Software Engineering Project Report

Figure 1: Title screen

Project Development Report for
Idol Hunt

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I Project Description

1 Project Overview

Idol Hunt is an adventure game with high end graphics taking place on an Island with a mystic being. The player is stuck on the island with only one way out, and that way is to complete the mission the mystic being has given. The mission the mystic being gave is to find an idol that on the far edge of the island which will free the mystic being, allowing it to send the player back home. The player has to use the resources around them to maintain their food, water and health. They would also need to craft the tools needed to help aid in the survival by gathering the resources required for the tools. The player will also be faced with challenges along the way such as wild animals, traps and puzzles which will require the tools and equipment that can be crafted to pass some of those challenges. The game will have an education component in which will test the players knowledge in the field of Computer Science.

The game is accessed as a desktop application. The user can log in to the game to access previous save data. Before the game starts, the player can select the level of difficulty which will decide how easy it is to find the resources, as well as how hard the challenges are. The player can also select which package they want to play, which is shown based on the packages they downloaded. Packages can be downloaded from online and are uploads by players, or Educational Institutions. The default package is the Computer Science package.

There will also be a skills system with these four skills, which can be upgraded, these skills can only be upgraded as the player progresses through the game and picks up more treasures, which are special items that grant the player skill points:

1. **Movement Speed:** Which determines how fast the player can move around the map, upgrading it will increase the movement speed for the player.

2. **Hit Points:** Which deals with how much damage or health the player has. Upgrading it will increase the amount of health the player has.

3. **Hunger:** Which deals with how fast the player gets hungry. Upgrading this will allow the player to be hungry less frequently.

4. **Dehydration:** It's the same as hunger except it deals with the amount of water the player needs to stay alive.

The game starts off with the player on the far edge of the island and will have a tutorial explaining how to move around, pick up items, select items, access inventory, use items, and accessing the skill chart where they can upgrade their skills. They will also be given 2 skill points at the start of the game which they can assign to any of the four skills they would like. The players inventory is like a backpack in which the player can store the items they find and pick up. They will also be given a map which they can use to find their way to where the idol is located. The map will update as the player

discovers new areas, and will contain information such as save spots, and side missions where they can earn additional skill points.

The game can be purchased by anyone with a sense of adventure and is up for the challenge to learn more about Computer Science. The game can also be purchased by educational institutions and will offer them the option to implement their own challenges, if they want to use it for subjects not related to Computer Science.

2 The Purpose of the Project

2a The User Business or Background of the Project Effort

The user will log in to Idol Hunt and then select the difficulty at which they want to play the game. The difficulty dictates how hard the resources are to be found as well as how hard the challenges are to be solved.

The Challenges the game will have are:

1. **Wild Animals:** Which will attack if the player gets in their way.

2. **Traps:** That appear in some of the abandoned structures, which the player must avoid, if the player falls for a trap then they are asked a Computer Science related question, or a question related to the package they selected which they must answer correctly. If they answer it wrong, then they take damage.

3. **Puzzles:** The puzzles also work in a similar way to the traps in which the puzzles will be Computer Science related but won't be questions instead it will make the players think more critically.

The player will be able to use the map they have to find their way towards the idol. The items they collect, craft, and the challenges they solve will give the player experience points which will contribute to their player level. Each level they gain will award them with one skill point which they can use to upgrade their skills. The main motivation behind the game is to develop a game that is both challenging and fun and will help the players gain some experience mainly with Computer Science. Educational Institutions will also have the option to opt in for a different subject instead of Computer Science, and they will have to provide challenged on their own that they want the game to have, each versions created by the Educational Institutions will also be available for download to be accessed by other Educational Institutions. There will also be a leaderboard which is based on completion and the time it took the player to complete the game.

2b Goals of the Project

We know that learning computer science could seem boring to some people, so we decided to teach Computer Science in an exciting way which will draw in young minds. This game is an adventure game combined with puzzles to help teach people about computer science. We will provide a tool for Computer Science to assign learning activity for their class and be able to gauge and monitor students' activities at the same

time. For self-learners we will provide different sort of packages that they can choose on what subjects they want to learn. They will also have access to a gauge that checks their progress.

2c Measurement

Idol will provide measurement tools to gauge the progress of the player on their computer science skill and for teachers they can look at reports of their classes. The way they know they are learning is that the further they progress in the game the harder the Computer Science questions will get. Furthermore, teachers can tell how far a student is so a student that has not progressed far they can tell that student may need more help. Users of this game will learn Computers Science skill without felling bored because they will be engaged with a fun mysterious game that will make them forget that they are learning while they are playing this game. There will be a leader board in this game which shows the progress of the students and how much time they have spent in the game. This will increase class competition which will make students work harder because sometimes being number one is a good motivation factor.

3 The Scope of the Work

The work of this project will help develop skill of the players of the game. This game will provide different types of puzzles for the player to play depending on what they are planning on learning. Many of the sales of the product will be sold to learning institutions. Majority of the learning institutions buying this game will have high school level students or lower. A secondary seller would be college level students and after that this product will be aimed towards self-learners. The activities that these buyers will obtain after buying this product is an interesting adventure game that also increases their knowledge on the chosen subject of the self-learner or learning institutions.

3a The Current Situation

Currently there are a lot of adventure games out there and there are many different types of software about teaching Computer Science. Although, there are not many adventure games which combine the two. Our product will be unique in this fact also the instructor or self-learner can buy the packages which they can use for the game.

The content that are Included for Computer Science is: Java, C, C++, Python, and HTML. These are what the players will be tested on if they select Computer Science for the subject.

The players or Educational Institutions can also create their own packages which they can upload online for others to download.

3b The Context of the Work

Not Applicable.

3c Work Partitioning

Not Applicable.

3d Competing Products

There are no actual competing products with similar aspects as Idol Hunt. There are many types of games that teach students about math and history. The only major game-based learning system is the Adventure Academy. Adventure Academy is a simulation-based game, so this game does not have the same style as Idol Hunt because Idol Hunt is an adventure-puzzle based learning game.

4 The Scope of the Product

4a Scenario Diagram(s)

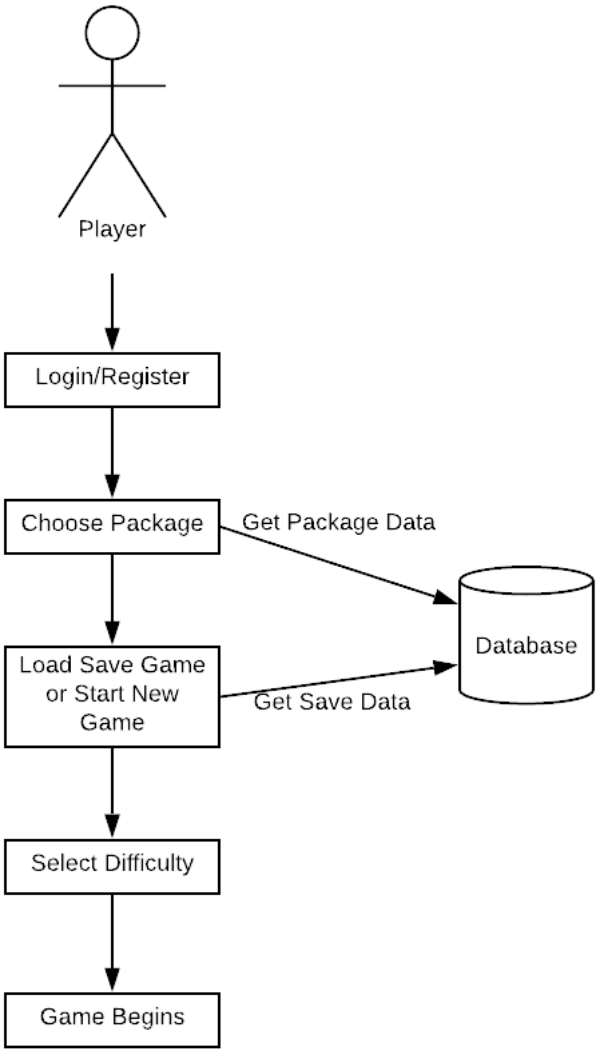

Figure 2: Starting Idol Hunt

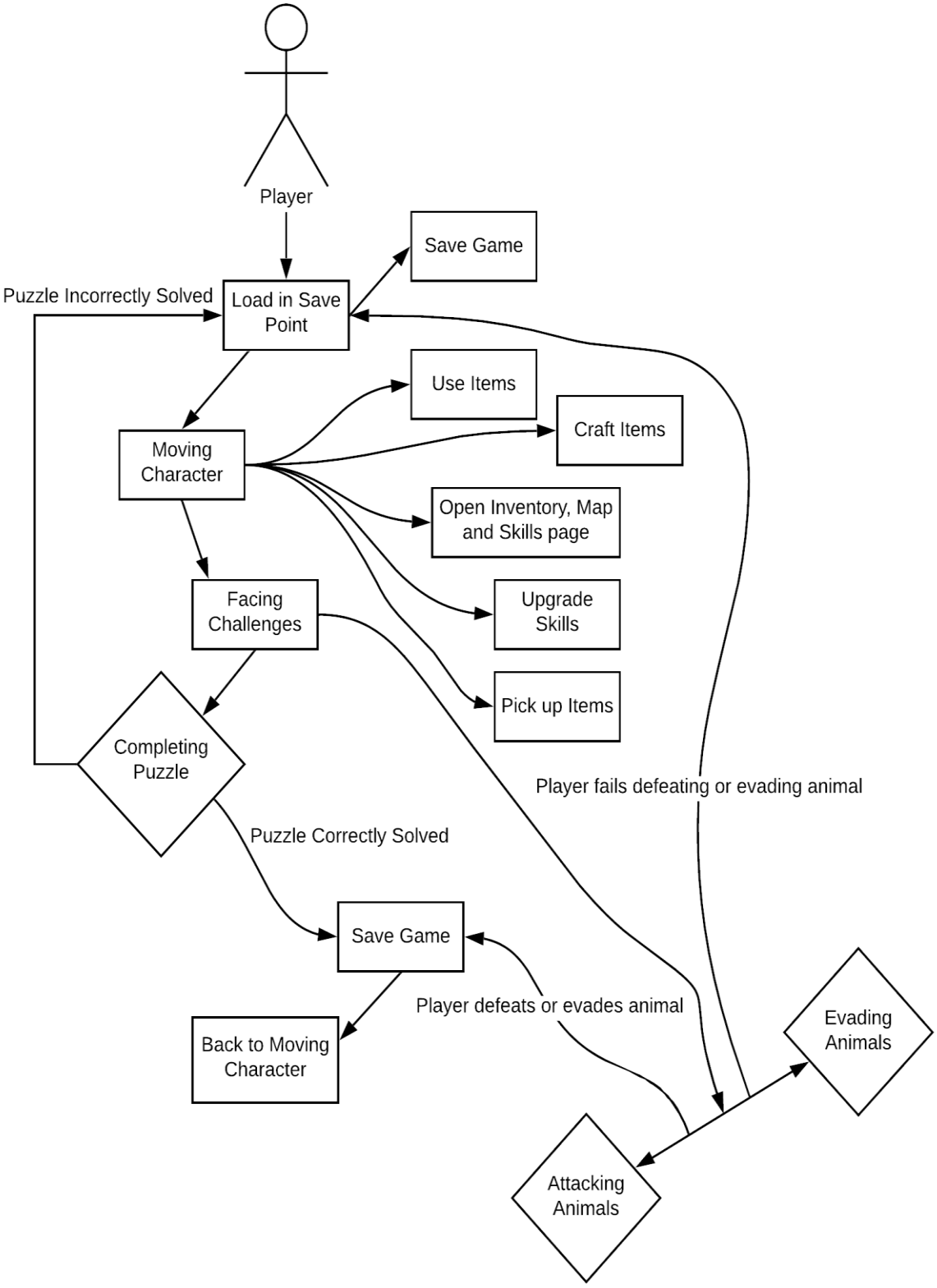

Figure 3: Gameplay

4b Product Scenario List

1) Player Login/Registration
2) Selecting A package
3) Load A Save Game
4) Selecting the Difficulty
5) Opening Inventory, Map, and Skills Page
6) Pick up items
7) Use Items
8) Craft Items
9) Upgrading Skills
10) Facing Challenges
    a. Wild Animals
        i. Attacking Animals
        ii. Evading the Animal
    b. Traps, Puzzles
        i. Answering questions based on package

4c Individual Product Scenarios

1) **Player Login/Registration:** The player can login or register based on if they are returning or new.
2) **Selecting A package:** The player can select one of the packages they downloaded and the tests for the traps and puzzles will be based on the package selected.
3) **Load A Save Game or Auto Save:** The player can load a save that they saved manually, or load into an auto save.
4) **Selecting the Difficulty:** There is going to be four difficulty levels: Beginner, Normal, Advanced, and Death Mode. The difficulty dictates how hard the challenges are and how hard it is to find items. Death Mode doesn't offer manual saves and the game is automatically over if the player dies at any point during the game.

5) **Opening Inventory, Map, and Skills Page:** The player will be able to open their inventory to look at the items they found and use those items. They will be able to open their map to see where they are, and where they are supposed to go. They will also be able to open their skills page where they can upgrade their skills based on how many skills points, they have.

6) **Pickup items:** The player can pick up certain items that can be found as they go about on their adventure.

7) **Use Items:** The player will be able to use the items they pick up, for example they can use, bandages to heal themselves. Food to reduce hunger and water to reduce dehydration.

8) **Craft Items:** The player can craft various items using the items they picked up. For example, the player will be able to craft a spear using a stick, twine and a rock.

9) **Facing Challenges:** The player will be faced with different challenges along their journey to find the idol.

    a. **Wild Animals:** There will be wild animals the player can attack, or the player can be attacked by.

    b. **Attacking Animals:** The player can attack the animal or evade them by sneaking around the animal. If attacked by the animal the player must fight back and defeat the animal. Sneaking around and attacking the animal will deal additional damage on the first attack.

    c. **Traps and Puzzles:** There will also be traps which the player might accidentally activate if they aren't careful, and puzzles which the player needs to solve to get ahead in the game.

    d. **Answering questions based on package:** If a trap is activated, then the player must answer a question, if the players answers the question wrong, they will take in damage. If they answer it correctly, they won't take any damage. For the puzzles, the players will be tested on their critical thinking capabilities. The questions are designed to improve the knowledge of the player based on the package they selected.

5 Stakeholders

5a The Client

The clients will be Pearson, and they are known for providing new and innovating ways of learning to young curious minds. Pearson will be responsible for maintaining and keeping the game up to date, and they will also deal with all the marketing and selling the game to the customers as well.

5b The Customer

The customers for this adventure game are individuals who is interested in learning about various subjects in a fun way and educational institutions such as Universities and Schools. They can purchase the game from Pearson, and they will have the ability to customize the questions that are asked for the challenges as they like. They will also be able to upload their customizations online so the other users of the game can download them as a package to use when they are playing the game.

5c Hands-On Users of the Product

The Hands-On Users of this project will be Students who are assigned this as a part of school work or who just really want to study, school teachers and college professors who are required to make the updated changes and help students understand the game and any common person who wants to play a fun, enjoying and knowledgeable game!

- **Username/category:** Students

- **User role:** Learn as much possible through the knowledgeable puzzles and most importantly have fun while doing it!

- **Subject matter experience:** No specific knowledge is required before the game, playing the game once or twice would be more than enough to adapt to how the game works.

- **Technological experience:** The student must be able to know how to navigate through the basics of computer technology, like left and right click, double click, basic typing and be able to adapt to new technology as releases are made. All in all, a person who knows how to use the basic computer should be able to play the game.

Physical abilities/disabilities: The game is restricted in a way that it requires the use of hands to make selections and play the game. Students also need a good vision, people with poor vision are not advised to play longer than an hour.

Intellectual abilities/disabilities: This game has multiple levels specifically engineered to support people with all types of intellectual levels. Everyone is encouraged to play.

Attitude toward job: It is recommended that the students who play this game have a positive approach to the game and the willingness to learn and never give up. Competitiveness is also encouraged as it only increases the fun and learning experience.

Attitude toward technology: A welcoming positive nature towards technology with eagerness to learn more ways of using the product is highly welcomed.

Education: No advanced education is required, but students who has a prior knowledge in the subject of the puzzle has a higher chance of doing better.

Linguistic skills: No special linguistic skills are needed to play this game.

Age group: Students above the age of 14 can we play, since this game is applicable for college students the ages between14-26 is most effective.

Gender: This game is applicable of people of all gender.

●**Username/category:** High school and College teachers

●**User role:** Monitor student's progress, upload puzzles to the database in their specific course. Teachers need to test the puzzles themselves first before letting the students play.

●**Subject matter experience:** A high level of knowledge in the course they are teaching as they will be testing the students with their own creation of puzzles.

●**Technological experience:** The teacher must be able to know how to use a computer with web, must be able to know or learn how to upload new puzzles onto the database and help students if any issues arise.

Physical abilities/disabilities: The teachers use their hands to make selections and play the game. Users also need a good vision, people with poor vision are not advised to play longer than an hour.

Attitude toward job: Teachers are recommended to be enthusiastic about this new way of learning and consider this as equally important as they would any written assignment.

Attitude toward technology: Teachers need to come in with a very positive approach of technology and the way of using it. They need to learn to adapt to the latest technologies even before anyone else will.

Education: Teachers are recommended to have at least a bachelor's degree in their area of expertise.

Linguistic skills: No special linguistic skills are needed to play this game.

Age group: This age group will include teachers who are in between 25-55

Gender: Applicable of people of all gender.

●**Username/category:** Common People

●**User role:** Learn as much possible through the knowledgeable puzzles and most importantly have fun while doing it!

●**Subject matter experience:** No specific knowledge is required before the game, playing the game once or twice would be more than enough to adapt to how the game works.

●**Technological experience:** The user must be able to know how to navigate through the basics of computer technology, like left and right click, double click, basic typing and be able to adapt to new technology as releases are made. All in all, a person who knows how to use the basic computer should be able to play the game. Describes the users' experience with relevant technology. Rate as novice, journeyman, or master.

Physical abilities/disabilities: The game is restricted in a way that it requires the use of hands to make selections and play the game. Users also need a good vision, people with poor vision are not advised to play longer than an hour.

Intellectual abilities/disabilities: This game has multiple levels specifically engineered to support people with all types of intellectual levels. Everyone is encouraged to play.

Attitude toward job: It is recommended that the users of this game have a positive approach to the game and the willingness to learn and never give up. Competitiveness is also encouraged as it only increases the fun and learning experience.

Attitude toward technology: A welcoming positive nature towards technology with eagerness to learn more ways of using the product is highly welcomed.

Education: It is recommended that the users have a middle school education to enjoy the game to the fullest and get the most out of it.

Linguistic skills: No special linguistic skills are needed to play this game.

Age group: Although anyone above the age of 14 can we play; the game would be most enjoyed and wanted for people between the ages of 14-28.

Gender: This game is applicable of people of all gender.

5d Maintenance Users and Service Technicians

Maintenance users will include a group of technicians who will work together to remove any bugs and or problems that occur in this game. There will also be a customer service staff which handles any technical problems for the customers. There will also be a group that will create new adventures in the game because after a while some customers get bored with the same old storyline, so we have an update staff which create new story packs and upload them to the game every so often.

5e Other Stakeholders

- Testers: Testers will make sure to discuss and fix and bugs that may exist in the program. Testers will also test new story lines that the developer's what to add as DLCs. This will help keep the game up to date and the users happy with game constantly changing.

- Market Experts: This group will help distribute this game and help make this game popular amongst gamers and educational institutions though advertisements. It will be these experts' job to sell this game.

- Gaming Experts: Gaming experts will help the developers come up with new quests and new story lines for the developers to create and add to the game.

- Education Experts: These experts will help expand the different types of packages this product will support. They will also help in creating the curriculum for the game.

5f User Participation

User input will be used in the development of the game and the DLCs. They will also help in giving input about graphics and design of the game. If the user feels the game functionalities are confusing or if the user does not feel comfortable to play the game, then the main objective of developing this product fails. The user participation is very important in development of this game. The user input the most import aspect to help the game succeed.

5g Priorities Assigned to Users

- **Key Users:** We believe that this game can be an important resource for students who are wanting to learn their material in a more enticing way. In the beginning this game will be aimed towards people who want Computer Science. Later we expand to more subjects. The keys users of this product will be students.

- **Secondary Users:** This game also has a market with gamers because not only is this an education game it still has and adventure game aspect so it won't just be educational it will also be fun.

- **Unimportant Users:** This game will attract enough attention that people who do not have any benefits from this game will try it out, the competitors could also potentially use this game as a basis to come up with an idea for something with more implementations.

6 Mandated Constraints

6a Solution Constraints

i) Description: The user installs the client-side user interface on their personal computer. The product's database shall be hosted on a server, and the client will interact and play the game over an internet connection.

Rationale: The school administration or the teacher using this product would like to host this application on their own server and have easy access to it while students/users don't have to be on campus to play game. Users can simply install the application on their computer and login to the application using internet

protocols to connect to the servers. Also, it makes it easy for the school administration to customize the puzzles of this game.

Fit criterion: The users of the product will be able to play the game by using thier personal computers over the internet.

ii) Description: This game will be played on a graphical interface

Rational: Players will be more compelled to play this game graphically and how this product is proposed; a command line application of this game may not be really appealing to the user.

Fit criterion: The user can just play the game without have to read manuals to know how use the mechanics of the games they can just click icons on the screen instead of knowing what commands they would have to know to input in the command line

iii) Description: The product does not need constant Internet connection. When not connected to the internet the user will only able to save on a local drive instead of a cloud. Also, any packages the user is using will not get updated while playing offline, so bugs that the user is having will not be fixed until they connect to the internet. When connected everything will be updated and the game will also update any progress leaderboard is set up by the learning institution for their students.

Rational: Players will not always have internet connection so they will be able to play offline. The game progress can still be saved on a local cache. This allows the player to play this game while they are on the road.

Fit criterion: While playing offline if the user tries to access a mode options that needs an internet connection the user will be given an error message.

6b Implementation Environment of the Current System

The game will work with common operating systems such as macOS, Linux, and Windows. The game will also allow the players to play with integrated graphics, with at the least 4GB of RAM on a 3.0GHz processor, the amount of space the game takes up with the default package will be about 12GB, and the users may need more hard drive space depending on the packages they download that the other customers create, each package may be about 1GB. The game will be sold through Steam, Epic, and GOG Galaxy, which are some of the most common platforms the customers will be able to buy the game from. The packages will also be uploaded on these platforms for download as well.

6c Partner or Collaborative Applications

The Idol Hunt game will be a multi-tier design and the main data base will be hosted on a central server. That requires the client interface connects to the Central database server to get updates on any new packages available and updates need on existing packages. Then when the user selects the packages it will be uploaded to a local drive,

so they do not always need to be connected to the central database. The Central data base will hold packages and hold the info of user's progress of the game.

6d Off-the-Shelf Software

One of the main aspects that makes Idol Hunt stand out from its competitors is the fact that the scores are published and added to the right people in real time. This will require the administrator to gather the statistics of the user's scores, be able to let teachers add questions to the puzzles and update user information. The easiest and obvious choice to store all this information in a database. To maintain this part of the requirement, the best way to do so is through Database Management System or DBMS. This is reliable, cheap and will be able to accommodate all of the game's needs. Considering that there are many open source DBMS in today's market, the most recommended one is MYSQL due to the popularity of SQL, its quick processing, reliability, ease and flexibility of use. If the developer chooses their choice of DBMS, it should still be able to maintain all the original requirements of the project regarding the database requirements mentioned in the beginning and also be able to handle a large amount of traffic.

6e Anticipated Workplace Environment

Since Idol Hunt is designed for educational benefit, the user will be able to use this application anywhere, such as their home, dorm, and their school or college campus. There will be an option to connect headphones to the computer, so it won't be distracting if they are playing the game at school or somewhere that needs to be quiet like a library. There will also be an option to control the volume as well, in case the user doesn't have headphones. If there is no internet connection, the game will still be playable, and the information will be saved locally. Once an internet connection is established, the appropriate information will be uploaded to the online database.

6f Schedule Constraints

Idol Hunts main target are education institutions such as Universities and Schools to be used as a learning tool. The game should be developed and well maintained before the start of the school calendar year and should be uploaded to the school servers at least one week before the classes begin so that appropriate training can be given to the teaching staff and admin. If the game isn't deployed in time, the product may not work as well as it was desired since the staff won't receive enough training to accommodate the game into their course schedule.

6g Budget Constraints

Given that the budget for Idol Hunt is $500,000 it should be doable and shouldn't extend over the budget. Since the game will be deployed over the school server, there is no need for a large server. There will however be a server deployed by Pearson, which will be used for users who purchased the game outside of any educational institution. The development team is encouraged to use an IDE that will allow them to create the game in its full entirety.

7 Naming Conventions and Definitions

7a Definitions of Key Terms

All Terms, Including Acronyms and Abbreviations, used in the Project are

SW -> Show Map.

CL -> Climb

Dk -> Duck down

RN -> Run

PU -> Pickup

RP -> Report (shows the player health report)

CB -> Checks the player bag and a report shows how many gems collected and how many more are needed.

7b UML and Other Notation Used in This Document

Not Applicable.

7c Data Dictionary for Any Included Models

Show Map: When the user hits SW, A map screen pops up showing the players location and a guide highlighted path towards the gem and puzzle place near him.

Report: This would be used when the user wants to know the player strength, stability and to check the life of the player at what level, so that he could be prepared before going into another task or falling into a trap.

Climb: If the player falls into a trap or is trying to climb out from a fall or trying to climb up a tree. The player could type CL which would the following for the player.

Duck Down / slide: When there are obstacles right in front of the player when he is running and if he could just slide down the bottom of the obstacle.

Run: A Run typically be used at any moment during the game for example to reach a specified destination as soon as possible or during a situation where the player health is very low, he/she could use run to find the medicine sooner.

Pickup: (RP)During the journey of the game the player would be needed to find and collect the gems and for this PU (Pickup) would help the player to collect the gem and drop them back into the bag

Bag check: (CB) During the progress of the game after collecting different types of gem, the Check Bag option would give an opportunity for the player to see the

acclaimed gifts he had achieved on the course of the game and how many more gems could be achieved .the bag would also the medicine lotion for the player to grab back all his energy and fill-up his life back too. So, to keep track on his health and gems he received this option of CB could be used

8 Relevant Facts and Assumptions

8a Facts

Selecting the Package

The players can select a specific topic from the packages. The default package comes with the subjects of Computer Science, Math, English, and History. The player can select one of those subjects. They can also select a subject from the other packages they download online for the game that others have uploaded.

Selecting the Difficulty

The player will be able to select from fours difficulty levels and they are:

- ◊ **Beginner:** Items can be found easily, and the challenges are very easy. There are also fewer wild animals, and their Hunger and Dehydration drains very slowly. If the player dies, they also won't lose any of the items they picked up, and any wild animals they killed will stay dead.

- ◊ **Normal:** There are a moderate number of items, and the challenges are harder but still manageable. The number of wild animals is increased, and they are a bit harder to kill. Their Hunger and dehydration will need to be watched at a regular basis. If the player dies, they will lose 25% of the items they picked up, and any wild animals they killed will be reset back to where they were before.

- ◊ **Advanced:** The number of items they can find is rare, so they need to be very careful with managing their items, the challenges are very tough and is for players that know the subject they are playing well. Their hunger and dehydration are the same as Normal difficulty. If the player dies, they will have to choose 30% of the items they picked up to keep and the rest of it will be gone. The wild animals are also very tough to kill and deals more damage.

- ◊ **Death Mode:** It's the same as Advanced, except if the player dies the game is over, and they will have to start all over again from the beginning.

8b Assumptions

The way the AI for the wild animals interact will depend on the difficulty level selected by the player prior to the start of the game. The AI will also determine the items that are spawned throughout the map as well based on the difficulty level. For example, if the player selected Advanced for the difficulty, then the AI for the wild animals will be

more aggressive and will be able to detect the player more easily compared to selecting Normal for the difficulty. The items that are going to be spawned will also depend on the items the player picks up, if the player picked up a certain item the chance of that appearing again soon will be reduced while Advanced difficulty is selected.

II Requirements

9 Product Use Cases

9a Use Case Diagrams

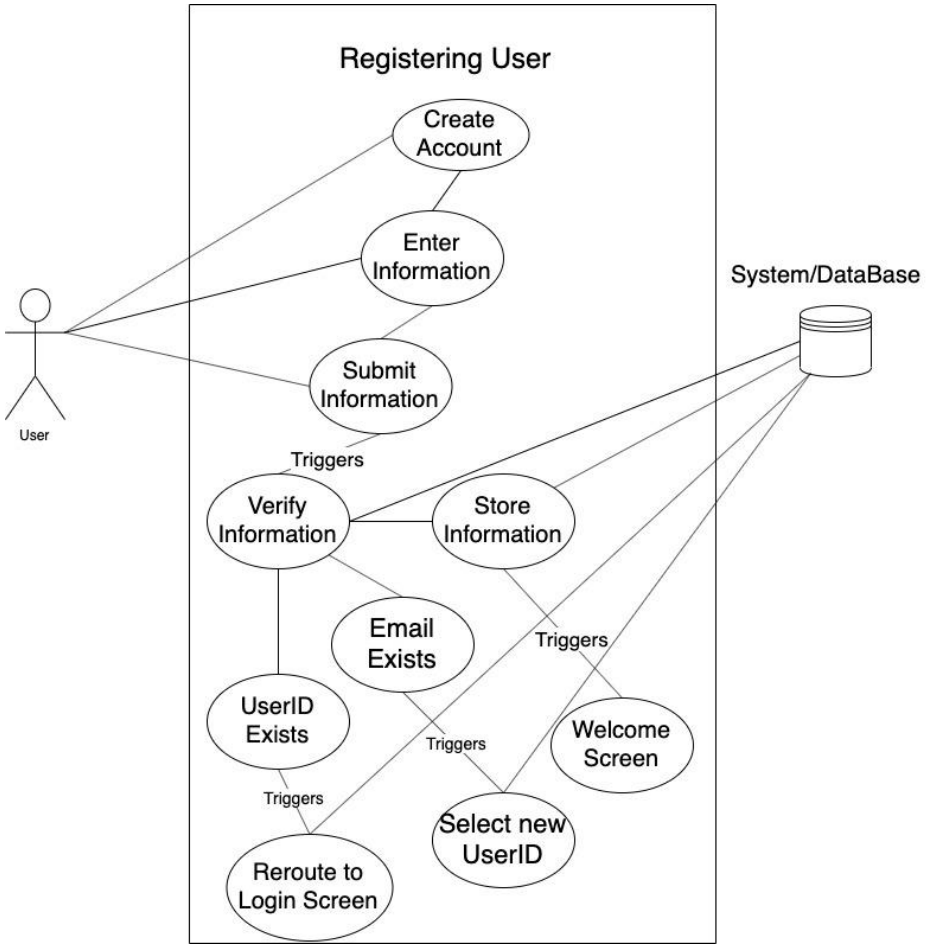

Figure 4: Registering User

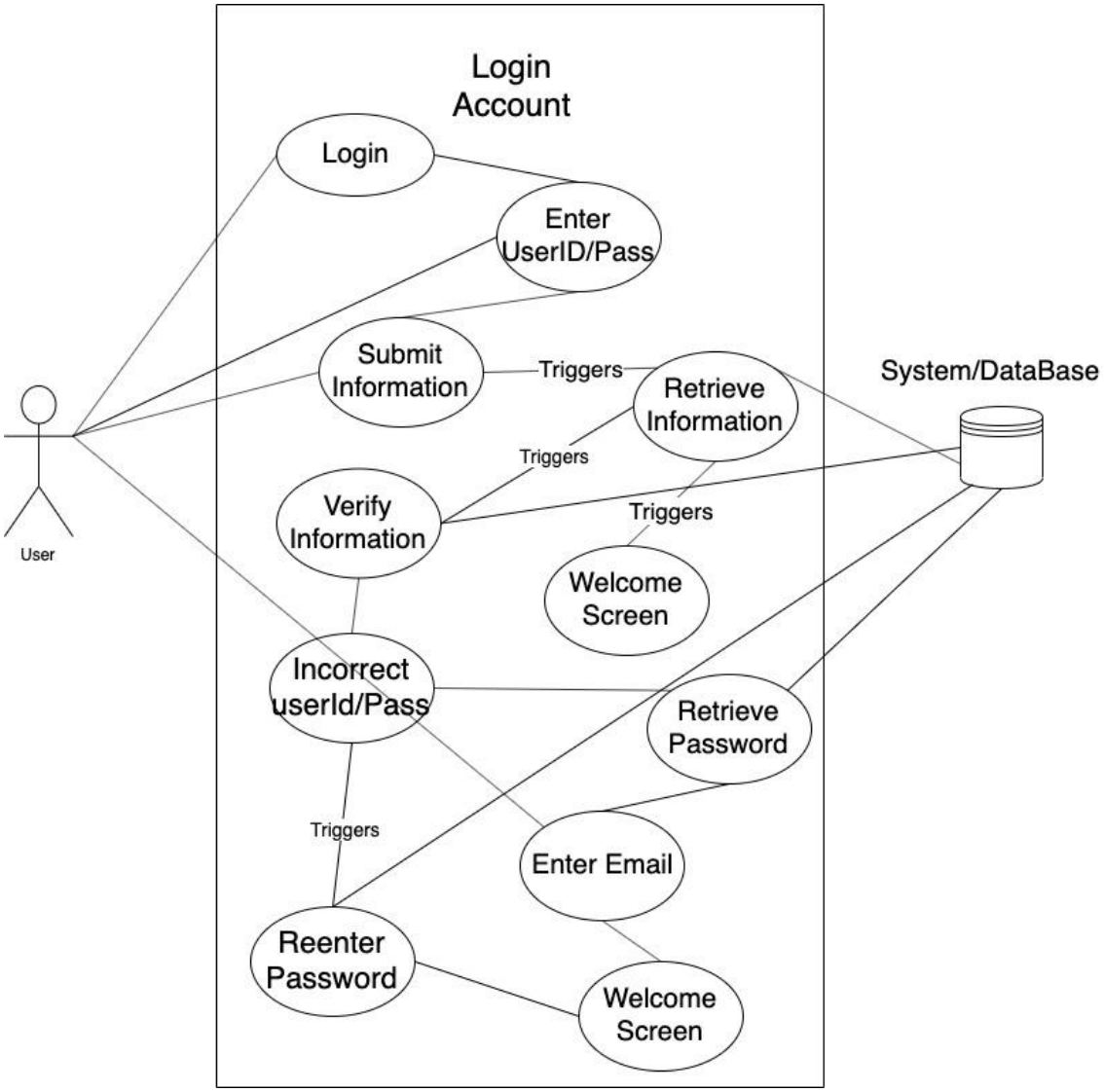

Figure 5: Login Account

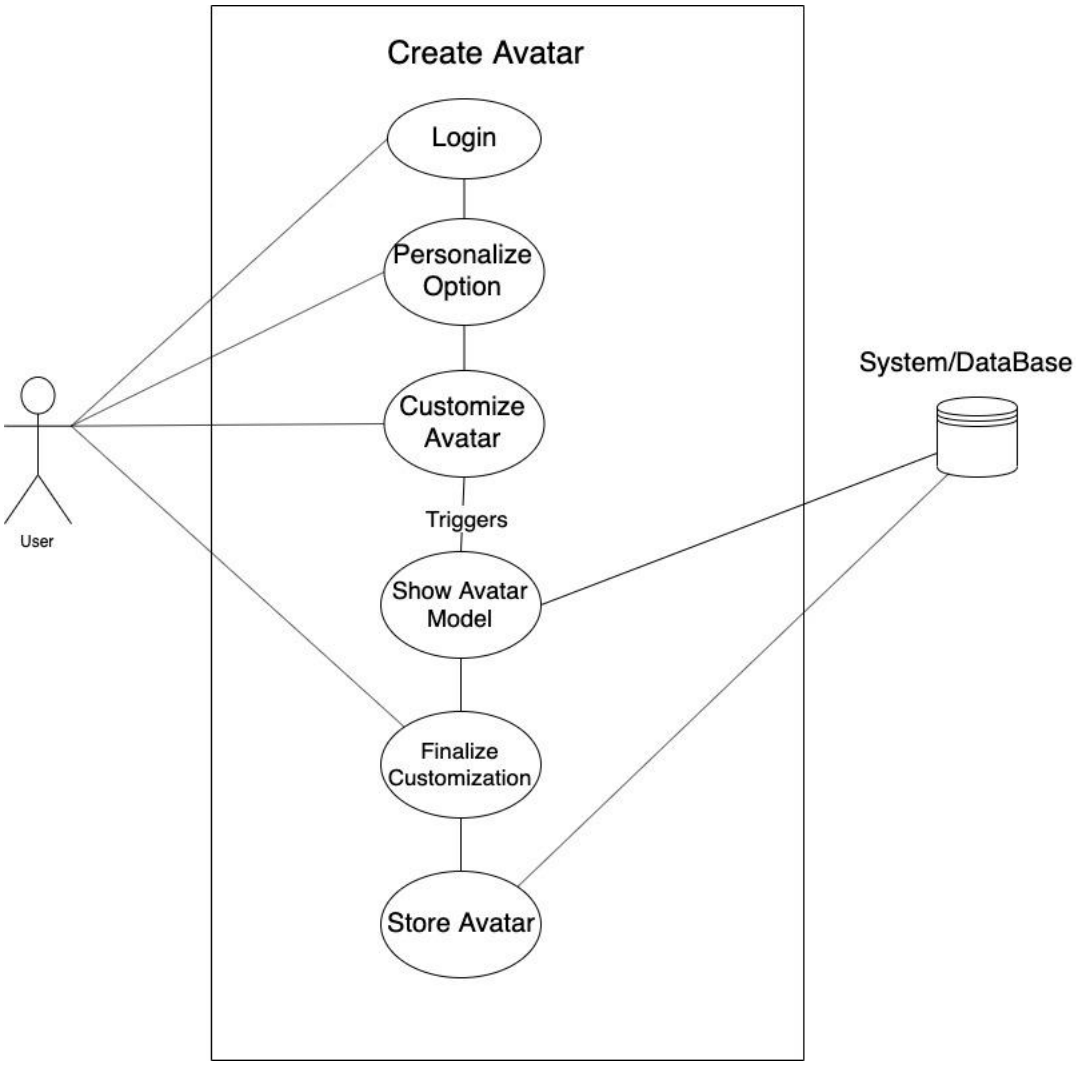

Figure 6: Create Avatar

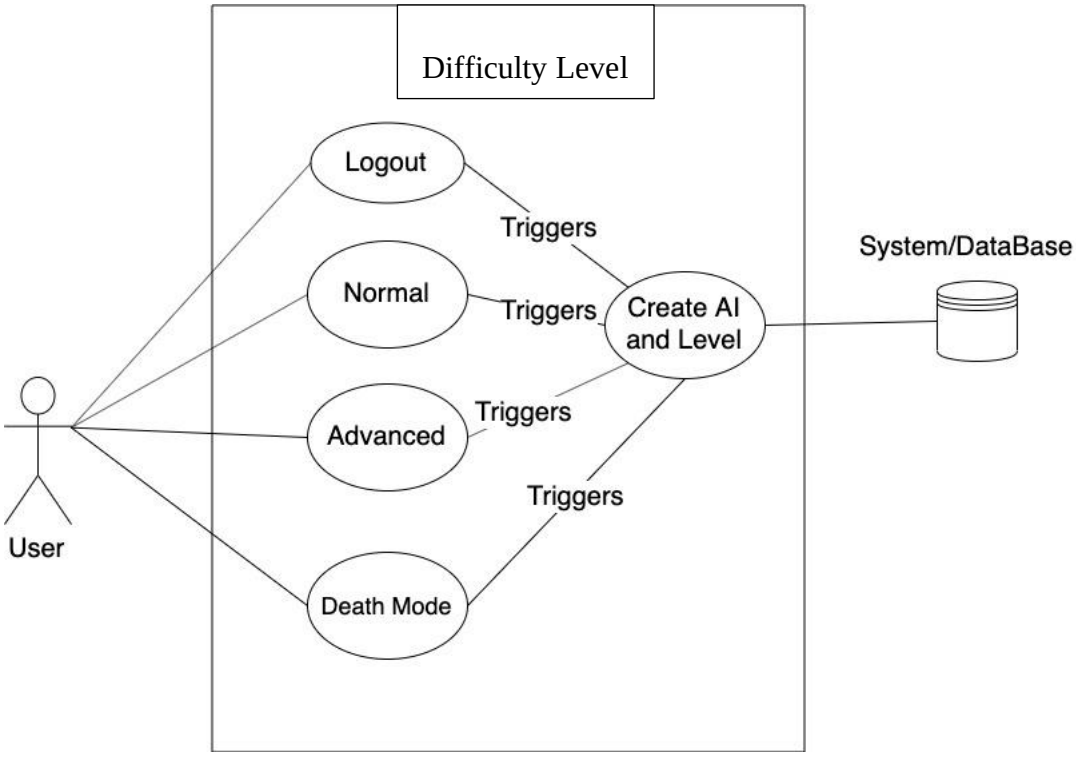

Figure 7: Difficulty Level

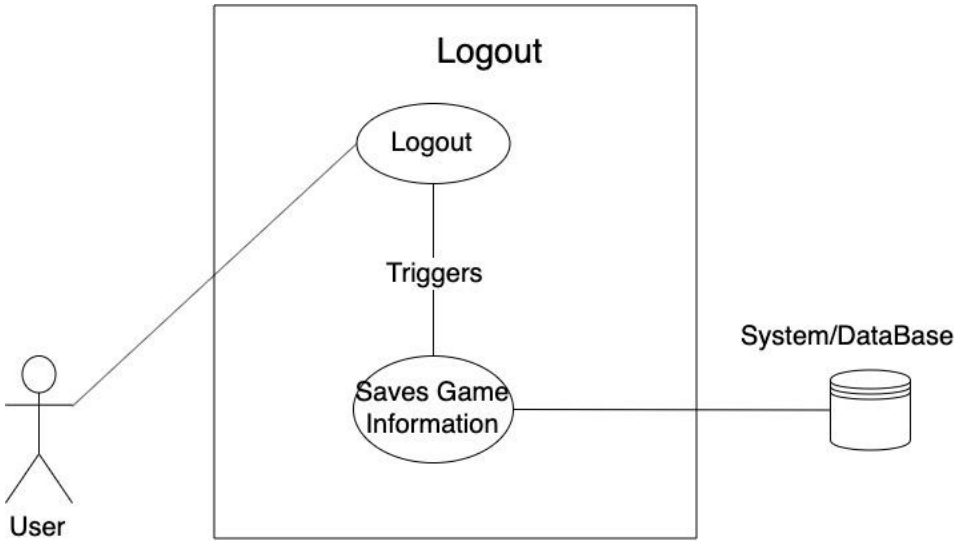

Figure 8: Logout

9b Product Use Case List

1. Register the User account
2. Login to the account
3. Create an avatar

4. Choose a difficulty level
5. Log out

9c Individual Product Use Cases

Use case ID: NA Name: Registering User pre-conditions: User is new and has no relevant information stored in system post-conditions: A new account has been created for the user. He/she can use this to log in for future sessions. Initiated by: User Triggering Event: The user indicates that he/she would like to create an account Additional Actors: User, System/Database
Sequence of Events: 1. The system displays a welcome screen with "create an account" button 2. User clicks on the button a. System opens another screen that lets the user enter their First, Last name, userID and email address as well as a password. 3. User enters the required information and clicks submit a. System connects to database to store this relevant information and create an account for the user 4. The user will be shown a welcome screen where they will be asked to log in with the new information.
Exceptions: If the email/ userID already exists, let the user know the information exits. • If the email exists- reroute to the welcome screen for the user to log in with the option of "forgot password" button. • If the userID already exists, have a pop up that just asks to choose another userID.

Use case ID: NA Name: Login Account

pre-conditions: User has an account that is created and would like to access it.

post-conditions: The user is logged into the account

Initiated by: User

Triggering Event: The user indicates that he/she would like to Login to an account

Additional Actors: User, System/Database

Sequence of Events:

5. The system displays a welcome screen with “Login” button
2. User enters their userId and password and clicks submit.
    a. System connects to database to retrieve the user data.
6. Welcomes the user.

Exceptions: If the userId or password is incorrect lets the user know they entered the wrong information.

- Asks the user to reenter their password or retrieve password. The user needs to enter their email address to retrieve their password.

Use case ID: NA Name: Create Avatar

pre-conditions: User is logged into their account and would like to customize his avatar.

post-conditions: User has a personalized avatar that he wished to create.

Initiated by: User

Triggering Event: The user indicates that he/she would like to have an avatar.

Additional Actors: User, System/Database

Sequence of Events:

7. After logging in, the user will go to his account and click the personalize option.
    a. The system makes a screen pop's up with different buttons for Gender, face shape, hair color and skin color.
8. User clicks on Gender and chooses either Male or female
    a. System shows a basic model of what the avatar looks like based on the selection
9. User chooses the other options to customize their avatar
    a. System keeps track of these changes and portrays these changes on the avatar being displayed to the user
10. Once finalized user chooses the "Done" button
11. The information of the avatar is stored in the database for this user.

Alternatives: This case will not apply if the user chooses not to customize his/her avatar.

Exceptions: If user wishes to only change one thing about their avatar, then the resulting image will just be what is automatically assigned by the system.

Use case ID: NA Name: Choose Difficulty Level

pre-conditions: User is logged into their account and would like to start playing.

post-conditions: The user can start the game

Initiated by: System

Triggering Event: The user indicates that he/she would like to select the difficulty level.

Additional Actors: User, System/Database

Sequence of Events:

12. The user selects between the four difficulty levels: Beginner, Normal, Advanced, Death Mode.
    a. The system creates the level as well as the AI based on the difficulty level selected

Exceptions: NA

Use case ID: NA Name: Log Out

pre-conditions: User is done playing the game for the time and would like to logout.

post-conditions: The user logs out and game information gets stored into the database.

Initiated by: User

Triggering Event: The user indicates that he/she would like to create an account

Additional Actors: User, System/Database

Sequence of Events:

13. The user clicks the "Log out" button.
    a. The system saves gameplay information so that the user starts off at the save point once they log back in.

Exceptions: NA

10 Functional Requirements

Requirement # 1

Description: The system will provide a way to for the user to create a new account by registering a username and password

Rationale: To be able to know the identity of the user, monitor and record their performance in the game. Also allows the user to save their progress on a cloud.

Fit Criterion: A new user is provided with an option at the login menu to create a new account, where user enter their name, email, password recovery question, school and class/course to create a new user account. Once user successfully creates an account, they can login to the game with their username and password. The user is also able to save their progress in their game on the cloud.

Acceptance Tests: Test 1 -First Time User Test

Requirement # 2

Description: When user starts a new game, they are able to choose from downloaded packages of puzzles to load into to that game to play. The user is only required to connect to the internet when saving to cloud and uploading their progress to a class database

Rationale: If the user wants to play a game but wants to learn different material or learn an advance topic of a previous topic this option allows to user to do so. Also allows the user to play the game on any PC with the game with their data. Also, the class database saves their progress data

Fit Criterion: When a user starts a new game, they are led to a selection menu where the user selects the type of puzzle they want. When saving if they are connected to the internet, they can save on cloud so they can continue from where they left off from any PC with this game app on the PC. When data is saved on the cloud the class database will be updated with the user's game progress so the professors can check the users learning progress or the user can check their own progress.

Acceptance Tests: Test 2 -New Game Test

Requirement # 3

Description: The system shall provide an option to recover password for existing users in case if they forget their password.

Rationale: The user can recover their account, so they do not lose their progress in their game or lose their cloud information.

Fit Criterion: An existed user can recover their password by answering the security questions that they selected and answered at the time of their registration. Once they recover their password, they can successfully log back into their account and have access to their save data.

Acceptance Tests: Test 3- Lost Password

Requirement # 4

Description: The system shall allow the user to select the type of puzzles they want in the game by choice.

Rationale: It allows the user to select what they want to learn about.

Fit Criterion: The user is presented with various choices of puzzle types to choose from, once the user selects a puzzle for the game, the system renders and lets the user play the game with the puzzle package that the user has selected.

Acceptance Tests: Test 4 - Select Puzzle

Requirement # 5

Description: The system must allow the user to play the game, in case there is no network connection to the main database server. In such an event system shall store the scores and related information in the local database, which is pushed to the main system whenever the connection to the main server is reestablished.

Rationale: To be able to interact with the system and play game while away from internet.

Fit Criterion: User can play the game when they leave the network and they are notified that the system is saving their score on a local database, this saved information 36 is pushed to the main server database at a later time when the connection has been reestablished.

Acceptance Tests: Test 5 - Offline Gameplay

Requirement # 6

Description: The system shall provide access to the players progress and the top 10 players who have the most progress done if this game is connected to a class database. The leaderboard displays the top ten performing players' username and their current progress. The leader board can be viewed with filters to see all-time leader by month or week as well.

Rationale: To be able to compare how far your classmates are compared to the user

Fit Criterion: User can select an option to view the top ten leader and apply the filters to view the leaderboard for a selected month, week or all time since the game is in its existence. This option is only available for users who are playing this game trough a class database.

Acceptance Tests: Test 6 – Leaderboard

Requirement # 7

Description: The system shall provide base level and admin level access. An admin can monitor every user's performance with their name instead of only username. A

base level privilege can only view the leaderboard only based on username but full names of the users.

Rationale: To be able to hide the usernames for anonymity and to be able for the administrator or teacher can view each individual's' performance. In case the teacher needs to provide extra resources for a student who is struggling.

Fit Criterion: Admin level user have ability to select an option to search for all users and monitor their daily and total performance. The base level user is denied such access.

Acceptance Tests: Test 7 – Admin Level Performance View

Requirement # 8

Description: The system shall provide ability for admin level user to access the main database server and modify the custom packages of the game that hold the custom puzzles. Base level user is prohibited to modify or/and update any puzzle packages.

Rationale: To be able to upload new puzzle sets, updated hard puzzles or fix unsolvable puzzles.

Fit Criterion: Admin level user can successfully update the question and upload new questions to the main database server. Such attempt by base level user is denied.

Acceptance Tests: Test 8 – Update Puzzle Package by Admin

Requirement # 9

Description: The system shall provide the user with a means of pausing the game and resuming to the exact spot later without the loss of any data or scores.

Rationale: The user should not be forced to complete the game in one sitting, they should be given the freedom to play and pause whenever they would like without having to worry about losing the saved spot.

Fit Criterion: The user is able to save the current spot and return to it whenever they would like without loss of any data.

Acceptance Tests: Test 9 – Pause Game

Requirement # 10

Description: The system shall be considerate regardless of culture and languages or political opinions.

Rationale: This is to make sure the users are comfortable playing the game without an issue.

Fit Criterion: If the system is considerate of the differences then this requirement is met.

Acceptance Tests: Test 66 – Respecting Differences

Requirement # 11

Description: The privacy of the scores in this game will be respected. This will only be able to be accessed by the user and an admin.

Rationale: Respecting the privacy will make the users more comfortable and no instances of inferiority complex will be felt.

Fit Criterion: Leaderboard should only show the usernames, the access to the scores is only had by the user and the admin.

Acceptance Tests: Test 68– FERPA Protection

Requirement # 12

Description: The game will be accessed in multiple forms, including the online website, apple store and android store.

Rationale: Increasing the number of ways to access the game will make it more popular and increase the likeliness of people playing the game.

Fit Criterion: The game being available in the sources mentioned above will fulfill this requirement.

Acceptance Tests: Test 63 – - Modes of releases

11 Data Requirements

Database #1

Description: The database will collect the name of the player by their first and last name basis the database will also hold a user ID for the user to enter which would preferably be their email address, after doing the following instructions the user will be given a couple of character models to choose from. The user will also be given an option to select their character to be Boy/ Girl and the selected information will be stored in the database, there will also be a user preferred model according to the gender they have selected will be also store in the database system.

Rationale: The game needs to store the username so that the player score would be updated with the username in the leader board, and for the login the database will store the user ID so that whenever the user enters the username he will be able to get back his saved game with the scores on the them. The database would also store the character model preferred by the player which will be designed to play in the course of the game

Fit Criterion: During the login menu the user will be given the option to enter the details of the user identity, so the database will take the information from the entered data from the first name and last name and after the data is entered and stored in the database the user will have the option to choose the gender and the next option will the database will be holding that information too. The user will be given an option to select a character from the models which would be used to play during the course of the game, the login part of the game is considered the userId where the player would enter his/her user name preferably their email address and as soon as the player enters the username the data stored in the database will bring up the information of the player with name , gender and the character model to continue the game. All the changes would be saved

Acceptance Tests: Test 10 – User Information in database

Database #2

Description: The database will be holding the data related to the game on the puzzles department, there would be different types of puzzles and also the questions to be asked are all stored in the database which would be randomly picked during the course of the game. The database system will also store a customized version of the Proctor/ Administrator questions for the students and a set of puzzles as designed for the class. Doing so there will be the administrator could add, remove and update the puzzles and the questions, the database will also keep track of the puzzles being solved and also tracks the scores by the student and the administrator will have all the access to the scores of all the students and the progress of the quizzes and the puzzles of the students

Rationale: The main aspect of the game is puzzles and questions asked during the process. when the player enters to the stage of playing with puzzles and the answering the questions for the administrator, all the questions and the puzzles could be customized for based on the classes taken by the student doing this would help the administrator to keep track of the score of the student

Fit Criterion: The administrator would be able to enter the quiz questions as needed for the game based on the class been taught and record the progress of the game and also tracking where the students/ learners are making mistakes unanimously and which topic seems to be very hard.

Acceptance Tests: Test 11 – Storing Puzzles

Database #3

Description: the above description would store the basic info of the player and the selection for their way of representing their character to be played in the game. In this part of the database the scores of the game would be stored and there would be a leader board which consists of all the different userId entered with their scores and the info. The scores will be updated each time the player plays his game and make changes to his position in the leaderboard. The player could his place in the game where his score last and the leaderboard will also show the top 10 players with high score in the game

Rationale: The part of the game is to store the scores scored by the players during the game and later those scores are updated in the leaderboard, so during the start of the game the player will provide the login information needed and as the game process and the players starts earning their score the saved game will also save the score of the player with their username and are updated to the leader board. the leader board will be updated by the username in a chronological order of the scores from the highest to the lowest

Fit Criterion: The user has the option to search his score or know his score from the leaderboard by enter his/her username by doing so the user could know the position he is at and would help the user to play more or get a better score

Acceptance Tests: Test 12 – Database Leaderboard

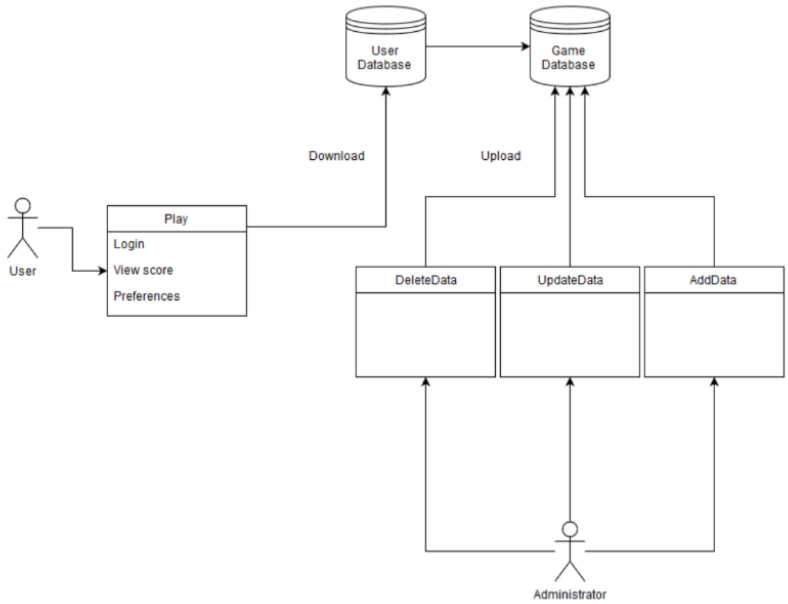

Figure 9: Storing Puzzles

12 Performance Requirements

12a Speed and Latency Requirements

4# - Reaction Time

Description: For each puzzle in the game, once the player enters their response to a puzzle, the system must take no more than 3 seconds to let the user know if it's a correct answer or not.

Rationale: In the excitement of the game, the users would not appreciate a game that takes longer to respond to their puzzle replies, if the time is longer then it is expected the popularity of the game to be immensely decreasing. In order to avoid this, the reaction time of the system to the puzzles has to be 3 seconds or less.

Fit Criterion: Doesn't apply.

Acceptance Tests: Test 13 – Reaction Time

5# Screens/Pop -up windows

Description: Every pop-up window or screen in this game should not take more than 5 seconds to load or populate.

Rationale: The goal again here is to have a game that is faster to make the attraction of the game higher.

Fit Criterion: Doesn't apply.

Acceptance Tests: Test 14 – Pop-Up Window

6# - Scores

Description: Considering that we have a low time condition on every aspect of the game, the time to display the scores at the end of the game is expected to be around 7 seconds. Once the game ends, the system will have 7 seconds to display the score screen.

Rationale: When the game ends, the player will be having a rush of adrenaline and will relax a bit, it is expected that towards the end of the game they will not notice the extra couple of seconds to display the scores that they have earned.

Fit Criterion: Doesn't apply.

Acceptance Tests: Test 15 – End Game Score

7# - Leader Board Scores

Description: The leader board scores for the game is expected to be updated every 2 minutes. This will show the scores of the top ten users who played that specific game.

Rationale: The customers for this game is expected to be tremendously high, so the best way to update the leader board scores will be every 2 minutes. It is assumed that the user won't even be able to notice this time for the most part because by the time they close the game and open the leader board scores by clicking multiple buttons, it is assumed the Leader Board will be updated.

Fit Criterion: Doesn't apply.

Acceptance Tests: Test 16 – Leaderboard

12b Precision or Accuracy Requirements

8# - Leaderboard

Description: The scores in the leaderboard should be accurately updated to the right users with the right username every 2 minutes to include the top 10 scores of a leaderboard.

Rationale: The game is competitive with the scoring part as a motivation. The fact that the users get their earned points will be a contributing factor in how well the game is in the market. This will also encourage players to learn more to answer the puzzle questions right.

Fit Criterion: The system fulfils this requirement if it accurately displays the top 10 scores in the leaderboard and matches it to the right users.

Acceptance Tests: Test 17 – Leaderboard

9# - Puzzle Topic

Description: Since the game offers multiple subjects for the puzzle sections, it is important that the questions for the puzzles matches up with the subject chosen.

Rationale: To be able to give the learning experience that the user desires.

Fit Criterion: The system fulfils this requirement if it only provides questions from the chosen topic of the user.

Acceptance Tests: Test 18 – Puzzle topics

10# - Game Levels

Description: As every game, to make *Idol Hunt i*nteresting, there are different difficulty levels offered. A person who is experienced may choose a higher difficulty level and a beginner can use one of the easier levels. The obstacles must

be customizing accordingly to make sure the game is adjusted to the difficulty chosen.

Rationale: To be able to provide the different learning experiences and challenges according to the user's needs and wishes.

Fit Criterion: The system fulfils this requirement if the obstacles and puzzles in the game matches with the level chosen by the user.

Acceptance Tests: Test 19 – Game Levels

11# - Points awarded

Description: The points awarded to the players should be accurate under any condition. These conditions include and are not limited to, the game being paused and resumed, answering/not answering the puzzles accurately.

Rationale: To be able to provide an interesting and competitive nature to the game.

Fit Criterion: The system fulfils this requirement if the points are being accurately awarded to the right players and kept track off in the leader board.

Acceptance Tests: Test 20 – Points awarded

12# - Pause/Resume Game

Description: The user must be able to pause the game after puzzle and should be able to resume from where they left off without any data being lost.

Rationale: The user should be able to take a break whenever they would like for any circumstance and not be forced to quit the game if they can't finish the game in one sitting

Fit Criterion: The system fulfils this requirement if the game can be paused and the player can resume the game without any loss of data and exactly where they left off.

Acceptance Tests: Test 21 – Pause/Resume Game

12c Capacity Requirements

13# - Logged In

Description: The system must be able to handle up to 70,000 active users logged in at a time

Rationale: Expecting a high popularity of the game, the system should be able to handle 70,000 active users at a time without causing an issue.

Fit Criterion: The system fulfils this requirement if it can handle up to 70,000 users logged in at a time without crashing.

Acceptance Tests: Test 22 – Logged In

14# - Games Run

Description: The game must be able to handle 40,000 games being run at any given time.

Rationale: Expecting a high popularity of the game, the system should be able to handle 40,000 games being played at a time without causing an issue.

Fit Criterion: The system fulfils this requirement if it can handle up to 40,000 games playing at a time without crashing.

Acceptance Tests: Test 23 – Games Run

15# -User Profiles

Description: The game must be able to store 789,000 user profiles in total. Considering that there can be a lot of people who just creates an account to try out the game, the system should be able to handle the data of up to 789,000 users.

Rationale: Expecting a high popularity of the game, the system should be able to handle 789,000 user profiles without causing an issue.

Fit Criterion: The system fulfils this requirement if it can handle 789,000 user profiles at a time without crashing.

Acceptance Tests: Test 24 – User Profiles

16# -Question Topics

Description: The game must come with a set of different distinct questions from the below topics in different levels of difficulties.

Rationale: People with multiple backgrounds will be using this game to improve their knowledge. The system should have the capacity to handle multiple subjects and topics related to them.

Fit Criterion: The system fulfils this requirement if it offers the users a wide variety of subjects and topics for the obstacles/puzzles in the game.

Acceptance Tests: Test 25 question topics

13 Dependability Requirements

13a Reliability Requirements

17# - Account Losses

Description: If by any chance there is a system failure, no user information should be lost. The account usernames, passwords and the scores should be safe from any destruction.

Rationale: In order to keep an history of all the users and games played by them, account and data losses should be avoided at all cost.

Fit Criterion: The system meets this requirement, if in case of a failure no data is lost.

Acceptance Tests: Test 26 account losses

18# - Maintenance

Description: Considering the vast majority of subjects and users being added every day. There should be a maintenance once in two weeks or as often as needed to check all the functionalities are working efficiently. The users must get a well advance notice of the maintenance taking place both by email communication and announced on the site.

Rationale: Maintenance is required to make sure everything is working smoothly and fix the issues that are not to avoid all the issues mentioned in the above sections.

Fit Criterion: The system meets these criteria if there are regular maintenance to make sure the game is working correctly and if the users get a well-advanced notice of at least three days of the maintenance that is going to take place.

Acceptance Tests: Test 27 – Maintenance

19# - Glitches

Description: The Glitches for this game should be very minimum. Considering this is supposed to be a mix of education and fun, the glitches should be avoided to once a month. This should be possible because of the maintenances that takes place every two weeks or as often as needed. This Maintenance should make sure the glitches don’t happen.

Rationale: Glitches ruin the reputation of the game and cause the game to not be a trusted product in the market.

Fit Criterion: The system meets this requirement, if there is one or less glitches per month.

Acceptance Tests: Test 28 – Glitches

13b Availability Requirements

20# - Days and Times

Description: This game should be available 24/7 a day and all days of a year unless taken down for maintenance.

Rationale: Users should be able to play this game whenever they would like without having to worry about losing progress.

Fit Criterion: The game being available for 24/7 will meet this requirement

Acceptance Tests: Test 29- Days and Times

21# - Functional Uptime

Description: Even when the game is under maintenance the user should still be able to access their portfolio to see information about their account and how far they have gotten within the game. Only time it shouldn't be accessible is if the database itself is getting an overhaul or getting updated, which should happen on rare occasions.

Rationale: Since the information is stored inside of a database the user should be able to see the information. This would especially be useful for educational institutions especially if the professors are assigning the game as part of a grade. The professors would be able to look at the information to provide the students with a grade. They shouldn't have to worry about

Fit Criterion: System letting the user access their portfolio should cover this requirement.

Acceptance Tests: Test 30- Functional Uptime

13c Robustness or Fault-Tolerance Requirements

22# - Database Connection

Description: If by any chance there is a loss of the database connection then the users must be updated of this and the log in to their accounts must be denied.

Rationale: The users must be given a warning that the connection has been lost and the maintenance staff is working on it in order to not loose trust in the game.

Fit Criterion: Message alerting the users about the loss of connection.

Acceptance Tests: Test 31- Database Connection

23# - Loss of Internet Connection

Description: If there is a loss of internet connection, then the data accumulated should be saved in the local device until the connection can be restored. The system should let the user save the game to the point and should let them return to that spot when the connection is restored.

Rationale: A disruption in the connection should not let the users destroy all the game progress that they have made.

Fit Criterion: Letting the user save the game and return to it once connection is restored and the data being synced once the connection has been restored.

Acceptance Tests: Test 32- Loss of Internet Connection

13d Safety – Critical Requirements

24# - Physical and Emotional Safety

Description: The maintenance team should make sure that the with the popularity of the game and new updates, the game will not encourage any physical or emotional harms to any of the users playing the game.

Rationale: The puzzles and jungle nature of this game should be highly kept track of too not cause any harm in both emotional and physical way.

Fit Criterion: The system meets this requirement as long as the maintenance staff makes sure to watch out for the public opinion to see if any concerns are raised on physical and emotional damage and act accordingly if they are.

Acceptance Tests: Test 33- Physical and Emotional Safety

14 Maintainability and Supportability Requirements

14a Maintenance Requirements

25# Update Game

Description: When the game goes on an update to fix any bugs or add any new content the game should still be available to play offline but any features that require the internet will be disabled until the update is finished. The maximum time for an update should be 24 hours. Most updates should only take 2-4 hrs for fixing bugs and adding small features, unless the update is adding new game content then the update can last for about 24 hours at most.

Rationale: To keep players interested in the game we add new features and game content to keep users interested in the game.

Fit Criterion: Many users will get board of the game after beating it a couple of times so we will keep them interested by developing new game ideas to give them a reason to keep on playing the game also this game is available to play offline so

the update should not affect how the user plays the game it should only affect online features such as cloud saving.

Acceptance Tests: Test 34- Update Game

26# - Fixing bugs

Description: When the game has bugs in the game users will report it the Maintenance team will investigate the reports and fix the bugs in the game. There will be weekly Maintenance on the game so when a bug is reported the Maintenance team should have fix the bug by the second Maintenance cycle after the report came in.

Rationale: To provide a better gaming experience for the user we will fix bugs that are in the game.

Fit Criterion: User will not enjoy playing a game that is full of bugs which ruin their gaming experience and may force them to quit playing the game. To prevent this from happing we will fix the bugs

Acceptance Tests: Test 35 - Fixing bugs

14b Supportability Requirements

***27*# - Log in Prompts**

Description: The systems should be quick enough to be prompting the questions and the puzzles. Every time the user login the game he / she will get a notification of the last log in time and the present login time. The same way if the user remembers the userId that is the preferable user email address but have forgotten the password the player could reset the password by typing in the wrong password three times when he does a security question will pop up which only the user know the answer to and later a pop menu bar pops bar asking to enter a new password.

Rationale: this is used just for the player who doesn't play often and returns to play the game but later forgets about it. Then for the player to access his old score and old saved game and to rest the password this method can be used

Fit Criterion: This would be a no worry zone for the players who might usually are not good with remembering the passwords but would still like to keep track of their scores

Acceptance Tests: Test 36- Log in Prompts

14c Adaptability Requirements

28# - Machine Requirements

Description: The product shall be compatible with the latest version of windows, mac, and Linux systems and also on the mobile application.

Rationale: The most used OS system at present in the world are mac and windows, Linux so preferably the students would be using them and the game should be compatible on their personal laptops and also the same way it would be as an application on the mobile device so that the students could use it to study

Fit Criterion: The mobile application is created so that it could be used whenever the students wants it to play and also the give fact that usage of the phone among the student are a bit more when compared to the usage of the laptops

Acceptance Tests: Test 37- Machine Requirements

14d Scalability or Extensibility Requirements

This section has already been covered with the number of users being able to access a large number as it is, if needed this can be expanded in the future- but the need for this is not currently seen due to the large users already being stored.

14e Longevity Requirements

29# - Educational Length

Description: For the educational institutions of the specific class the product will run till the scheduled semester ends, so that the administrator can recycle his student grades and his notes in the database for the next semester. For the students taking the course individually will also have the limited time of the semester basis. the future of the game will be improving over the time by taking care of the bugs and mean while also making the graphics much interesting

Rationale: the time period is giving in a time frame so that student would try to finish a course in the limited time and move on rather than taking the same course for ears and this brings up a standard quality to the idol hunt application

Fit Criterion: not applicable

Acceptance Tests: Test 38- Educational Length

15 Security Requirements

15a Access Requirements

30# - Privacy Issue

Description: The user info for example the username and password shall not be accesses by anyone other than the user itself, but the submission and the scores achieved by the player could be viewed by the administrator, and in the another

case for the user using the application as a personal use the statics of the leader board will be given out with average of the class and the mean of the class

Rationale: the personal information of the user shouldn't be shared as the quizzes and puzzles might have to be played alone. Therefore, the username and the password shouldn't be shared. The same way to know the progress of the class the administrator would be able to check the progress of the users through a leader board

Fit Criterion: the above gibes the requirement for the user

Acceptance Tests: Test 39- Privacy Issue

15b Integrity Requirements

31# - Access Limitation

Description: The stored data scores cannot be edited or changed from anyone in the application, whereas it can only be viewed. Maintenance team bi- weekly report will also include the measures taken to protect the integrity of the data

Rationale: A concerned effect shall be made to protect the data of the players and the administrator

Fit Criterion: by building a better version of the firewall so that the game wouldn't be hacked or modified by someone. The system backup will take as soon as it needed and backup all the information's and data of the project

Acceptance Tests: Test 40 – Access Limitation

15c Privacy Requirements

32# - Agreements

Description: As every application there would be an agreement to be signed electronically by the user as well as the administrator just before creating a new account in idol hunt and every time user/ administrator logs in the application there would be a small description below the password icon as saying note : with a link to the privacy

Rationale: This would be safe keeping the user account and gets notified what is happening with account and when it happened, would also help him to know if his account was hacked and someone was using it somewhere else

Fit Criterion: The application will email the user if there are any changes to the account or if there is something suspicious happening to the account if someone tried to login to the account. The application will send s an email stating if the user hasn't logged out from his account for a very long time

Acceptance Tests: Test 41 – Agreements

15d Audit Requirements

33# - User-Info

Description: The information of the players/ administrators like first and last name and the username and also the email-id and also the time of intervals the user used to login into the application and the amount spent on the application is recorded for safety measures

Rationale: the information of the player/administrators is retained only for security purposes if in case any mishap happens and the user rejects stating the data score was wrong and he hasn't used the application during the time

Fit Criterion: This could also stay as time stamp as a further proof for time spent on the of the puzzles and quizzes and if there is a due time for them to finished then this method will help the administrator

Acceptance Tests: Test 42 – User-Info

15e Immunity Requirements

34# - Hacker Measures

Description: The application will have a robust firewall to protect itself from computer viruses, trojan horses and to stop the possibility of being hacked

Rationale: The data stored in the application helps the administrator to guide the topics in depth and for the players to re-learn the topics therefore it is very important for the computer to be antivirus free and not engage with any kind of malfunction

Fit Criterion: It is important the application be unfunctional due to any glitch caused by a virus, so something like a robust firewall would fix this by deleting the virus if found

Acceptance Tests: Test 43 – Safety-Measures

35# - Maintenance/Safety Records

Description: The maintenance team will keep track of any attempts by any sort of virus appeared during an update and during the bi-weekly report

Rationale: when a scan produces a threat to the application then it would guide the Maintenance team to delete the infected file and find where was the source of the virus coming from

Fit Criterion: Doing this so would make sure there is no way a virus could harm the application and application team could also find what caused the virus to be

threat and at what was the scenario for that to happen, keeping track of these could make the Maintenance team to fix the application more

Acceptance Tests: Test 44 – Safety-Records

16 Usability and Humanity Requirements

16a Ease of Use Requirements

36# - Game-Speed

Description: It would take a maximum of 5 to 7 seconds for the application to load down after entering the login information.

Rationale: Players will be more compelled to play this game graphically and how this product is proposed; a command line application of this game may not be really appealing to the user.

Fit criterion: The user can just play the game without have to read manuals to know how use the mechanics of the games they can just click icons on the screen instead of knowing what commands

Acceptance Tests: Test 45 – Game-speed.

37# - Map-factor

Description: During the middle of the game if the player seemed to be lost int the jungle and didn't know how to go forward in the game the player can be helped with a graphical map

Rationale: Maps holds down all the information of the game from guiding the users to reach a certain destination and it also guide the user to find some health supplement

Fit criterion: The user can just play the game without have to read manuals to know how use the mechanics of the games they can just click icons on the screen instead of knowing what commands

Acceptance Tests: Test 46 – Map-factor

38# - Reset-password

Description: If the user doesn't remember the password for his login then the user can reset his password with ease

Rationale: The user password can be reset by entering the user's email id, when the user email is entered a link would be sent to the email which will have a security question needed to be answered and after doing so the user can update the password.

Fit criterion: This would help the user to fix the login trouble when the password is mismatched and if the user feels that the password might need to be updated the process of doing it is much simple

Acceptance Tests: Test 47– Reset-password

39# - Respond-time

Description: For each puzzle in the game, once the player enters their response to a puzzle, the system must take no more than 3 seconds to let the user know if it's a correct answer or not.

Rationale: This motivates the client to be concentrated more on the game and not to be deviated, if the average response time of the result is being a bit more slower it would make the client feel the time consumed is a lot and it might decrease the interest on the application therefore a quick response from the application would be enjoyable and motivates the users more

Fit Criterion: Doesn't apply.

Acceptance Tests: Test 48– Respond-time

16b Personalization and Internationalization Requirements

40# - Language-Mode

Description: The game will be accessed with the default language English,

Rationale: The application will be advised to use as an international product so we will have couple more international languages added to the product that the user could select as provided

Fit Criterion: the product needs to be in front of the international market so the English as the default medium does open up a lot of possibilities, but also there would be an option of selecting other most spoken languages.

Acceptance Tests: Test 49– Language-Mode

41# - Admin-game

Description: The game has two types player based on their role in the game one is base level, and another is the admin level, the admin level has the freedom to edit the quizzes and puzzles in the product

Rationale: The product can be modified by an admin level user for the base level users according the syllabus and the class being taught, admin level user could modify the questions making it hard or a bit easier and also change the puzzles as pleased. The admin level user has every right to access the database of the students' progress map and also check all the base level users' grades.

Fit Criterion: the product needs to be in front of the international market so the English as the default medium does open up a lot of possibilities, but also there would be an option of selecting other most spoken languages.

Acceptance Tests: Test 50– Admin-game

16c Learning Requirements

This section does not apply as this game is very self-explanatory and if anyone finds it hard, it comes with a documentation on how the game works. No training is required.

16d Understandability and Politeness Requirements

42# - Idol graphics

Description: The game is graphical nature of the game is based on the jungle and it the developer has made sure that there is no combination of violence of any sort involved to motivate any users for the product advertising

Rationale: the game doesn't include any violence or much of an action sequence for the user to be played. This game is a simple treasure search game with knowledge-based questions and puzzles asked during the game.

Fit Criterion: the game is based on the idea of educating the students in an\ more interesting way of

Acceptance Tests: Test 51 – Idol graphics

43# - Game setup

Description: Setting up the application inn laptop or any mobile device is simple

Rationale: The user has to download the application of the product Idol hunt from the preferred educational institute or from the distributor and just hit the download button and make an account by creating a username and password of their individual choice

Fit Criterion: One of the aspects of an applications that it should be easy to setup and for this the application setting up and application is

Acceptance Tests: Test 52 – Game setup

16e Accessibility Requirements

44# - Disabilities

Description: This game should be able to be accessed for people with disabilities like vision blindness.

Rationale: An inclusive environment regardless of any disability will help with the popularity of this game.

Fit Criterion: Different version for color blindness would satisfy this condition.

Acceptance Tests: Test 53 – Disabilities

16f User Documentation Requirements

45# - Tutorial

Description: There will only be one requirement provided that will provide the users with the basic functionality of the game and how to play the game. This will work as a tutorial to help players get started with this game.

Rationale: Considering that there are users of multiple ages playing this game, there will be a documentation provided for the ones needed.

Fit Criterion: A documentation with information on how to play this game will fulfill this requirement.

Acceptance Tests: Test 54 – Tutorial

16g Training Requirements

This section does not apply as no training is needed to play this game.

17 Look and Feel Requirements

17a Appearance Requirements

46# - Graphics-look

Description: The graphical representation of the game is based on the actual life model of a jungle

Rationale: The game is a treasure hunt happening in the jungle so the graphical representation of the game will specifically suites on the forest backdrop with wild animals as a challenge in it

Fit Criterion: The graphics would be truthful to the concept of idol hunt happening in forest island with a backdrop treasure hunting

Acceptance Tests: Test 55 – Graphics-look

47# - Character-selection

Description: The product will allow the user to select a character model

Rationale: The game will provide an option of model-based characters that the user could choose among them which he likes the most doing this the user would feel more interested in the game

Fit Criterion: doing so the user could change the character style as he wants and would make the game a bit more interesting

Acceptance Tests: Test 56 – Character-selection

17b Style Requirements

48# - Game-mode

Description: The product would be created in a thriller genre this makes the user collecting the points and medics and storing the backpack more interesting

Rationale: the game wouldn't be just a character running around the island it would have obstacles in between which is considered as a part of a thriller style in the game the player would duck, run and jump to carry out the required gems and medic needed

Fit Criterion: This shows the criteria of the how game move forwards with minimum amount of action happening during the first part of the game

Acceptance Tests: Test 57 – Game-mode

49# - Quiz-Interface

Description: The quiz and the puzzles section of the questions are more interestingly placed with the images on the background

Rationale: During the quiz and puzzle section there would be an image on the backdrop of the question and theses images are connected to the questions asked

Fit Criterion: The game would look simple but also the style of showing an image for each question asked would make it the game look more demanding

Acceptance Tests: Test 58 – Quiz-Interface

18 Operational and Environmental Requirements

18a Expected Physical Environment

50# - Environments

Description: The game will work with common operating systems such as macOS, Linux, and Windows and also in mobile applications. The game will also allow the players to play with Integrated graphics,

Rationale: The game can be installed in most of the top operating system as commonly used in many universities

Fit Criterion: This would be functional only through the above Operating system

Acceptance Tests: Test 59– Environments

51# - Game-Place

Description: The game is designed for the educational benefit there the application can be used in any environment the user chooses to study from dorm to house

Rationale: Noise reduction for the pleasantness of hearing is very important. If there is no internet connection, the game will still be playable, and the information will be saved locally

Fit Criterion: the advantage of using the game in any platform would help the description to fit the criteria

Acceptance Tests: Test 60- Game place

18b Requirements for Interfacing with Adjacent Systems

52# - Release System

Description: The game would be released on most of the operating system on the time of release and work with no internet connection and if a change is done to the game through desktop and when the user opens the phone the change would repeat itself over there too

Rationale: The no internet issue would still save the local changes by product accessing the database server through internet or intranet

Fit Criterion: the changes in the computers are also reflected in all the systems

Acceptance Tests: Test 61 – Release System

53# - Lost Connection

Description: Establishing a lost connection

Rationale: If connection is lost while playing a game, the data must be restored.

Fit Criterion: the connection between the interface is experienced here

Acceptance Tests: Test 62 – Lost Connection

18c Productization Requirements

54# - Modes of releases

Description: The game should be able to be downloaded through the online website the game runs on. This should also be accessible on Apple store and Play store.

Rationale: The more modes of releases we have, the more this product is available to the public. This will increase the popularity in the market.

Fit Criterion: Satisfying where the games can be accessed will fulfill this requirement.

Acceptance Tests: Test 63 – Modes of releases

18d Release Requirements

55# - Download Checks

Description: The product will be checked at first by downloading the application from a leading browser to check if the application opens smoothly all the time.

Rationale: the download setup will point out if any of the data content has been missing and the application could run in a no network room

Fit Criterion: checking for any error before the release time would avoid some obstacles during the release time.

Acceptance Tests: Test 64 – Download Checks

56# - Message Notifications

Description: For every new release of update there would also be a mail or a notification stating what bugs was fixed and what have been changed so the user has the idea of what has been updated all these time

Rationale: The notification would give more insight of the program and the function of the programs works

Fit Criterion: setting up an explanation for the update or the error might have caused during the early stages would be fixed.

Acceptance Tests: Test 65 - Message Notifications

19 Cultural and Political Requirements

19a Cultural Requirements

57# - Respecting Differences

Description: This game if used to personalize and in other countries, shall not offend anyone by any means. It will be respectful of the culture and religion of the countries that the game is released in. It will also play no political bias by not promoting or running political agendas.

Rationale: It should be the intention of the developers that this game doesn't offend anyone and respects the different cultures in the world in order to not cause an issue.

Fit Criterion: If the game doesn't offend anyone in the country it is released in, doesn't deal with any political issues then the system meets the requirement.

Acceptance Tests: Test 66 – Respecting Differences

58# - Different languages

Description: This game if released in any country besides the United States of America, shall adapt to the language of the country. Every functionality that is offered will be converted to the most popular language used in the country that the game is being played in.

Rationale: To make sure language barriers doesn't apply to this fun interactive learning experience, different languages will be provided in the countries that need them.

Fit Criterion: If the country that runs the game has their language implemented in the game, then the system meets this requirement.

Acceptance Tests: Test 67 – Different languages

19b Political Requirements

This section doesn't apply to us as we are not concerned about any superior agenda. The only goal from this game is to create a fun interactive learning experience.

20 Legal Requirements

20a Compliance Requirements

59# - FERPA Protection

Description: If this game is used by educational institutions, then there will be a mandatory FERPA protection where all the grades(points) earned by the students will remain strictly confidential and only accessed by that particular student and

instructor in the course. The leaderboard will only show userID of students that they choose.

Rationale: To make students feel comfortable with playing this game and to avoid bullying with comparison of points, FERPA is very important.

Fit Criterion: If the scores of students are not accessible to the general public except for that particular person and the instructor, then the system passes this requirement.

Acceptance Tests: Test 68– FERPA Protection

20b Standards Requirements

60# - Federal/ State Laws

Description: This game should follow all the federal and state laws/requirements as needed per country it is being released in.

Rationale: The game should not be given any chance of being taken down by not being aware and violating the laws of the place it's released in.

Fit Criterion: If the system doesn't break any laws then this requirement is met.

Acceptance Tests: Test 69 - Federal/ State Laws

21 Requirements Acceptance Tests

21a Requirements – Test Correspondence Summary

Test	Requirements											
	Req 1	Req 2	Req 3	Req 4	Req 5	Req 6	Req 7	Req 8	Req 9	Req 10	Req 11	Req 12
Test 1	X											
Test 2		X										
Test 3			X									
Test 4		X		X								
Test 5					X							
Test 6						X						
Test 7							X					
Test 8								X				
Test 9									X			
Test 10	X											
Test 11		X		X								
Test 12												
Test 13												X
Test 14											X	
Test 15										X		
Test 16						X						X
Test 17						X						
Test 18		X		X								
Test 19												
Test 20												X
Test 21									X			
Test 22							X		X			
Test 23						X			X			
Test 24									X			
Test 25		X										
Test 26	X		X									
Test 27								X				
Test 28									X			

Test 29						X					X	
Test 30												
Test 31								X				
Test 32					X							
Test 33											X	
Test 34								X				
Test 35								X				
Test 36												X
Test 37												X
Test 38											X	
Test 39	X										X	
Test 40											X	
Test 41											X	
Test 42	X										X	
Test 43											X	
Test 44											X	
Test 45									X			
Test 46									X			
Test 47	X		X								X	
Test 48									X			
Test 49								X				
Test 50	X											
Test 51											X	
Test 52							X					
Test 53											X	
Test 54								X				
Test 55												X
Test 56	X										X	
Test 57										X		
Test 58		X		X								
Test 59												X

Test 60								X				
Test 61								X				
Test 62					X							
Test 63												X
Test 64					X							
Test 65								X				
Test 66											X	
Test 67		X		X							X	
Test 68						X					X	
Test 69											X	

21b Acceptance Test Descriptions

Test 1 -First Time User Test

Description: If someone wants to play the game for the first time, they will register an account by entering their name email and password recovery question. When registering they must create a username and password. Then they will have access to game where they can save on a cloud.

Test 2 -New Game Test

Description: If the user wants to start a new game, they must choose a puzzle package to load into the game while connected to the internet. Then they are loaded in the game and only must connect to the internet to save on a cloud so they can play on other computers if they want.

Test 3- Lost Password

Description: If the user loses their password, they use the lost password functions. When the lost password function is used, they must answer the answer the security question. Then they could update their password and the changes will be saved with all the data scores of the users will be retained.

Test 4 - Select Puzzle

Description: The user can select what type of puzzle they want in the game. When they select a package of puzzles, they will load that package in the game. Then when they play the game those types of puzzles will be in the game.

Test 5 - Offline Gameplay

Description: If the user wants to play the when they are offline then they will be able to play it without cloud saving capabilities, but they can save on a local drive.

Test 6 – Leaderboard

Description: If the user is playing this game in a class Environment, when they press the leaderboard function, they will see the top 10 farthest players in the game.

Test 7 – Admin Level Performance View

Description: The system will have 2 types of accounts base and admin. When the base account tries to access administrate items it will not be allowed to assess the items. When an admin level tries to access administrative accounts, then they will be able to view the users of the game's performance.

Test 8 – Update Puzzle Package by Admin

Description: If the custom puzzles need to be updated. When the admin level account accesses the database then they can update the custom puzzle packages that they have uploaded in the game.

Test 9 – Pause Game

Description: If the user needs to take a break from the game, they will need to pause the game. When they press the pause game function the game will pause then they can save the game and step away from the game without losing data.

Test 10 – User Information in database

Description: When the user creates a new account their login information and game details are store in the database. Then whenever the account is logged into the database will collect the account detail and reload them to the game such as the players characters gender and loadout information.

Test 11 – Storing Puzzles

Description: When the user selects a puzzle package from the database, the database will load the puzzles of that package into the game then when the user is at a puzzle section of the game, they are given a puzzle from the selected puzzle package.

Test 12 – Database Leaderboard

Description: The information of the user is sent to the database when users click the leaderboard option then the leaderboard will be calculated from the information in the database showing the top 10 students,

Test 13 – Reaction Time

Description: When the player enters their response to a puzzle, then the system must take no more than 3 seconds to let the user know if it's a correct answer or not.

Test 14 – Pop-Up Window

Description: When a window or screen pop-up in this game should not take more than 5 seconds to load or populate.

Test 15 – End Game Score

Description: When game ends then the system will have 7 seconds to display the score screen.

Test 16 – Leaderboard

Description: When the leader board scores for the game is updated every 2 minutes then it will show the top ten users who played that specific game.

Test 17 – View Growth

Description: The view list would show up the students' academic growth in the class.

Test 18 – Puzzles Topics

Description: Since the game offers multiple subjects for the puzzle sections. When a specific subject is chosen then the questions for the puzzles should match up with the subject chosen.

Test 19 – Game Levels

Description: When the user progress further in the game then difficulty of each level will become harder the more they progress.

Test 20 – Points awarded

Description: When the player stops the game, then the points should the player has should still be accurate.

Test 21 – Pause/Resume Game

Description: When the user pauses the game, then they should be able to resume the game from where they left off.

Test 22 – Logged In

Description: if the game is full of users then is should always be able to handle 70,000 active users.

Test 23 – Games Run

Description: if the game has many users playing the game at once then the game should be able to handle 40000 running at the same time

Test 24 – User Profiles

Description: The game must be able to store 789,000 user profiles then the system should be able to handle the data of up to 789,000 users.

Test 25 – Question Topics

Description: When the game levels progress then the game must come with a set of different distinct questions from the below topics in different levels of difficulties.

Test 26 – Account Losses

Description: When there is a system failure then no user information should be lost. The account usernames, passwords and the scores should be safe from any destruction.

Test 27 – Maintenance

Description: Maintenance should be done every 2 weeks when Maintenance is going to happen the user will get advanced noticed by email and on the game site. Then the Maintenance will be done quick as possible.

Test 28 – Glitches

Description: When a glitch is found then it should be reported once reported then it will be fixed in the Maintenance cycle.

Test 29 – Days and Times

Description: When there is no maintenance then the game should be working

Test 30 – Functional Uptime

Description: When maintenance is going on than the user should be able to access their portfolio to see information about their account and how far they have gotten within the game. Only time it shouldn't be accessible is if the database itself is getting an overhaul or getting updated, which should happen on rare occasions.

Test 31 – Database Connection

Description: When database is lost user must notify of this when they try to log into their accounts and are denied

Test 32 – Loss of Internet Connection

Description: When there is a loss of internet connection, then the data accumulated should be saved in the local device until the connection can be restored. The system should let the user save the game to the point and should let them return to that spot when the connection is restored.

Test 33 – Physical and Emotional Safety

Description: When users play this game, they should not be harmed physically or emotionally

Test 34 – Update Game

Description: When theirs an update then the internet version of the game will be offline for 2-4 hours unless it is a new feature update where the update could take up to 24 hours.

Test 35 – Fixing Bugs

Description: When theirs a bug that has been reported then it will be fixed within 2 weeks

Test 36 – Log in Prompts

Description: When the user logs in then they will get a prompt of the last time they logged in.

Test 37 – Machine Requirements

Description: When the game runs then that means the operating system is a Windows, Linux, or Mac

Test 38 – Educational Length

Description: When the semester ends for a given class database resets after the grading period for the semesters ends this only works for educational intuitions

Test 39 – Privacy Issue

Description: When a user's data wants to be viewed it can only be viewed by an admin or the user themselves.

Test 40 – Access Limitation

Description: data scores can only be viewed they cannot be changed by anyone manually and if the there is an attempt then the maintenance will fix this security problem

Test 41 – Agreements

Description: When the user installs the game and tries to play it then they have to accept the user agreement form.

Test 42 – User-Info

Description: When the someone wants to check how long and when they logged in the game then they go to the user info section

Test 43 – Safety-Measures

Description: When virus attack this game then the robust firewall protects the application

Test 44 – Safety-Records

Description: When a virus tries to attack the application then the maintenance team will keep track of the when the virus has attacked the application

Test 45 – Game-Speed

Description: When application is being loaded then it took about 5 to 7 seconds to load after login info was inputted

Test 46 – Map-factor

Description: When the player is lost in the jungle then he can user the map to help guide his way

Test 47– Reset-password

Description: When the user enters the email id and answers the security question correctly then the user can update the password

Test 48 – Respond-time

Description: When the user enters a response for a puzzle then the system should take no more than 3 seconds to give a correct or incorrect response

Test 49 – Language-Mode

Description: default English language is selected in the game; it would be changed when the user makes the selection

Test 50 – Admin-game

Description: when the admin-level user wants to modify and edit the quiz then they can do it as they please

Test 51 – Idol graphics

Description: The game is based on a jungle environment when advertising this game, no violence is used for the advertisement of the game

Test 52 – Game setup

Description: When setting up the application you download the application then follow the instruction which are easy to follow

Test 53 – Disabilities

Description: When a person who has disabilities access the game then they should be able to play this game

Test 54 – Tutorial

Description: When the user plays the tutorial then they will learn the basic functionalities of the game

Test 55 – Graphics-look

Description: When the user plays the game then they will notice that the game is based on the actual life model of a jungle

Test 56 – Character-selection

Description: When the user starts a new game then they will be able to select a character model

Test 57 – Game-mode

Description: When the character uses duck, run and jump then they are busing this to move away from the obstacles

Test 58 – Quiz-Interface

Description: When the user starts a quiz then images pops up for every question asked

Test 59– Environments

Description: When installing from Mac, Windows and Linux system then the application will cause no harm

Test 60- Game place

Description: When there is no internet connection game then the game will still connect locally, and the sound button can reduce and increase the noises

Test 61 – Release System

Description: When there is no internet for the database then will save through intranet

Test 62 – Lost Connection

Description: when the internet is lost the game will be played without the loss of data and when the internet is back connected the database will connected to internet automatically

Test 63 – Modes of releases

Description: Download of the game from the apple store and play store will download all the required files successfully

Test 64 – Download Checks

Description: The download setup from the browser will point out the files missing if there is any

Test 65 - Message Notifications

Description: When there is a new update then user will be notified of the update via email

Test 66 – Respecting Differences

Description: When other users from other countries are using this application then they should not be offended by what's in the game because the game story should not and will not offended any culture

Test 67 – Different languages

Description: When this game is released in any country then the respected language will also be available

Test 68– FERPA Protection

Description: strictly follows the FERPA rules and protections

Test 69 - Federal/ State Laws:

Description: Anything in the form of illegal actions or any actions that violates the law system wouldn't let it happen

III Design

22 Design

The design goals represent the desired qualities of the Idol Hunt game, and they represent a consistent set of criteria that must be considered when making design decisions. Our primary purpose is to deploy robust, maintainable, well-designed, and reusable software with object-oriented analysis and design. We are determined to define and visualize each perspective of the system explicitly in order to ultimately materialize out object-oriented approach. Next, we also pay attention to how to diminish the influence and impact of alterations or security exploits.

The design goals identified in detail are as follows:

- Adaptability: Unity/C# is a popular programing language when it comes to providing cross-platform gaming for graphically enhanced games. Therefore, Unity is the most optimal choice for the development of our program. Unity allows our system to be converted to an executable once we are finished programming the game. Meaning the user will not have to worry about operating requirements on the popular OS's.

- Efficiency: The system is going to be responsive and be able to run with high performance. The game will run in at least 50 frames per second (fps) in order to provide smoothness in the movement of an adventure game. This gives the illusion of a character running through the jungle, avoiding and attacking animals. The speed also helps to keep the smoothness of the system while solving puzzles. This is a crucial design goal of the game because if the game lags, it could ruin the performance of the users, and it could also cause the user to lose the game.

- Reliability: The System will be released bug-free consistent in the boundary conditions. Any bugs discovered after the game is released shall be maintained and fixed by the maintenance team. The system must not crash with gameplay, puzzles, or due to any incorrect inputs.

- Usability: One of the essential aspects of the game should be the level of easiness while playing the game. This is one of the most important goals as this will decide the popularity of the game. The game has to be friendly to the user and pleasing to the eyes. The user should be able to understand the controls of the game quickly without requiring much practice. The animation and sounds involved must only add on to the experience of playing the game, which will make the users play longer, come back to it often, and recommend to friends and family.

23 Current System Design

There is no pre-existing system. A proposed system design has been described below.

24 Proposed System Design

24a Initial System Analysis and Class Identification

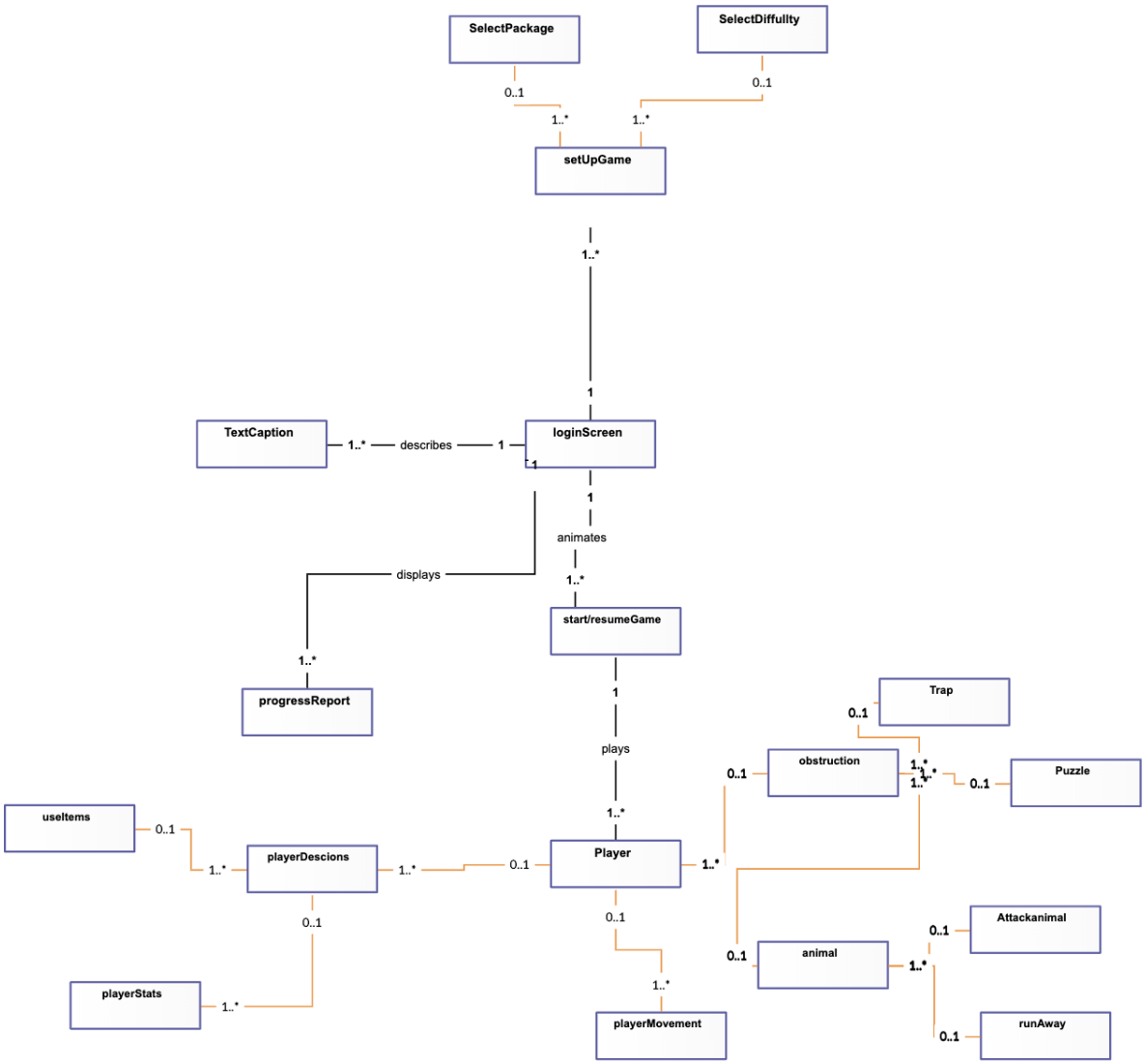

Figure 10**:** Initial Class Diagram

24b Dynamic Modelling of Use-Cases

The sequence diagrams for the most important use cases are diagrammed below:

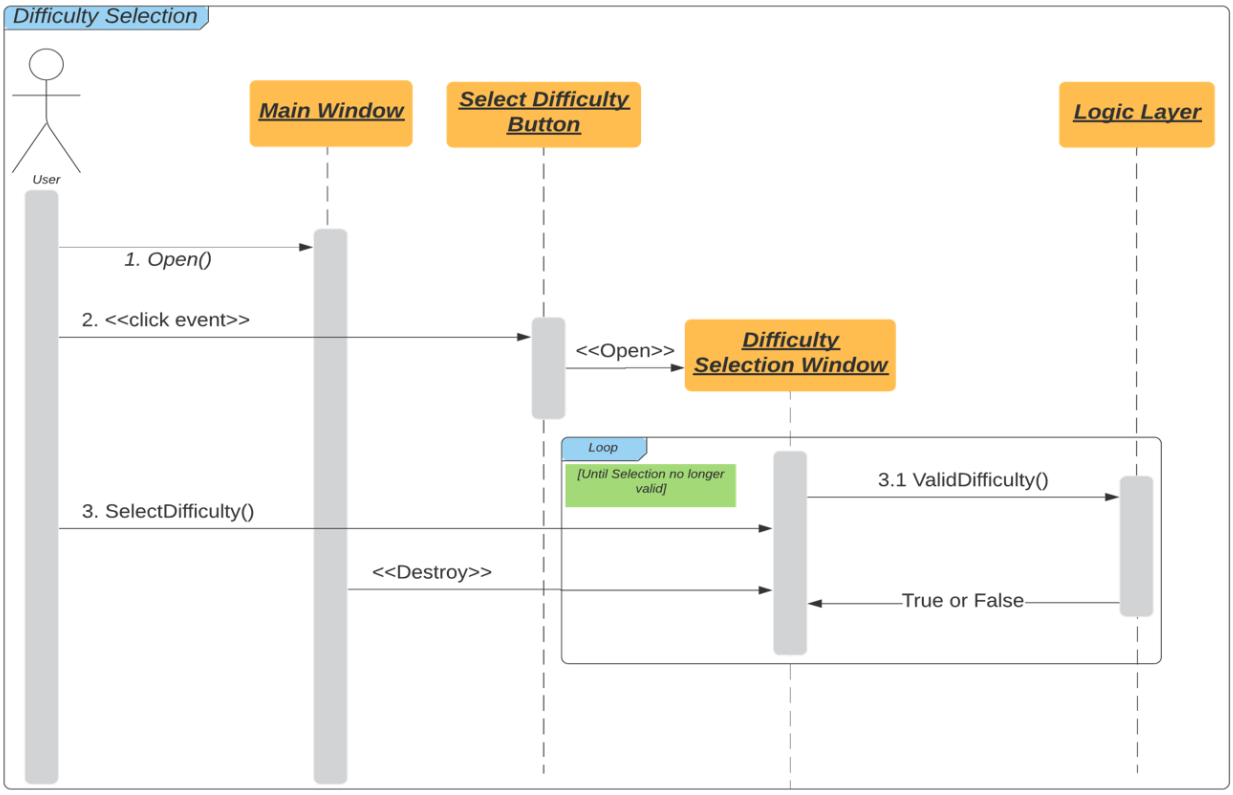

Figure 11**: Difficulty Selection**

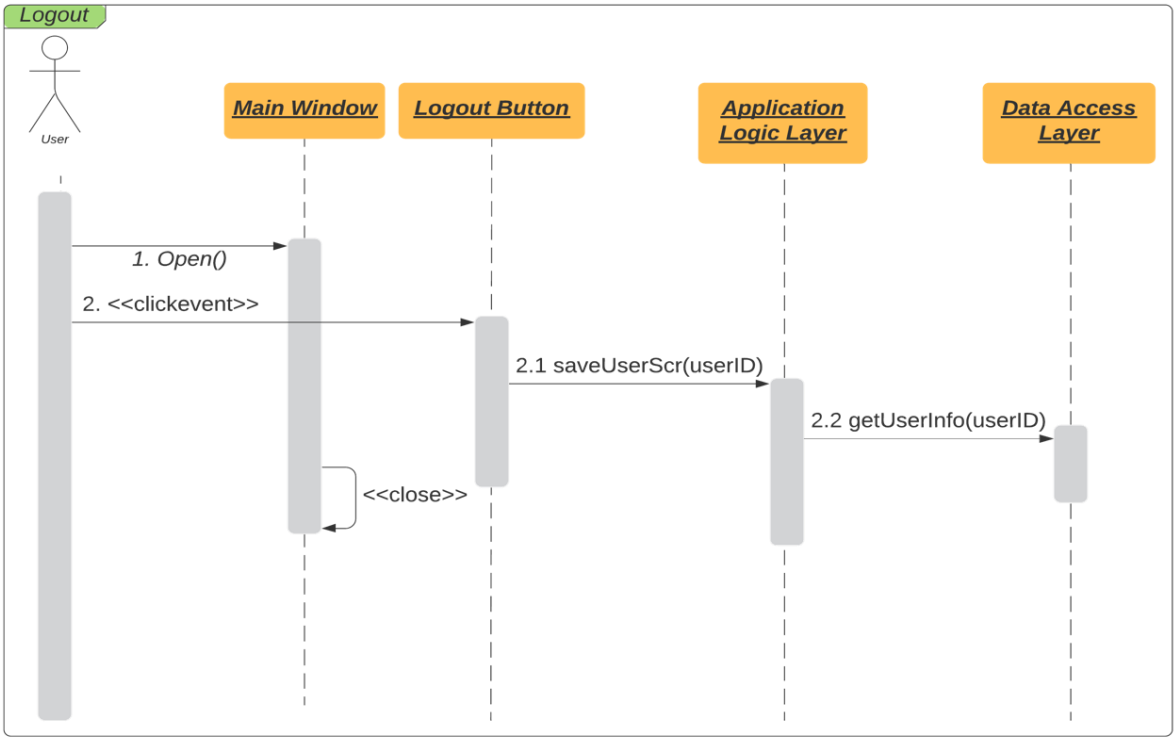

Figure 12**: Logout (Sequence Diagram)**

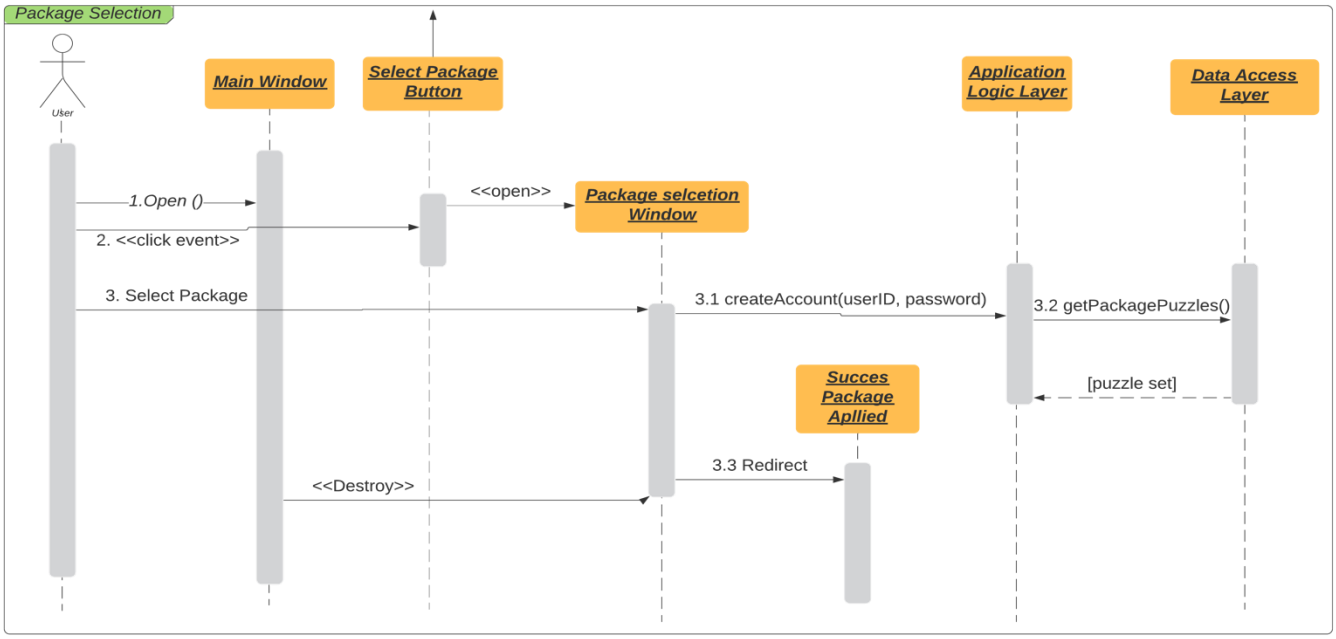

Figure 13**:** Package Selection

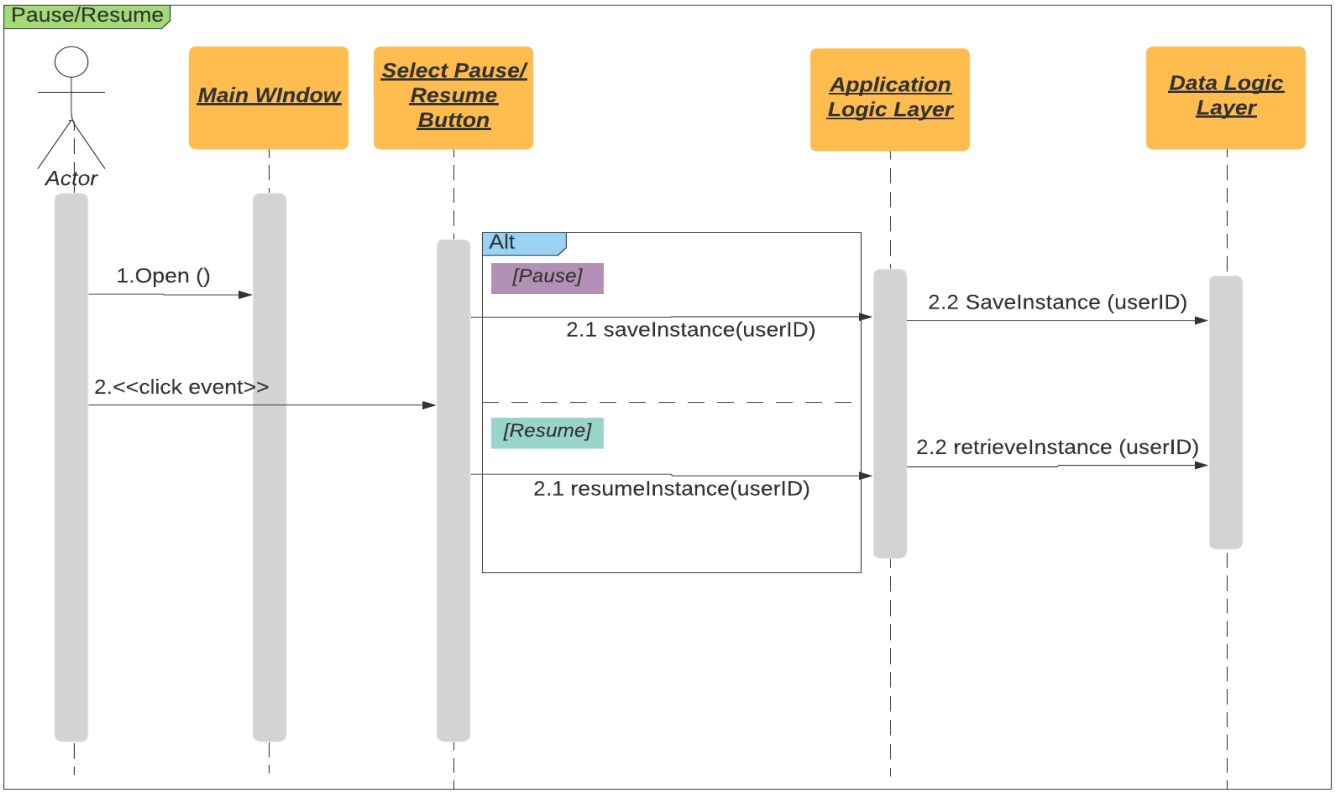

Figure 14**: Pause/Resume**

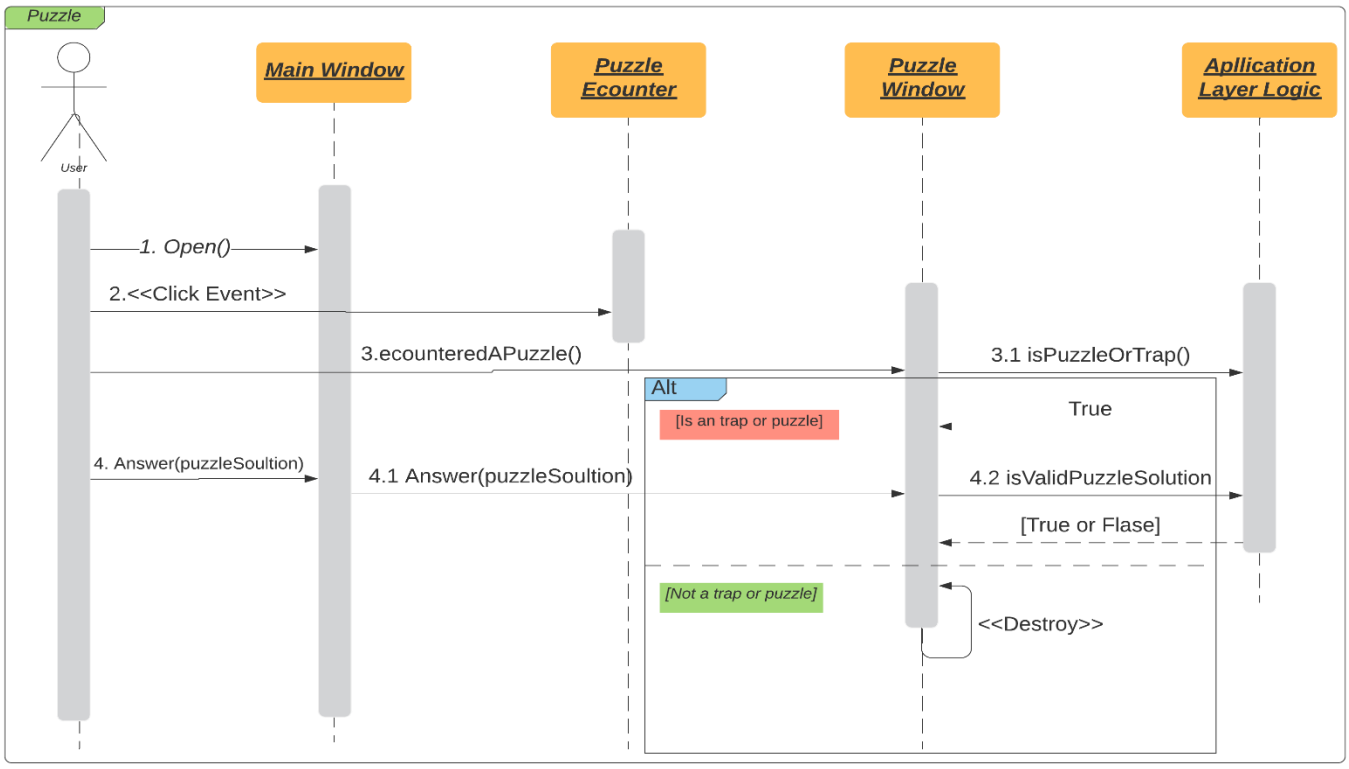

Figure 15**: Puzzle** Encounter

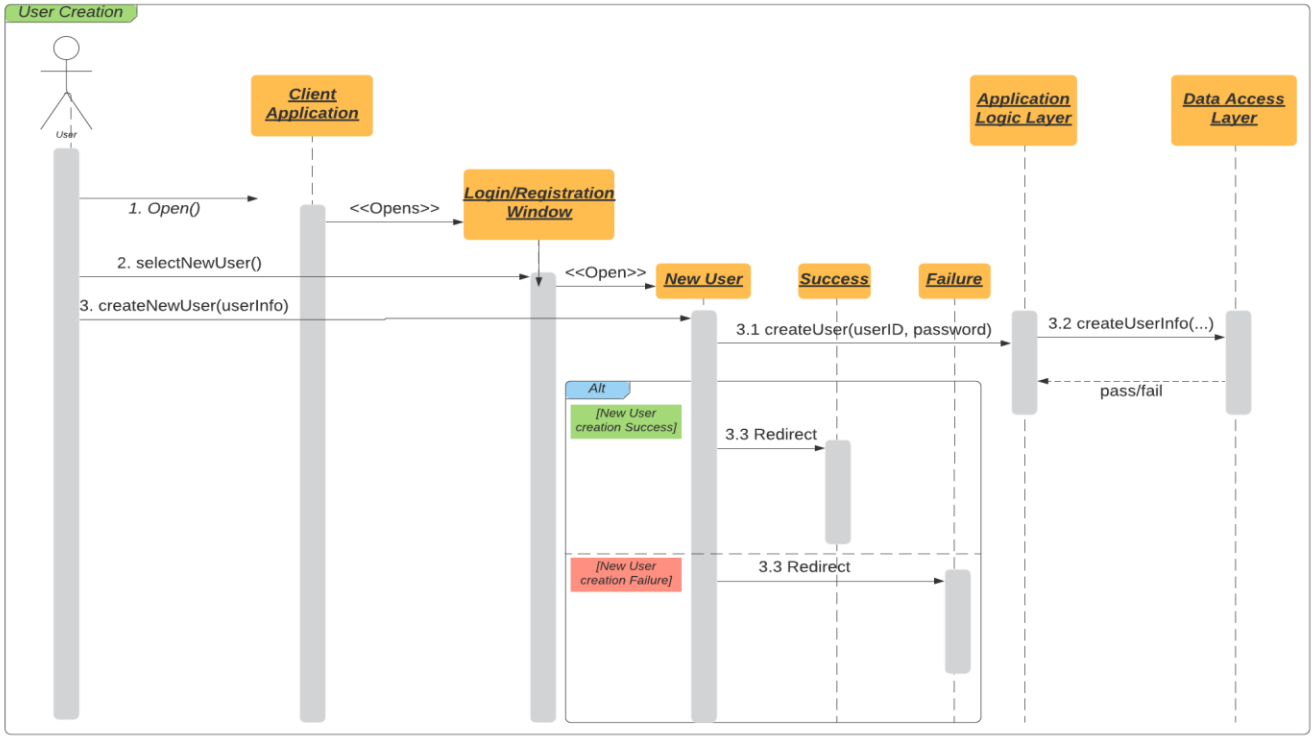

Figure 16**:** User Creation

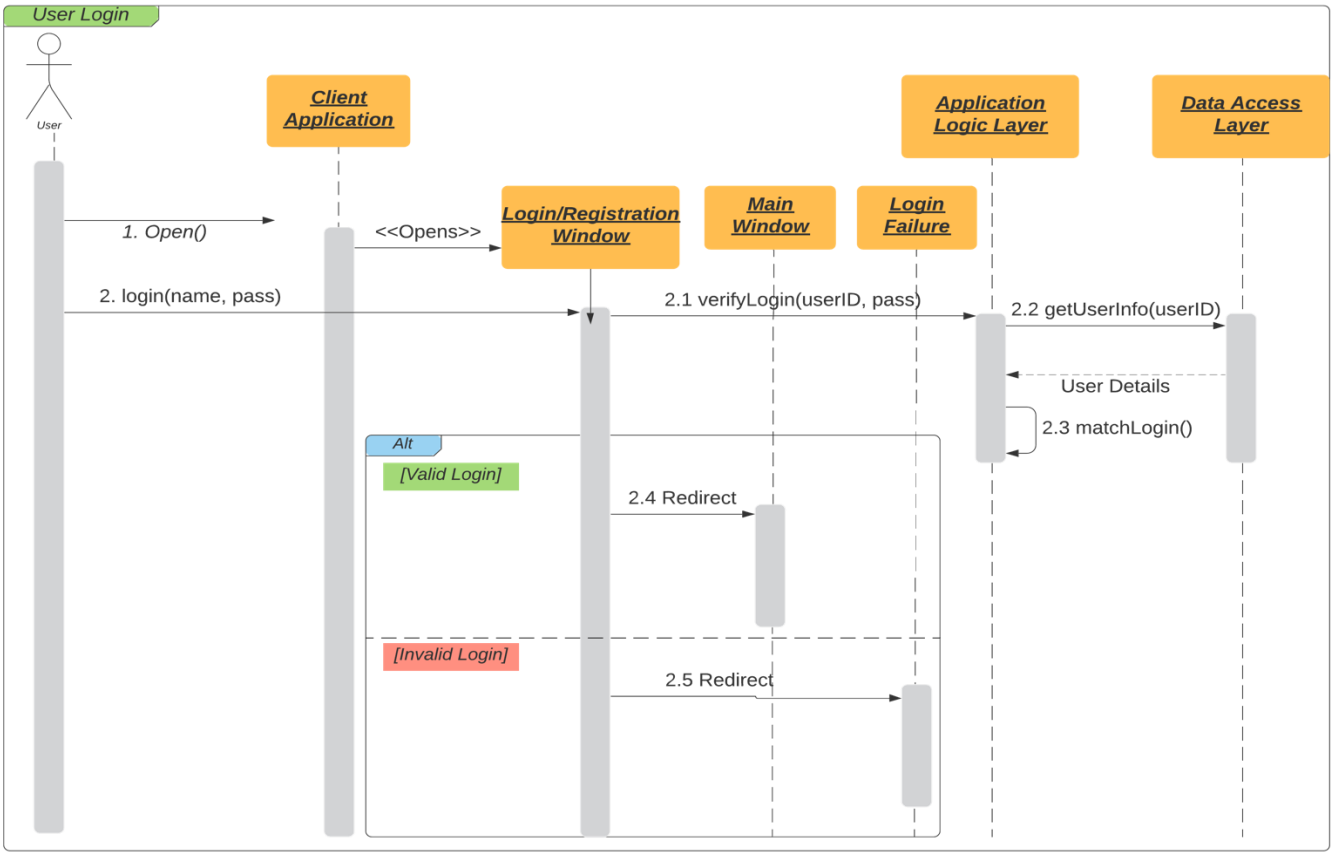

Figure 17**: User Login**

24c Proposed System Architecture

Idol Hunt's architecture model will compose of a three-tier design composed of the User Interface Layer, Application Logic Layer, and a Data Access Layer, which is used for the database. The User Interface will allow the user to interact with Idol Hunt; it will be used to display the relevant information for the user so they can progress throughout the game. It will also prompt the user when they trigger certain events as they advance the game. An example of a trigger would be when the user activates a trap; the user must answer the question that is asked by the system. The Application Logic Layer holds the logic to verify user inputs and actions. It will be used to verify inputs such as if the answer the user selected or the puzzle the user solved is correct or not. It will verify actions such as if the user can move in a specific direction, for example, if there is a wall in front of the user, the user should not be able to move in that direction. The Data Access Layer will be used as an interface for the application so that it can interact with the Database Management Systems (DBMS). It also contains valid information such as server address path along with the required credentials to connect to the remote server to fetch and update the game information as needed. The User Interface Layer must go through the Application Logic Layer, which will connect through to the Data Access Layer so that information can be updated and received with the DBMS.

The three-layer model is displayed below:

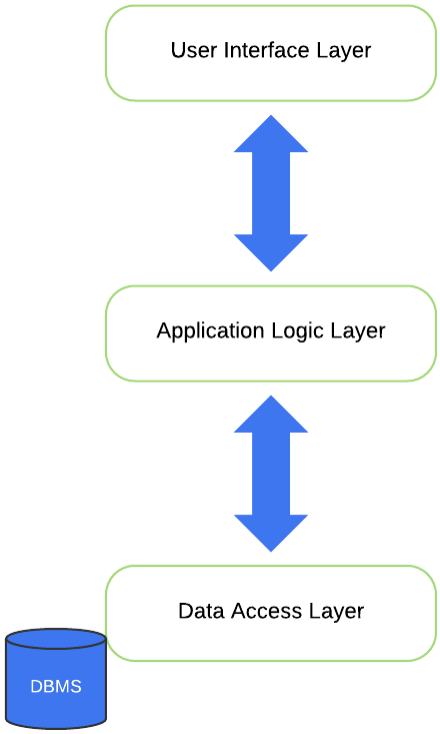

Figure 18**: Three-La**yer Model

24d Initial Subsystem Decomposition

The Subsystem Decomposition is divided into two separate parts. The first being Game Organization and the other being gameplay organization. Game Organization deals with the design of the of the games features as well as the backend setup.

The component diagram for Game Organization is shown below:

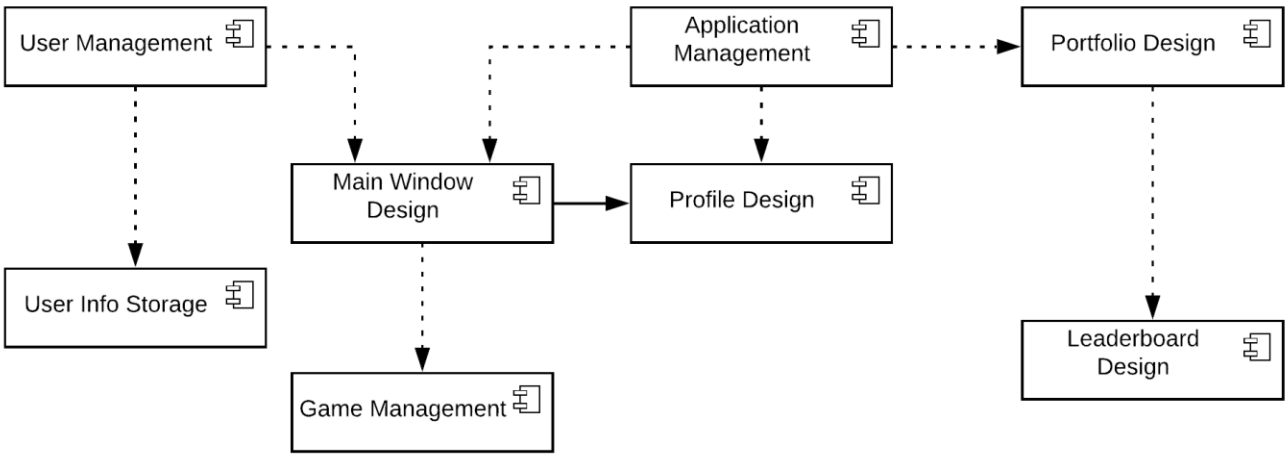

Figure 19**: Game Organization** Subsystem

The Gameplay Organization Subsystem includes the features that are the disposal of the users during the game. The subsystems can be assigned to individual or small groups of programmers.

The component diagram for Gameplay Organization is shown below:

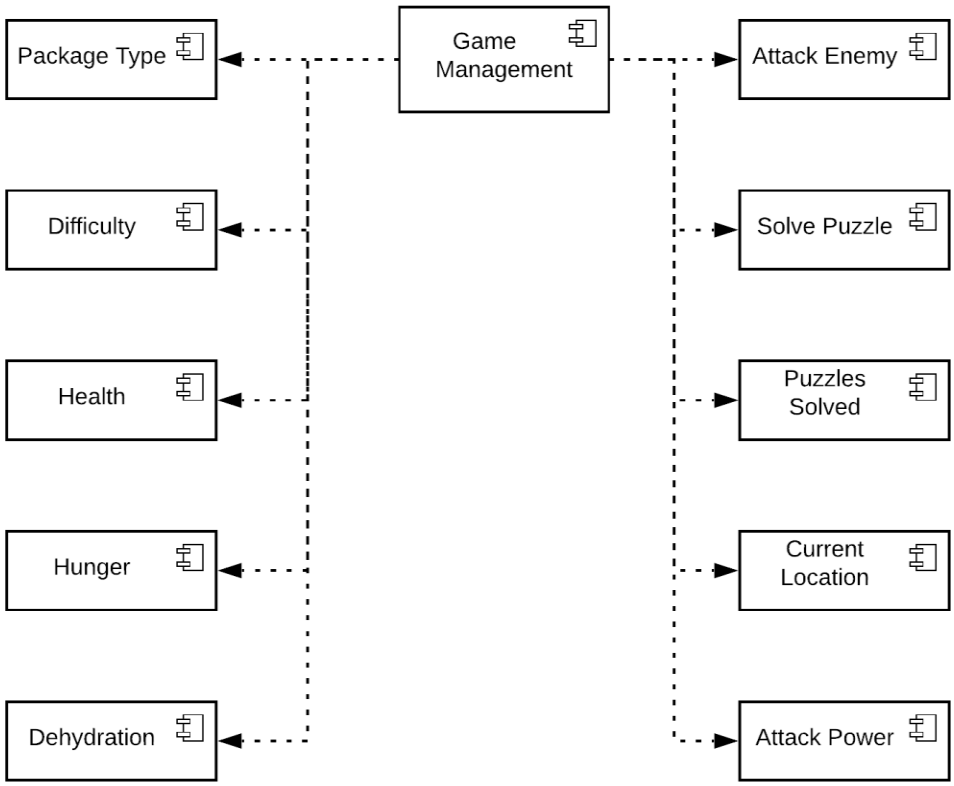

Figure 20**: Gameplay** Organization Subsystem

25 Additional Design Considerations

25a Hardware / Software Mapping

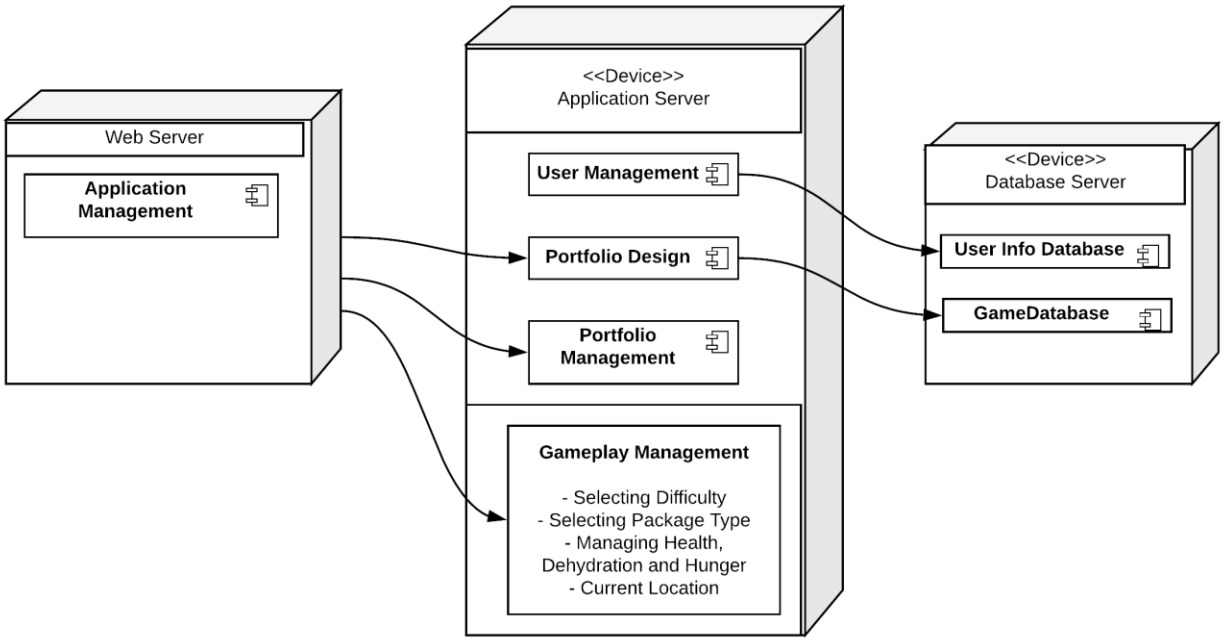

Figure 21**: Deployment Diagram**

25b Persistent Data Management

The persistent data includes login information of the users that are entered into the database once the user has signed up for the game. Information about the player, such as how long the player took to complete the game, how many puzzles they solved correctly, how many questions they answered correctly. This information will be displayed on a leaderboard. This will act as the User Database.

Information regarding puzzles and questions the player will be asked is also stored inside of the database. This will act as the Game Database.

The database that will be used is a relational database. The database will be at a remote location, and the only ones that have access would be the game administrators. Since the game will mainly be used in an educational setting, the game administrators will be professors or teachers that are using the game in their classroom to provide a better learning experience for their students.

25c Access Control and Security

Access Control Matrix:

Actors	Game Database	User Database	Profile	Leaderboard	Questions	Puzzles
Player			<<Create>>	viewAnytime()		
Game Admin	Update()	Update()		viewAnytime()	Update()	Update()

25d Global Software Control

In *Idol Hunt*, the Event-Driven control flow paradigm will be used once specific operations have been requested either by some click event such as clicking a button or triggering an event such as a trap or a puzzle. The event will become available and gets dispatched to an appropriate object based on the type of event and information. An example can be when the player triggers a trap; an event gets created, and the appropriate object gets dispatched, which will open a pop-up window. This will be the way most of the game functions. Once the user triggers an event, the appropriate event gets fired, and the specified action associated with that event will occur.

25e Boundary Conditions

The main conditions that needs to be addressed is when there is unexpected system shutdowns and reboots. These are considered fatal if not addressed properly.

In the case of an unexpected shutdown or rebooting of the system, the game should be automatically saved at the point that was left off. If there is enough time, the user should be given the option of exiting the game or force quit the game. If there isn't time for the user to make a selection, the game should be designed in a way that the game automatically saves the place in the game without the loss of any data.

25f User Interface

Below is the preliminary design for the user interface.

Figure 22: Login or register

Figure 23**: Register screen**

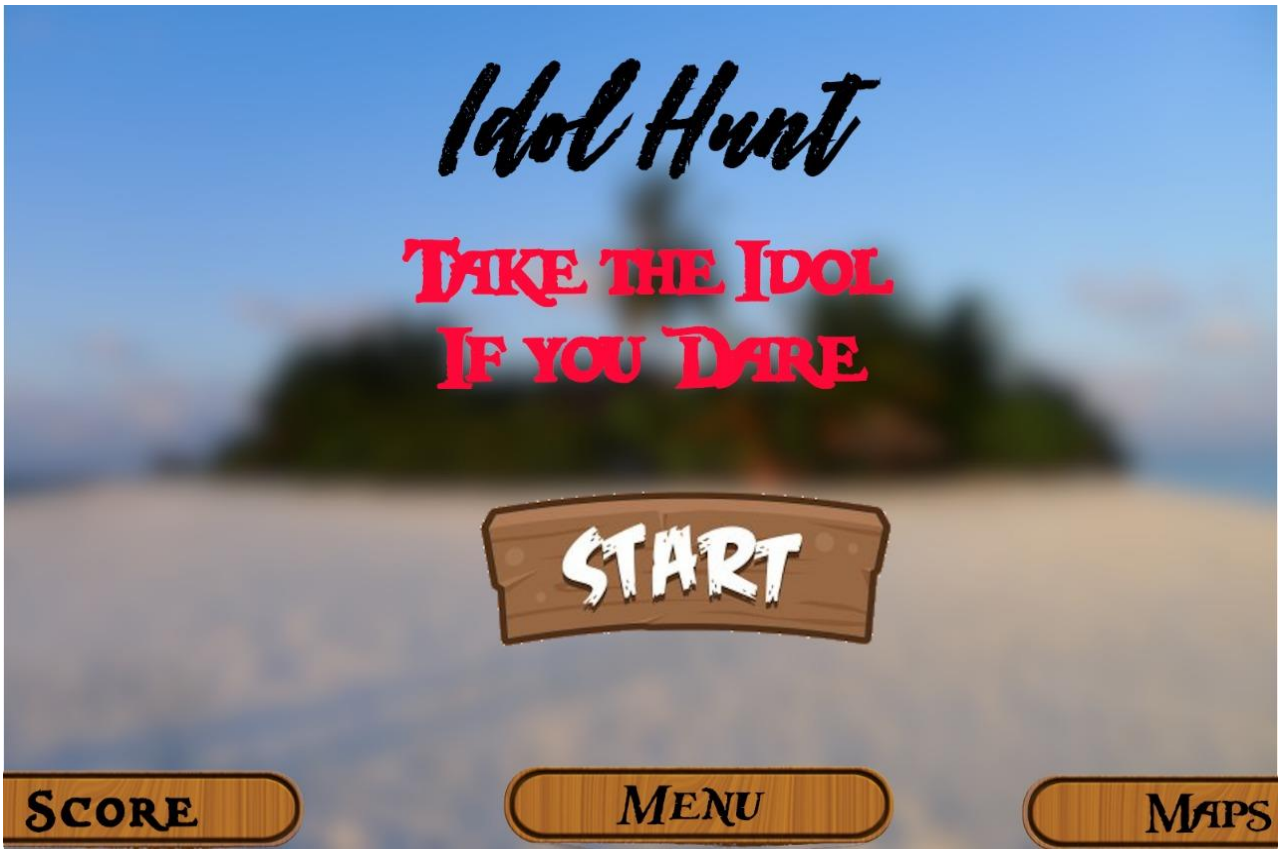

Figure 24**: Start Menu**

Figure 25**: Choose difficulty and package type**

25g Application of Design Patterns

Please refer to the above sections.

26 Final System Design

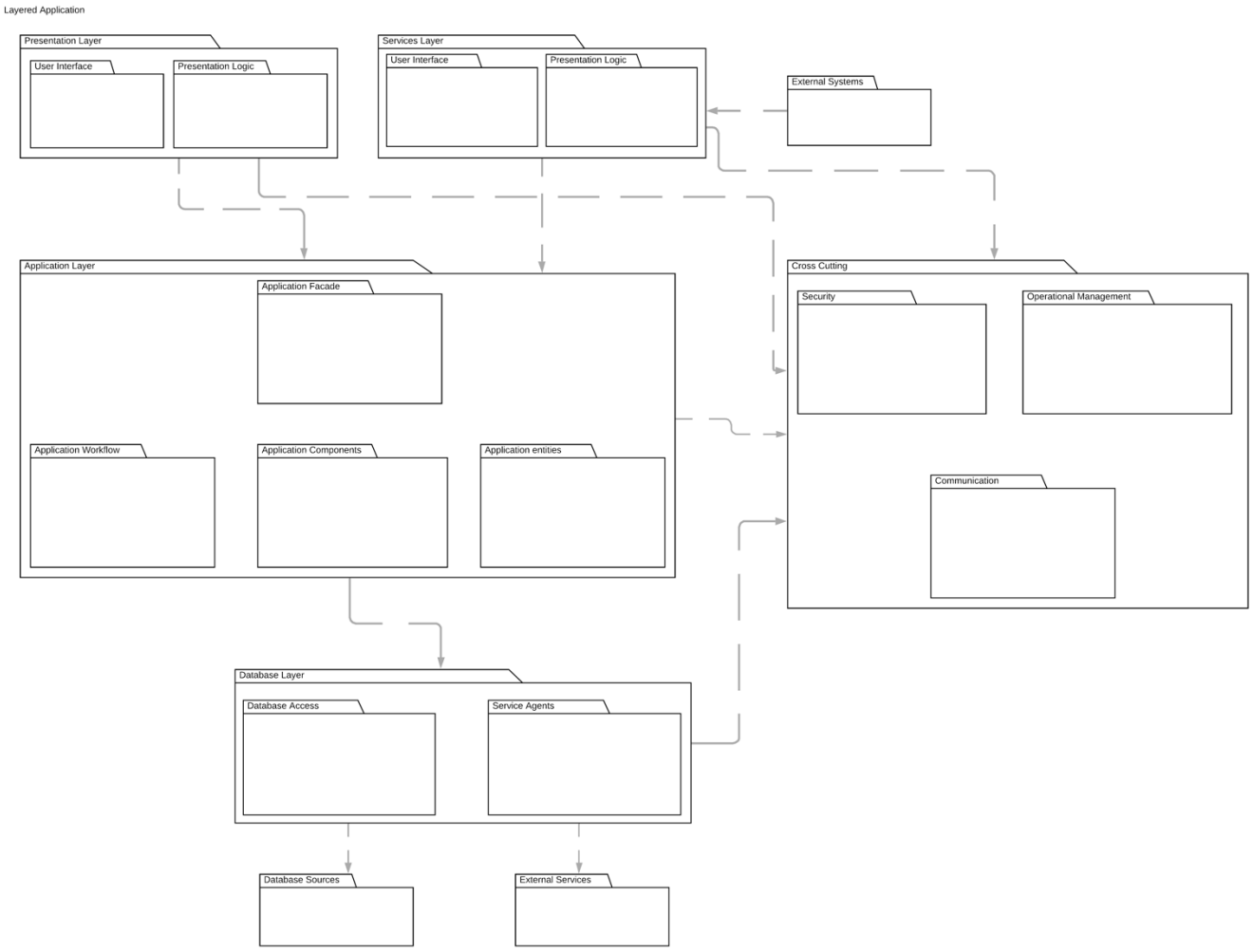

Figure 26**: System Design**

27 Object Design

27a Packages

To make the development easier for the developers of the project, the creation of only one package is recommended. This package will be the same used in all of the game's system for convenience and flexibility. The owners of the game, along with the team, are at the freedom to choose a meaningful name along with what they would like to include within the package. The ability to have this freedom will provide leniency while creating the game and have the developers be mindful of their creation.

27b Class Interfaces

◊ Stats

◊ Player

◊ Item

◊ Map

◊ Point

◊ Challenges

◊ TrapOrPuzzle

◊ AnimalStatus

◊ AnimalEncounter

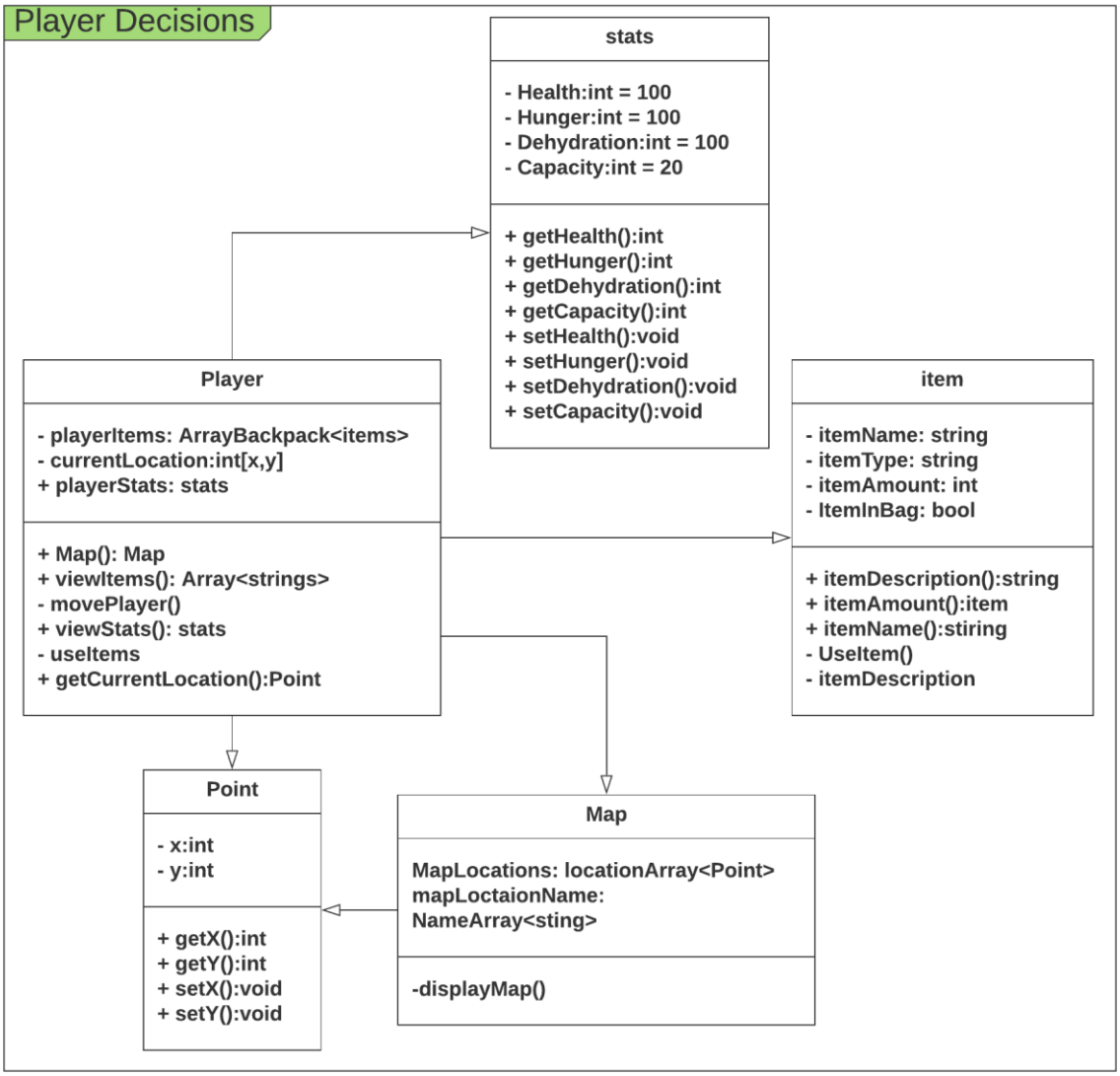

Figure 27**: Player Decisions**

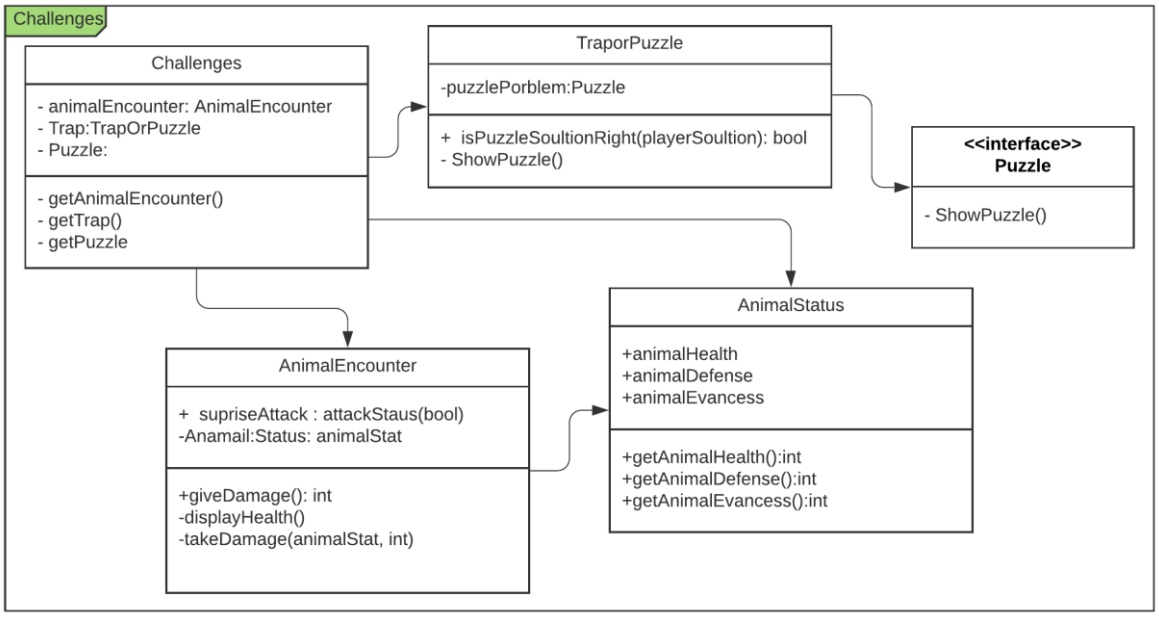

Figure 28**: Challenges Class**

IV Project Issues

28 Open Issues

The goal is to be able to expand the project to the point that it can be played on consoles such as PS4 and Xbox. In order for the game to adapt this functionality, there may be additional controllers that need to be bought, which will not be included in the original downloading of the game. This might negatively affect the popularity of the game if the controllers are not easy to access. Another issue that we are currently facing is the questions that will be going in for the puzzles of the game. We are not sure how to get a centralized system where all the questions originate from. Right now, the questions must be searched and put together into a package. The database is also expected to hold a large number of active users at any given time and also store the information of an even more significant number; we are not sure how this will work out either.

29 Off-the-Shelf Solutions

29a Ready-Made Products

When it comes to the creation of this game, ready-made products are highly encouraged. Although this might not provide a complete solution to all the issues being faced, the products can be used and be customized to do so. One of the essential products to use would be a database. There are many incredible databases, but the recommended for relational is MySQL, and the other uses will be Microsoft SQL Server. Ultimately, it is up to the developing team and the project owners to decide whether to use the recommendations made above or build a new database on its own.

One of the other solutions that we can think about is to extract questions from reliable websites instead of a person having to type them in manually.

29b Reusable Components

We can use Unity's prebuilt assets to make most of the User Interface, such as the menu, difficulty, package, and login screens. Other assets can also be used for other aspects of the game, as well.

29c Products That Can Be Copied

Any project the development group has created in the past is free to be copied as long as there are not any restrictions preventing the reuse of the product. Any products from third-party developers are also free to be copied as long as permission has been granted legally.

30 New Problems

30a Effects on the Current Environment.

The game is intended to have no adverse effects on the environment. It is strictly for entertainment and learning purposes. This will be a new game; hence, the future cannot be accurately predicted; it is up to the developers and the project manager to decide upon the implication on the environment.

30b Effects on the Installed Systems

The system where the game is being downloaded has to be updated with the most recent changes. Older systems will have trouble loading and playing the game.

30c Potential User Problems

Idol Hunt is expected to be a popular and addicting game; it is recommended that developers write about these problems in the terms and agreement condition of a game. Although the game intends to be fun and educational, these possibilities cannot be ignored.

30d Limitations in the Anticipated Implementation Environment That May Inhibit the New Product

The only limitation is that the games should be run on core i5 or higher. This is not considered an issue as most computers these days have an i5.

30e Follow-Up Problems

Game updates can cause new bugs in the system its downloaded in.

31 Migration to the New Product

Not Applicable

32 Risks

When it comes to Idol Hunt, there will be risks involved. The Risks involved are mentioned below. It is highly recommended that the developers of this team talk about these risks before the start of the project and formulate potential solutions for each one mentioned here and the ones that they also think may come up. Tests should be run as needed and at least bi-weekly to avoid these risks at any cost.

• Inaccurate metrics are easy to be recorded in this game if there is a lag in the timeframe as that will lead to potential loss of the game for the player.

• Inadequate measurement when gathering items to be placed into the given backpack is considered a severe thread and should be dealt with as needed.

• Inaccurate cost estimating

• In order to release the game fast, low quality is a risk that should always be avoided. It is better to delay the release by providing a high-quality game that will be appreciated instead of proving a sooner low-quality game.

• Low productivity is considered a serious risk that will decrease the popularity of the game and even cause the game to be terminated and pulled from the market.

33 Costs

To create a high functioning and highly efficient game, the costs are expected to be at large. Here is a list of the costs that have been estimated.

● The inputs and outputs given into this project should make enough sense for the game to run smoothly

● There should be several use case-diagrams of this product at the beginning to estimate the audience of the game which will result to an estimation of the cost needed to satisfy them.

- The functional requirements should satisfy everything mentioned above in this document, more can be added as needed

- The non-functional requirements should satisfy the above mentioned, the developers are at freedom to change this according to the popularity during the time of the release of the game.

- There must be events held that will promote the game and bring more attention to the theme of this project.

34 Waiting Room

Implementations that we would like to have but couldn’t get to are listed below.

- We can make is so that idol hunt is on the hunt for many idols instead of just one on an Island.

- We would also like to have a series of locations with different idols and new adventures.

- Locations can be graphically altered to represent any real-world cities and the Idol can be hidden at a landmark. Examples are listed below:

    ◊ The location of the game can be Agra and the Idol can be hidden in Taj Mahal

    ◊ The location of the game can be New York and the Idol can be hidden in the Statue of Liberty.

- The ability to make it multi-player by having the players compete against each other to see who will acquire the Idol first.

- The ability to let the users alter their avatar to a point they can upload their images as the avatar's face and body.

35 Ideas for Solutions

Some of the issues of the game will be easy and quick fixes that can become up based on the year the game is being released. It is highly recommended that the developers of the game have a website displaying data, promotions, and an about tab. This website may also contain contact info and an FAQ section where players can view frequently asked questions to solve their problems. There may also be a section where users can submit their questions publicly, which may be answered by another player; this section will also be monitored by staff to help answer the questions.

36 Project Retrospective

The people in the group made a difference when it came to software engineering. We were open enough to discuss the strongness and weak points of each of the group members at the beginning of the semester, doing so helped us focus on working on the weakness. Pair programming was the central theme in our group, as that helped the better coders to teach others. We also partnered up to increase our presentation and writing skills. Our group followed an agile methodology and that we all agreed this worked best and had an excellent outcome. For the development project as well, we always went back and fixed the report based on the reviews that were given. The one thing we could have done better was time management, this would have helped us relieve some of the stress, but in conclusion, we were delighted with the turn of events and the knowledge we earned in this course.

V Glossary

No special terms were used in this report.

VI References / Bibliography

[1] J. Bell, "Underwater Archaeological Survey Report Template: A Sample Document for Generating Consistent Professional Reports," Underwater Archaeological Society of Chicago, Chicago, 2012.

[2] A. Silberschatz, P. B. Galvin and G. Gagne, Operating System Concepts, Ninth ed., Wiley, 2013.

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