entity-relationship diagram shows all the visual instrument of database tables and the relations between Leader board and player. It used structure data and to define the relationships between structured data groups functionalities. The main entities are Player and Leader board. In the above figure Player_id is the primary key i.e., a unique attribute and 1 and M specify one to many relationships.

3.1.4 Process Modeling

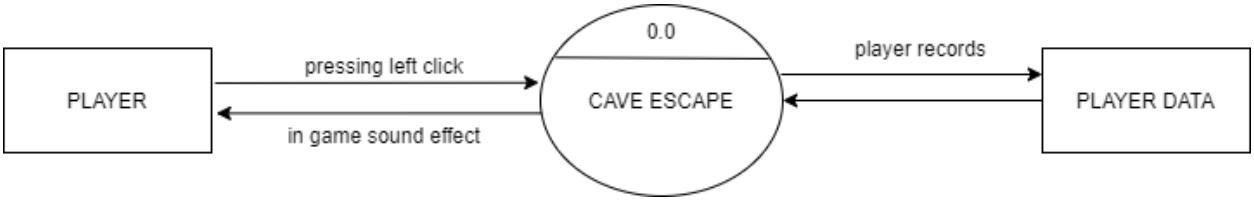

Figure 3 Level 0 DFD of cave escape

Level 0 DFDs, also known as context diagrams, are the most basic data flow diagrams. They provide a broad view that is easily digestible but offers little detail. Level 0 data flow diagrams show a single process node and its connections to external entities.

DFD stands for data flow diagram Above figure is the Zero Level DFD of Cave Escape, where elaboration of the high-level process of Video games is done. It's a basic overview of the whole project or process being analyzed or modelled. This deals with one or more of the data flows to or from an external agent, and which together provide all of the functionality of the Video Game System as a whole. It also identifies internal data stores of user.

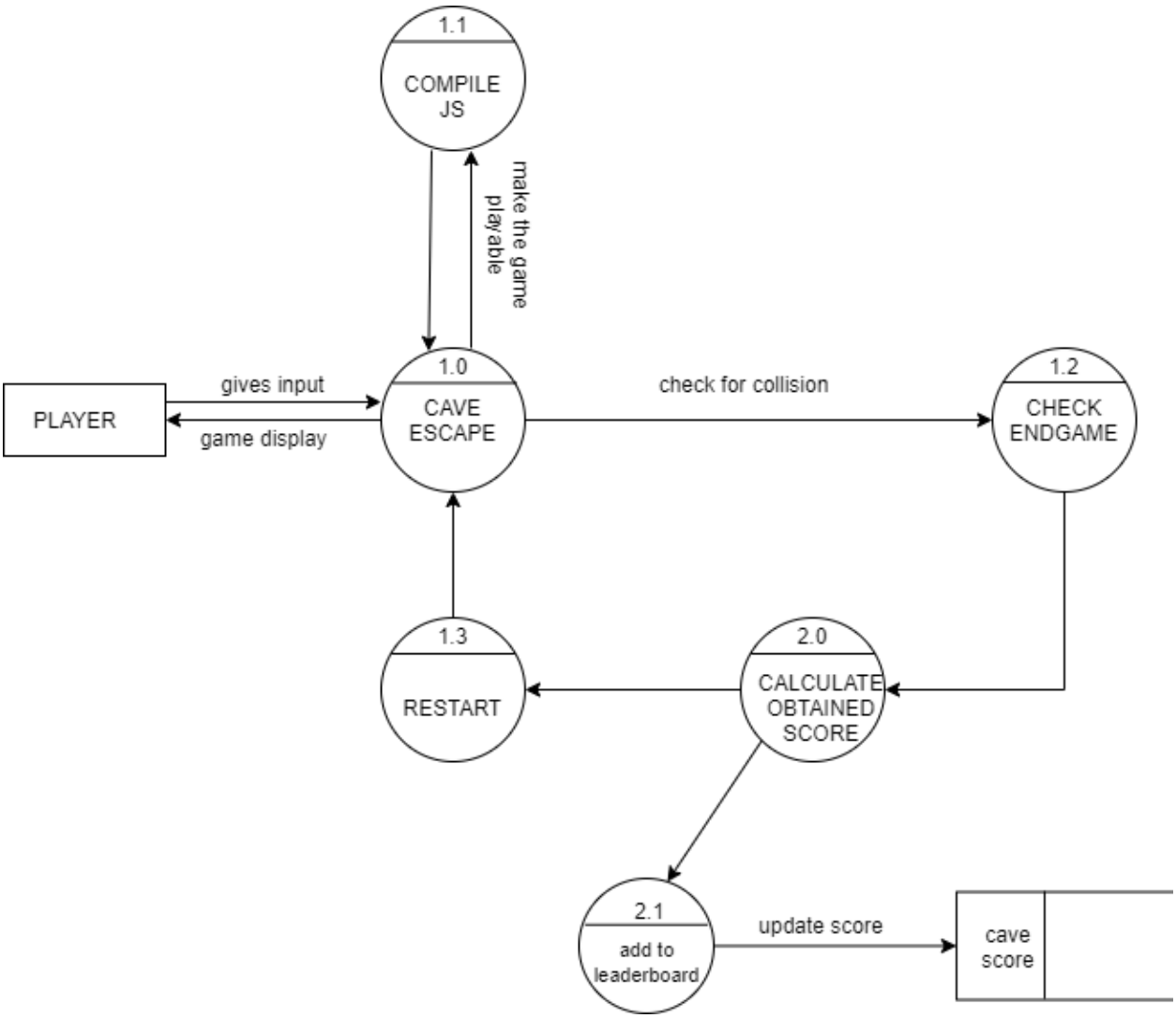

Figure 4 Level 1 DFD of Cave Escape

First Level DFD (1st Level) of Cave Escape shows how the system is divided into sub-systems (processes), It may require more functionalities of the project to reach the necessary level of detail about the Video Game functioning. It shows the detailed process how game works.

3.2 System Design

3.2.1 Architectural Design

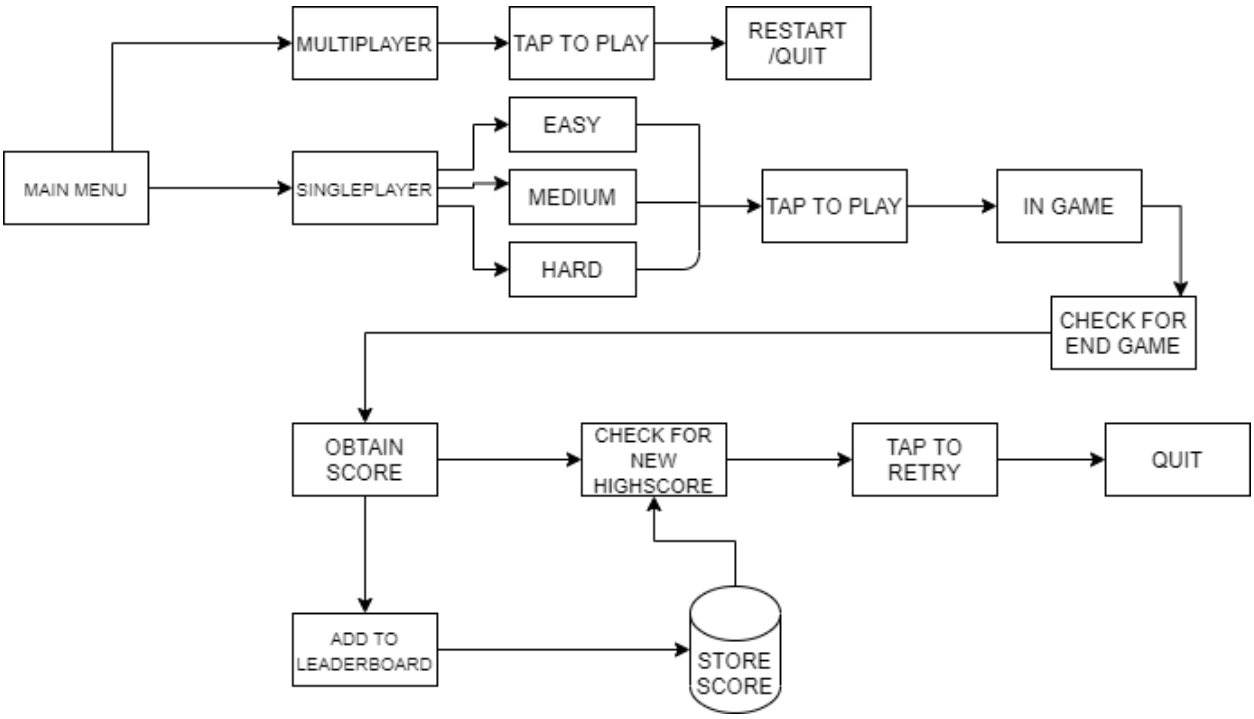

Figure 5 Architectural design of Cave Escape

Server's main responsibilities are verifying user information, transmitting data between users through server, storing user records, and providing user records upon request. The webpage is a static website with a leaderboard that displays the username and ranking of Each user. Users can view the top performers over various windows of time and search for Rankings by username.

3.2.2 Database Schema

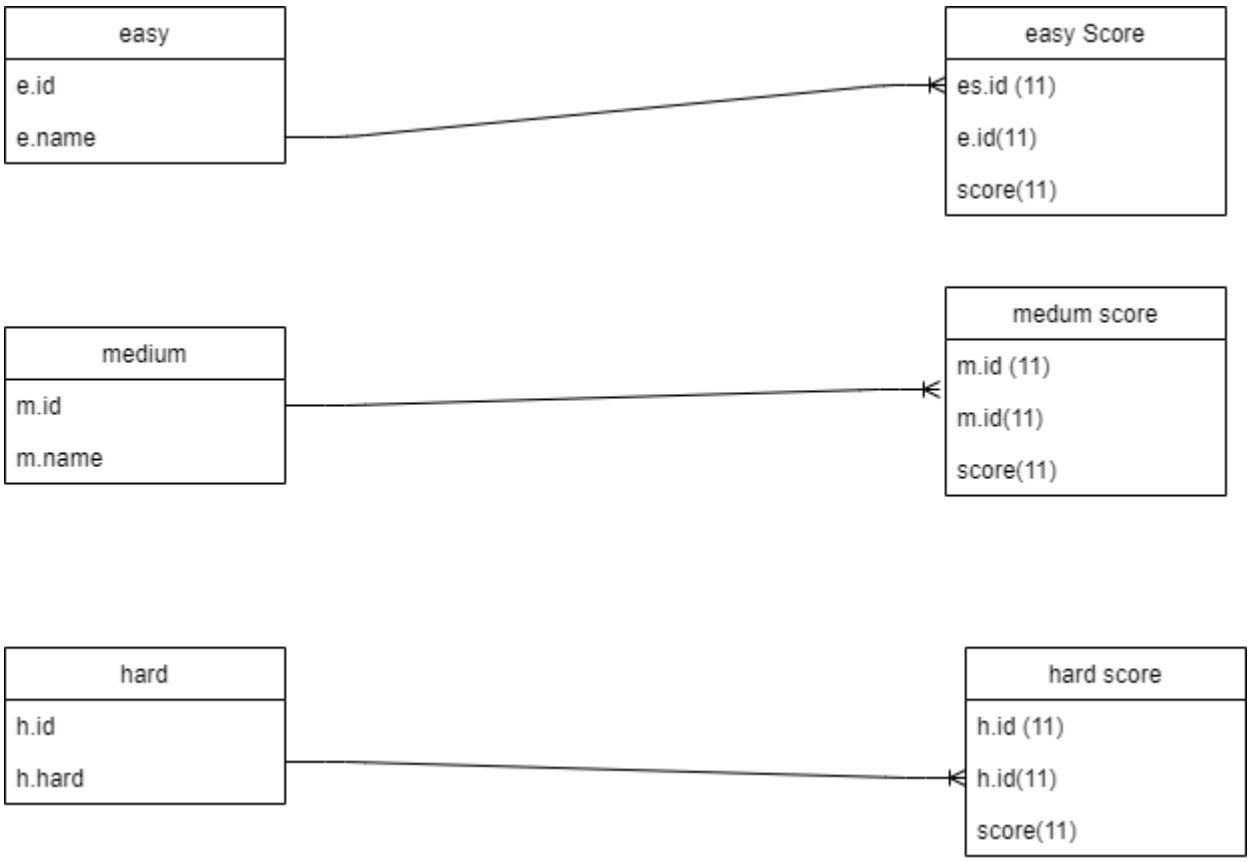

Figure 6 Database schema of cave escape

It is the skeleton structure that represents the logical view of the entire database. It defines how the data is organized and how the relations among them are associated. It formulates all the constraints that are to be applied on the data.

The database schema if Cave Escape represents its entities and the relationship among them. It contains a descriptive detail of the database, which can be depicted by means of schema diagrams. It's the database designers who design the schema to help programmers understand the database and make it useful.

3.2.3 Interface Design

Figure 7: User interface

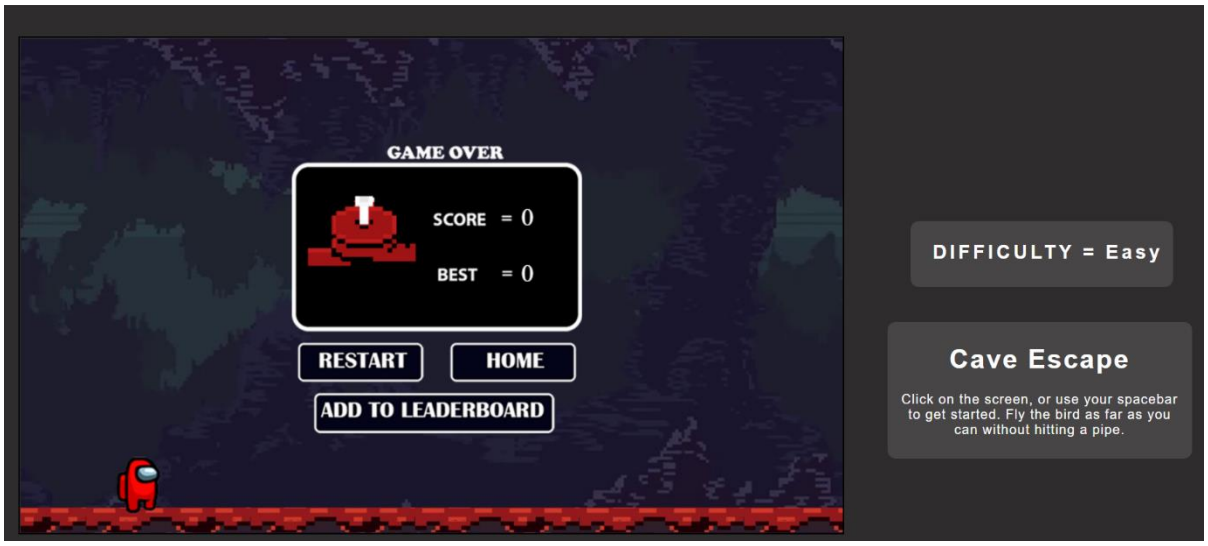

Figure 8: User interface

store3.2.4 Physical DFD

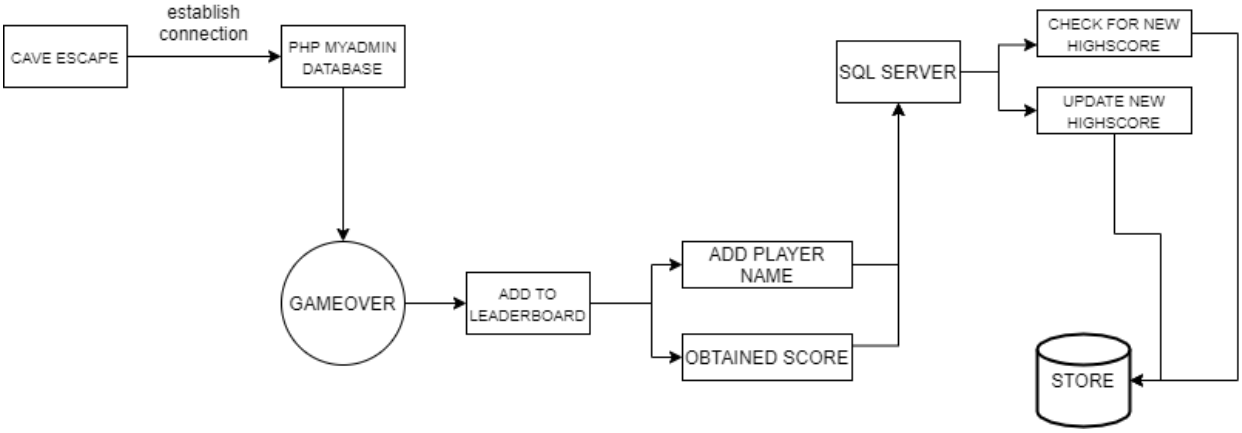

Figure 9 Physical DFD of cave escape

Physical DFD of Cave Escape shows how the system is divided into sub-systems (processes), each of which deals with one or more of the data flows to or from an external agent, and which together provide all of the functionality of the Video Game system as a whole. It also identifies internal data stores of users. This shows the interaction between the game and the user and all the actions that the user can perform in game.

Chapter 4: Implementing and testing

4.1 Implementing

4.1.1. Tools Used

- Vs-code

  Vs-Code is used as the text editor to write and edit codes in the project. Various extensions were used to make the coding simple and fast.

4.1.2 Implementation details of modules

- HTML

  HTML is used as the base of the game. The buttons make to change the between the pages are also made here. We also use it to display Score and high Score.

- HTML Canvas

  The HTML canvas element is used to draw graphics, on the fly, via JavaScript. The canvas element is only a container for graphics.

- JS JavaScript

  JavaScript is used to make the object flap and play in game sounds when a certain event take plays.

- PHP

  PHP is used to store, retrieve and update data to the database (MySQL).

- MySQL Database

  MySQL database is used to store the data (Score) received form the php.

Testing

4.2.1 Unit Testing

Unit testing is a type of software testing where individual units or components of a software are tested. The purpose is to validate that each unit of the software code performs as expected. Unit Testing is done during the development (coding phase) of an application by the developers.

Table 1: unit testing

No	Test Case	Test data input	Expected outcome	Test results
1.	Using left click		Bird flap according to key pressed	Bird is flapping according to the key pressed
2.	Using other keys to flap the bird		Bird is not flap according to key pressed	Bird is not flapping according to key pressed
3.	Pipes moves and score		Pipes move towards bird and Score increasing	Pipes are moving towards bird and score increasing
4.	Game over		Game over screen	Can't flap the bird.
5.	Add to leaderboard	Player name: Noyal	Ask player name and save it to the database	Ask for the player name
5.	Restart		game restart and score is 0	Game restarts and the score is 0
6	Score is high score		Ask player name and save it to the database	High score is updated to the database and score is only displayed.
7	Player vs player		Players can play with their friends.	Player can play with another player.

4.2.2 Integration Testing

Integration testing is a level of software testing where individual units / components are combined and tested as a group. The purpose of this level of testing is to expose faults in the interaction between integrated units. Test drivers and test stubs are used to assist in integration testing.

Table 2: Integration testing

No	Test Case	Test data input	Expected outcome	Test results
1.	Store score	Player name: Noyal	Player can save the score	pass
2.	View high score		Player can see the current high score and saved score in leaderboard	pass
3.	Navigate through pages		Player can move from one page to next	pass

Chapter 5: Conclusion and Recommendation

5.1 Lesson Learnt

Working with a project has been a great experience in learning new things and gaining practical knowledge. During the period of project, it is known that theory knowledge is incomplete without practical knowledge. But to work in practical environment, the theory knowledge is very essential. The period helped to build confidence and strong determination towards professional life. Some of the lessons learnt from the timeline of the project are:

- Work in group and make quality group decision.
- Working under pressure.
- Importance of coordination and cooperation in the work environment.
- Understanding the difference between theoretical knowledge and practical world.

5.2 Conclusion

The final project was planned, developed and demonstrated as expected. The project was done by using JavaScript, which could be played in personal computer. This web application was developed to prevent boredom. The main objectives of this web application is to experience the multiplayer web based game.

5.3 Recommendation

- Design more complex game logic can increase our game integrity.
- Can be developed for androids and IOS devices.

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