HANOI UNIVERSITY OF SCIENCE AND TECHNOLOGY

SCHOOL OF INFORMATION COMMUNICATION AND TECHNOLOGY

Management of Software Engineering

Topic: Fruister

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I. Overview

1. Introduction:

Multiplayer video games are games where multiple players can play together in the same environment. It requires players to share a single game system or use networking technology to play together over a greater distance. Players can play together locally on the same system or over the internet.

In this game, the players will be evaluated and ranked based on the number of points they collect. The game will have features such as chatting, skins, and more.

2. Purpose:

- Create a new entertaining method for users

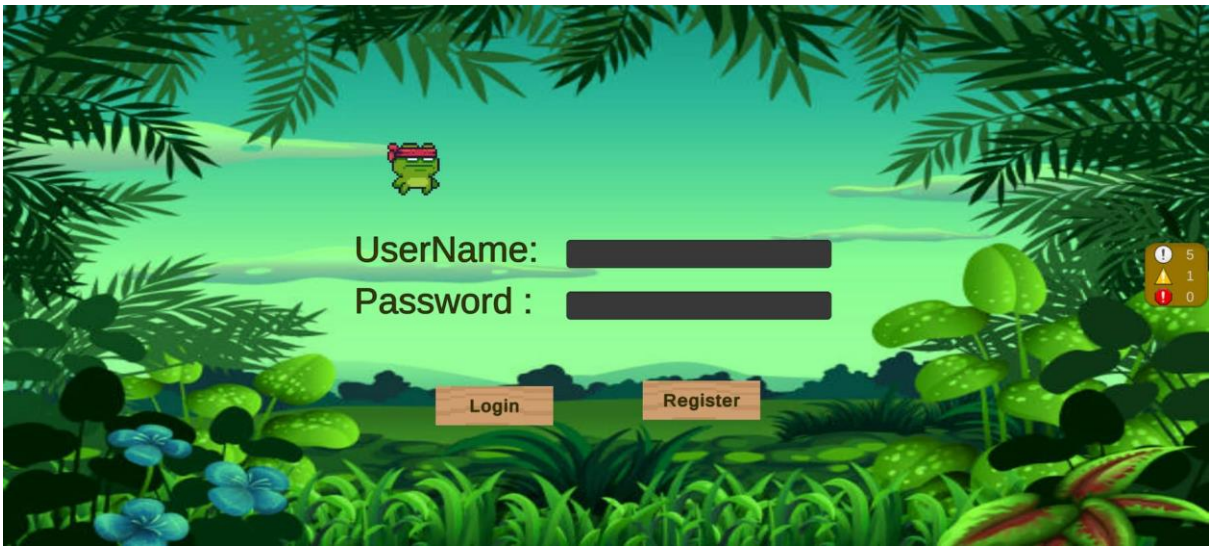
- Build a game that is user-friendly UX/UI, easy to use and attractive gameplay

- To ensure the ease in development and maintenance of the product

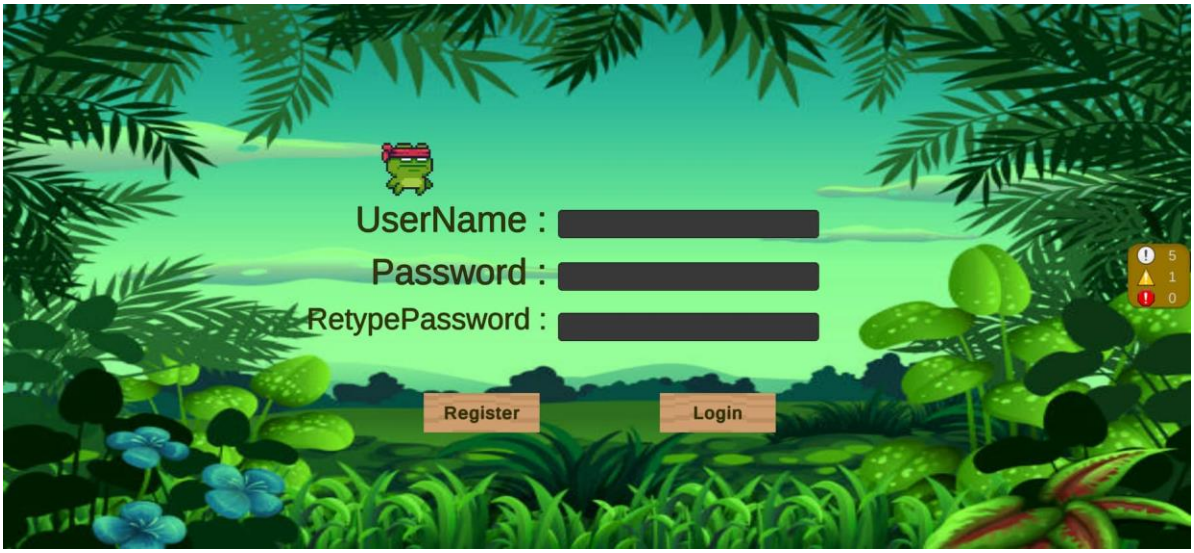
- To ensure the data and users' credentials security and integrity

II. Project Structure:

1. **Features and description:**
   a. Login & Register screen



Login screen



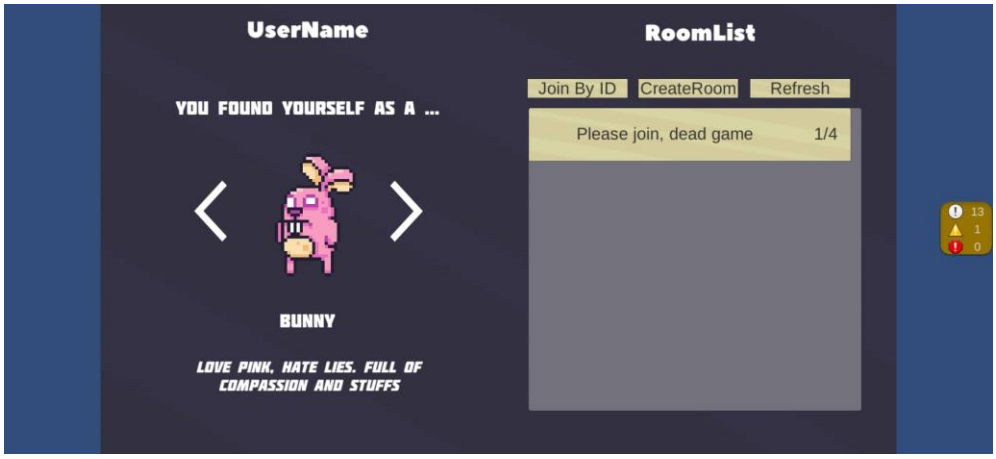
Register screen

Login and Register screen are the first few screens players will see upon open the game

In the Login screen, player can enter their username and password then click ‘Login’ button to log in to the game. Or they can click ‘Register’ button to move to Register screen to start register new account

In the register screen, player can enter username, password and retype the password to create new account for the game. Or they can click ‘Login’ button to move to Login screen.

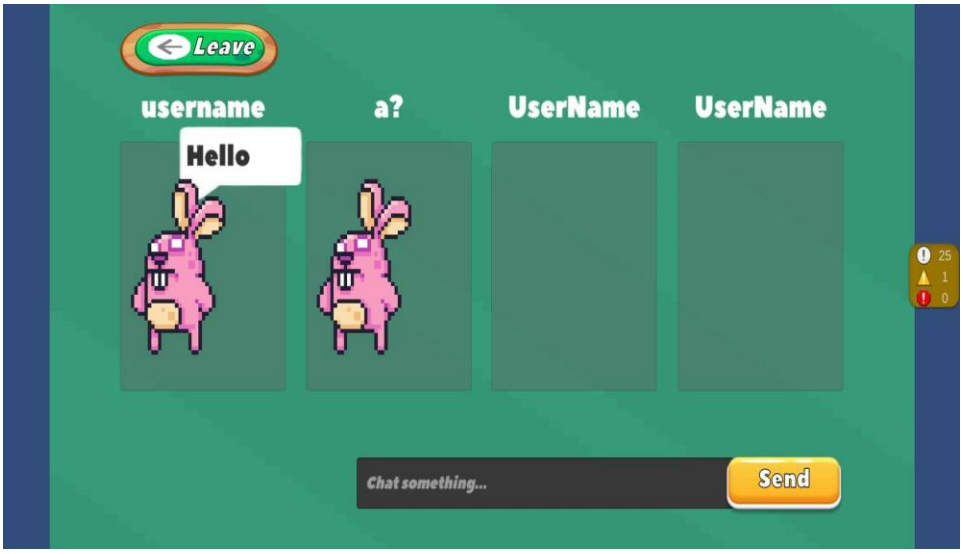
b. Lobby screen



Lobby screen

After successful login to the game, players will be welcome by the Lobby screen.

In this screen, player can choose the skin they would like to play in, joining in an available room, join room by room id, create new room, or hit refresh to reload the available room list



Room screen

After successful joining a room, players will see the room screen, where other players username, skins are displayed.

Players in a room can chat with each other by typing the chat message then click 'Send' button, a speech bubble will pop out on top of the player's skin display that chat message to every players in the room.

Players can also choose to leave the room by clicking 'Leave' button and moving back to the Lobby screen

c. Main game screen

Main game screen

After joining a room and successfully start a game, players will be move into the Main game screen, where players will compete with each other to see who can get the most fruits.

On the way to get fruits, players will encounter several obstacles, which are:

Rocks

Rocks comes with different sizes, which can block players path, make them to consider another route to the fruit apart from going straight at it

Slime

Different from rocks, slime doesn't straight up blocking players path, but allow them to go through, but with the cost of slowing them down. With slimes, players have to choose between going through the slime to get to the fruit, or going around it.

Mushroom

Finally, the last obstacle, and might be the most dangerous of them all, mushroom. Mushroom will intoxicate any players who comes in contact with it, slow them down for a few seconds, and might cost them the entire game.

2. Organization Structure:

Position	Members involved	Responsibilities
Team leader	Lê Huy Hoàng – for FrontEnd Nguyễn Vũ Minh – for BackEnd	1. Coach team members 2. Organizing work 3. Delegating tasks 4. Managing project progress
Backend	Vũ Hoàng Nam Nguyễn Ngọc Huân Trương Tuấn Nghĩa	1. Building and maintaining server 2. Assessing the efficiency and speed of current applications 3. Writing high-quality code
Frontend	Nguyễn Ngọc Tú Nguyễn Minh Hiếu Nguyễn Quang Anh	1. Building and maintaining game UI 2. Maintain and improve game 3. Optimize applications for maximum speed 4. Collaborate with back-end developers to improve usability

3. Technologies

1. Backend:

- Programming language : Java - Java is a high-level, class-based, object-oriented programming language that is designed to have as few implementation dependencies as possible.
- Tool for managing project and dependencies : Maven - a software project management and comprehension tool. Based on the concept of a project object model (POM), Maven can manage a project's build, reporting and documentation from a central piece of information.
- Library used to communicate with client (Frontend): Socket.io - a library that enables low-latency, bidirectional and event-based communication between a client and a server. It is built on top of the WebSocket protocol and provides additional guarantees like fallback to HTTP long-polling or automatic reconnection.

2. Frontend:

- Programming language : C# - a general-purpose high-level programming language supporting multiple paradigms. C# encompasses static typing, strong typing, lexically scoped, imperative, declarative, functional, generic, object-oriented, and component-oriented programming disciplines.
- Platform : Unity - a cross-platform game engine developed by Unity Technologies, can be used to create three-dimensional (3D) and two-dimensional (2D) games, as well as interactive simulations and other experiences. The engine has been adopted by industries outside video gaming, such as film, automotive, architecture, engineering, construction, and the United States Armed Forces.
- Library used to communicate with server(BackEnd): using system.net.socket provide by C#.

3. Version control:

- Github - an Internet hosting service for software development and version control using Git. It provides the distributed version control of Git plus access control, bug tracking, software feature requests, task management, continuous integration, and wikis for every project.
- Meeting at Microsoft Teams - a proprietary business communication platform developed by Microsoft, as part of the Microsoft 365 family of products.

III. Project Planning and estimation:

1. Scrum software lifecycle model:

- Scrum lifecycle is the number of consecutive steps and iterative stages that should be performed during the realization of any Scrum project.

- The iterative approach is the main principle of the scrum life cycle. The work on a Scrum project is subdivided into segments called Sprints. The Project develops from one sprint to another until the final product is ready.

- Each sprint cycle is subdivided into several consecutive stages that it must pass from the beginning till the end.

- Product backlog: a list of features and requirements needed to complete certain project.

- Sprint backlog: what needs to be completed during the current Sprint.

- Product increment: The product increments the product version what will be delivered at the end of each sprint.

- Product owner: responsible for defining Stories and prioritizing the Team Backlog to streamline the execution of program priorities.

- Scrum master: responsible for making sure a Scrum Team Lives byte values and practices of Scrum.

- Development team: composed of the professionals who do the hands-on work of completing the tasks in a Scrum sprint.

2. Project planning:

No.	Task	Period
1	Startup and research	1

2	Analyze business requirement	
3	Design	
4	Analyze user requirements	2
5	Software requirements analysis	
6	Risk analysis	
7	Programming	
8	Testing and evaluation	
9	Packaging, finishing documents	
10	Training customers	3
11	Commissioning and handover the system to client	
12	User support	
13	Updating and upgrading	
14	Maintenance	
15	Project completion	4

IV. Project management

1. **Cost estimation:**

Following is our cost estimation for our project:

1. Cost formula

Planned days	Days
Total working days	**95**
Backup working days	**25**
Real working days	**70**

Coefficient pay for every type of working hour	
Type of hours	**Coefficient pay**
Office hours	**1.0**
Overtime hours	**1.2**
Holiday hours	**1.5**

Coefficient pay for every type of position in the project	
Position	**Coefficient pay**
Project Supervisor	**2.5**
Project Manager	**2.0**
Team leader	**1.5**
Team member	**1.0**

Personnel in the project	
Name	**Position**
Dr. Nguyễn Nhất Hải	**Project Supervisor**
Lê Huy Hoàng	**Project Manager**
Nguyễn Vũ Minh	**Team Leader**
Vũ Hoàng Nam	**Team Member**
Nguyễn Ngọc Huân	**Team Member**
Nguyễn Quang Anh	**Team Member**
Nguyễn Ngọc Tú	**Team Member**
Trương Tuấn Nghĩa	**Team Member**
Nguyễn Minh Hiếu	**Team Member**

Wage's formular	
Hourly wage	60.000 VND
Daily wage	60.000 * 7 = 420.000 VND
Weekly wage	420.000 * 5 = 2.100.000 VND

2. Estimated costs

- Expenses for human resources:

Name	Position Coefficient Pay	Office Hours	Overtime hours	Holiday hours	Salary (VND)
Dr. Nguyễn Nhất Hải	2.5	476	0	0	71.400.000
Lê Huy Hoàng	2.0	490	7	2	59.520.000
Nguyễn Vũ Minh	1.5	490	7	0	44.604.000
Vũ Hoàng Nam	1.0	476	10	2	29.496.000
Nguyễn Ngọc Huân	1.0	460	6	0	279660000

Nguyễn Quang Anh	1.0	470	6	0	28.632.000
Nguyễn Ngọc Tú	1.0	460	5	0	27.960.000
Trương Tuấn Nghĩa	1.0	470	5	0	28.560.000
Nguyễn Minh Hiếu	1.0	465	6	0	28.260.000

- Expenses for non-human resources

Name	Expense per month	Number of months	Expenses
Rental space	7.000.000	4	28.000.000
Equipment(wifi, server,…)	12.000.000	4	48.000.000
Utilities expenses (water, electricity, waste disposal,…)	5.000.000	4	20.000.000
Marketing expense	4.500.000	4	18.000.000
Additional expense	1.000.000	4	4.000.000
Total			118.000.000

2. Risk management

1. Introduction

A risk is an occurrence that has a chance of happening and could have an impact on a project's goals in either a favorable or negative way. Risk management calls for processing the progress of a project to find, evaluate, react to, monitor, and report any hazards. This risk management strategy outlines how hazards related to the project will be found, examined, and controlled. It emphasizes how risk management operations are carried out throughout the project's lifespan and offers templates and best practices for logging and ranking hazards.

The project manager drafted the risk management plan during the planning stage of the initial project development. Throughout the project development process, this strategy will be monitored and updated. The project team, sponsor, and adviser are the section's primary target audiences.

2. Procedure

	Risk	Description	Probability	Impact	Severity	Mitigations
	Lack of communic ation and teamwork	Hard to work together online	HIGH	HIGH	HIGH	- Online meeting every week - Team contract (common rules between members)
	Member leaving	A team member leaves the project (disease, working, etc.)	LOW	MODERATE	LOW	- Split the work tothe remaining members

	Changing requirements	Misunderstand or not discuss with client leads to incomplete or changing in requirements	MODERATE	HIGH	HIGH	- Establish clear visibility plan with client - Explain and get confirmation from client
	Project behind schedule	Progress does not keep up with the milestone plan (examination, low motivation, etc.)	LOW	MODERATE	HIGH	- Meeting for reschedule - List and focus on some prioritize works if cannot finish on time
	Cost overrun	Cost exceeds the estimation due to increase workload or overspending	HIGH	HIGH	MODERATE	- Discuss with the stakeholders - Addin 10% of overall estimation for contingency cost
	Lack of technical knowledge	Members have limited knowledge of relevant web-technologies used in project	HIGH	LOW	MODERATE	- Slow design and implementation phase - Clear planning for members to prepare the necessary knowledge
	Server failure	Failure of the server due to OS crashes, hardware malfunction, bug, etc	LOW	LOW	LOW	- Avoid system overload - Back up to prevent data lost
	Personal data leak	User personal data getting leak	LOW	HIGH	HIGH	- Using encryption, authenticated algorithm - Using anti-virus software
	Legality issues	Copyrights issue, regulatory risk, etc.	LOW	MODERATE	MODERATE	- Identify and analyze possible legal risk in the beginning

V. Project summary

1. Result

The Fruister game has a positive impact on relaxation. The game UI is user-friendly and easy to use even with freshmen.

1. Difficulties

- When coding, we have some bugs and conflicts, and we have to fix them together.

- We lack communication and teamwork because of inconveniently located, and it’s hard to work together online.

- Sometimes, team members misunderstand each other's ideas.

- Some members have limited knowledge of relevant game development use in our project.

2. Future work

- For each gameplay, there will be more interactions between players such as power-up utilities or chatting box between them.
- To enhance the competitiveness, a leader board can be added to show 10 most pro-players from data collected.