DESIGNING OF HEROS 2D DUNGEON GAME ON WEBSITE PLATFORM

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ABSTRACT
"Heros" is a 2D roguelike and single-player game using mouse and keyboard controls. Players will enter a dungeon that is controlled by monsters and must fight monsters in order to move the next level and up to the final level then defeat the final boss. This game requires internet access and play on the website using a PC. This game has eight levels, and each level has a different room layout, monsters, and item placement. Inside the dungeon there are potions to restore HP, chests to get items, and gold to buy weapons. This game will be designed using the C# programming language and the Unity Game Engine. The objective of this game is that the player must reach the last level and defeat the final boss.

Keywords: Dungeon, Heros, Roguelike, Unity, Website

1. INTRODUCTION

The current advancement of information technology is rapidly progressing, and it has a positive impact on the field of video games. With the continuous improvement in technology, game developers have been creating engaging and diverse games. Video games are electronic games that can be played on gaming consoles, computers, or smartphones. These games typically immerse players in various challenges that need to be overcome in order to complete the game.

The game technology has seen rapid advancement, especially in the realm of online gaming websites. Online gaming websites provide a platform for playing games over the internet. One highly enjoyed genre is Roguelike, which offers a unique gaming experience by incorporating action and combat elements. [1] Roguelike is a subgenre of Role-Playing Games (RPGs) with key features such as item randomization, procedurally generated dungeon crawling, and permadeath, meaning characters permanently die and cannot be revived.

The designed game is "Heros," an adventurous and challenging dungeon-crawling game filled with monsters In this game, players will battle against monsters that obstruct their path in every level of the game. The term "dungeon" refers to a location or area such as a castle, prison, or tunnel that contains various challenges and valuable items for players to traverse. One notable

advantage of this game is that it can be played directly from any web browser without the need for special software installation.

Referenced Game

"Heros" is created by combining various complex concepts, mechanics, and styles inspired by several famous games. The main sources of inspiration in the development of this game include Soul Knight, Enter the Gungeon, and Arcana Memories.

Soul Knight is an engaging action genre game based on Android that has captured attention. The objective of this game is for players to complete all the missions. Players must also defeat monsters and face various obstacles along the way. By successfully completing missions, players can earn more money.

Enter the Gungeon is a shooter game where players wield weapons to confront monsters in a dungeon. The game features a wide variety of weapons, ranging from shotguns to rifles. It also includes multiple characters and ever-changing dungeons to explore.

Arcana Memories is a 2D roguelike game based on the PC platform, developed by Johny Andersen (NPM 535170008), a student of the Informatics Engineering Program at Tarumanagara University's Faculty of Information Technology. The game is created using the C# programming language with the Unity Engine for development. In this game, players take on the role of a young man trying to regain lost memories. The objective of the game is to retrieve the character's memories by completing tasks such as exploring ever-changing dungeons, defeating enemies within the dungeons, reaching the final level, and defeating the boss in the dungeon. The example of the game Arcana Memories can be seen in Figure 1.

Figure 1. Arcana Memories
Sumber: Johny Andersen; Jeanny Pragantha, dan Darius Andana Haris, "PERANCANGAN GAME TOP DOWN ROGUELIKE SHOOTER "ARCANA MEMORIES" PADA PC", Jurnal Ilmu Komputer dan Sistem Informasi 9.1 (2021), h.135

2. RESEARCH METHOD

In game development, a solid theoretical foundation is necessary as a reference for designing the desired game. Some of the fundamental theories that need to be explained include design methods, game genres, and other aspects related to game design.

Design Methodology

Game design is an essential element in shaping a game. In designing a game, several design stages are needed to create the desired game. [2] There is no specific template that must be followed in game development. [3] However, there are several aspects that can be considered, as follows:

1. High Concept

   High Concept is a part of describing a game that will be designed. This stage includes the goals of the game, the game genre, and several other aspects. The specifications of the designed game are as follows:

   1. Game Title   : Heros
   2. Genre   : Roguelike
   3. Language   : English
   4. Target Player   : Age 8 and above
   5. Number Player   : Single Player
   6. Visuals   : Two Dimensional
   7. Game Engine   : Unity
   8. Programming Language   : C#
   9. Control   : Keyboard and mouse

2. Gameplay

   Game "Heros" is a roguelike shooter where players eliminate enemies by shooting them within a dungeon. At the start of the game, players enter the dungeon equipped with a basic pistol and have a Health Point (HP) bar. They must explore the dungeon's different rooms, progressing through stages and defeating the boss at the final stage. Within the dungeon, players can find potions, chests, and gold. When low on HP, players can search for potions while exploring the dungeon. Along the way, players can collect weapons and gold. If a player loses all their HP or dies, they lose everything and have to start over at that level. To complete the game, players must reach the final level and defeat the boss.

   There are several stages of gameplay design as follows:
   a. Control Design

The game is designed to be played on a PC with a browser and requires an internet connection as it is web-based. The game utilizes keyboard and mouse controls. The mouse is used to aim the weapon, determining the direction of the shots. Meanwhile, the keyboard controls are used for player movement and other actions. The control scheme for the game can be seen in Table 1.

Table 1 Game Control Design

No	Tombol	Fungsi
1	Mouse Left Button	Shoots in the direction of the cursor
2	Space	Dodge
3	W	Move up
4	A	Move left
5	S	Move down
6	D	Move right
7	E	Pick up stuff
8	Tab	Change weapons
9	Esc	Open pause

b. Character Design

The game "Heros" features various characters designed by the game developer. The characters are divided into three categories. Here are types of character design in the game:

1. Player Character

The player character in "Heros" has a Health Point (HP) system, which serves as their life in the game. The player character starts with 100 HP. The HP of the character can decrease when they are attacked by monsters, which inflict a certain amount of damage points. To restore HP, players can search for potions within the dungeon. At the beginning of the game, the player character is equipped with a basic pistol with an attack point of 20. They can shoot at monsters by aiming the mouse cursor. The design of the player character is depicted in Figure 2. [4]

Figure 2. Player Character

2. Enemy Character

The monster characters in the game are the enemy characters. Each monster character has a Fire Rate, Health Point (HP), and behavior. They also possess an Attack Point. The Fire Rate represents the speed at which a monster attacks if it has a long-range attack type. Attack Point refers to the amount of damage inflicted on other characters, reducing their Health Point (HP) when hit. The behavior of the monsters indicates how they interact with the player character within a certain distance. Enemy detail can be found in Table 2. [5]

Table 2. Enemy Specifications

Enemy Name	Health	Attack	Speed	Fire Rate	Behavior
Bat	40	15	3.5	Melee	attack by touching the player
Slime	40	15	3.5	Melee	attack by touching the player
Imp	60	20	4	4	attack from a distance

3. Boss Character

The boss is a stronger monster character with different behavior compared to other monsters. They have higher HP than regular monsters. In the game design, there are three types of bosses. Boss detail can be found in Table 3.

Table 3. Boss Specifications

Boss Name	Health	Attack	Speed	Fire Rate	Behavior
Venomous	800	20	4	4	attack from a distance
Sepulcher	1000	30	4	4.5	attack from a distance
Drogath	1200	35	4.5	5	attack from a distance

c. Object Design

In this stage, we will discuss the design of objects within the game "Heros." The object design is divided into four categories: weapons, potion items, gold, and chests. For detailed information about each object and their descriptions, please refer to the following:

1. Weapon

Weapons are objects used by players to attack enemies. Each weapon has attack points, fire rate, and different weapon levels. At the beginning of the game, players will receive a regular weapon with unlimited ammunition. If players want to obtain higher-level weapons, they must search for chests while exploring the dungeon. For detailed weapon specifications, please refer to table 4.

Table 4. Weapon Specifications

Name	Attack	Attack	Ammo	Fire Rate	Description
Gun	20	20	∞	0.75	Trajectory projectile shot in a straight direction according

					to the cursor
Machine gun	30	30	80	0.25	Trajectory projectile shot in a straight direction according to the cursor
Shotgun	25	25	50	0.4	Trajectory fires 3 projectiles simultaneously according to the direction of the cursor

2. Potion Item

    Potion items are objects that provide effects to the character when they are picked up or used, such as restoring Health Points (HP). For detailed potion item specifications, please refer to table 5.

Table 3. Potions Specifications

Item Name	Description	Usage Amount	Price in shop
Potions S	Restores HP by 20	1	5 gold
Potions M	Restores HP by 50	1	15 gold

3. Gold

    Gold is a currency that can be obtained by searching chests and defeating enemies within the dungeon. An example of a gold design can be seen in Figure 3.

Figure 3. Gold Design

4. Chests

Chests are objects that can be found by the player while exploring the dungeon. treasure chest will issue weapons. An example of a chest design can be seen in Figure 4. The list of drop rates in the chest can be seen in Figure 4.
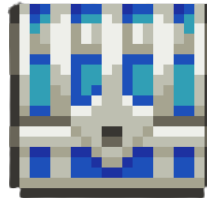

Figure 4. Treasure Chest Design

Table 5. Treasure Chest Drop Rate List

Nama Item	Drop Rate
Tidak ada drop	40%
Ammo	25%
Shotgun	20%
Smg	15%

d. Level Design

"Heros" is designed with eight levels. The dungeon path design utilizes multiple map templates. Each time a player starts the game, a random map template is chosen from a selection of available templates. This ensures that each player experiences different map layouts. Each dungeon level has a varying number of rooms. The room design in each level utilizes procedural generation to create different dungeon rooms, including main rooms, monster rooms, shop rooms, treasure rooms, boss rooms, and portal rooms. An example of a level design can be seen in Figure 5. [6]
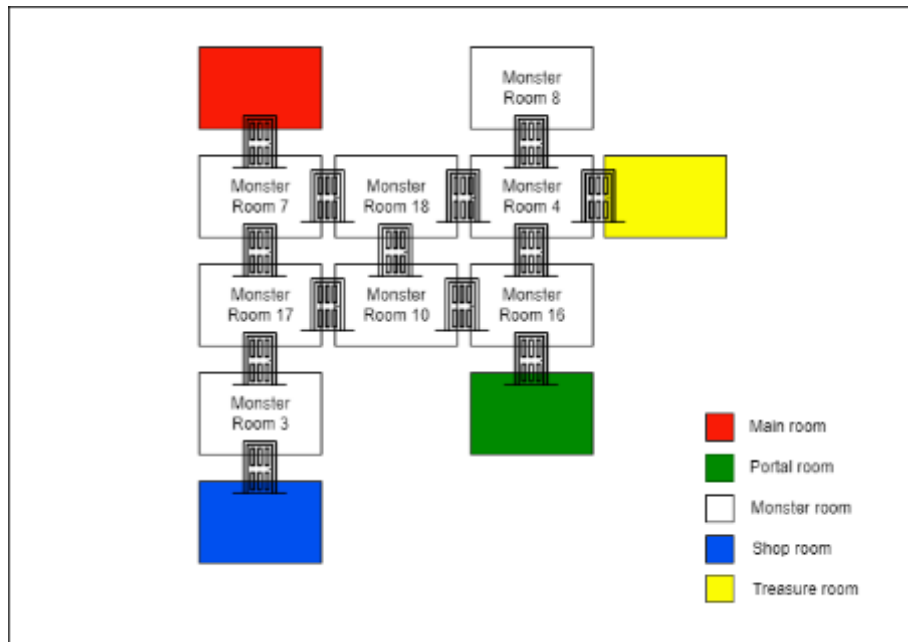.

Figure 5. Level Design

   e. Sound Design

In this stage, we will discuss the sound design that will be incorporated into the game "Heros". Sound is an important aspect of any game. In "Heros", the sound design consists of two types: Sound Effects and Background Music. [7]

     1. Sound Effects

Sound Effects are the sounds that are heard when something happens within the game. Sound Effects play a crucial role in enhancing the gaming experience.

     2. Background Music

Background Music is the audio in the form of music that plays as a backdrop while the game is being played. Background Music is used in various parts of the game, such as the main menu, dungeon, and game over screens.

3. Audience

The target audience for this game is intended for players of all ages, starting from a minimum age of 8 and above. The game is recommended for those who have good reflexes and skills in using mouse controls. [8]

4. Hardware and Software

The following are the specifications of the computer hardware used in making games:
1. Processor   : AMD Ryzen 5 2500U with Radeon Vega Mobile
2. Ram   : 12 GB

3. VGA   : NVIDIA Geforce GTX 1050
4. SSD   : 512 MB
5. Other Devices   : Mouse, Keyboard

Roguelike

Roguelike is a subgenre of Role Playing Games (RPG). It was originally released in 1980 by Michael Toy and Glenn Wichman. This genre of games utilizes level generation. It has distinct features such as permadeath, where players have to restart the game from a predetermined starting point if they die in the game. Roguelike games also feature item randomization during gameplay. In dungeons, players can find healing potions that restore their health. Nuclear Throne is an example of a roguelike game.

Software Utilized for Development

In the game design process, the following essential software tools will be used to perform various tasks such as game design, script creation, and graphic asset creation. Each of these tools is recognized in the industry for their various features and capabilities, which encompass different aspects of game development:[9]

1. Unity is an application used for creating games on various platforms. The Unity editor is designed with a user-friendly interface.

2. Visual Studio Code is a lightweight and reliable text editor created by Microsoft for multi-platform operating systems, which means it is also available for Linux, Mac, and Windows versions.

3. RESULT AND DISCUSSIONS

The game "Heros" is a 2D roguelike shooter available exclusively for PC through a browser with an internet connection. It is designed as a single-player experience. Players will find themselves in a dungeon armed with a pistol and a health bar (HP). They can discover different types of pistols and ammunition within the dungeon, as well as Potions to increase their HP. The objective of the game is to explore the dungeon, reach the final stage, and defeat the boss. "Heros" is developed using the Unity game engine, Visual Studio Code, and programmed in the C# language. [10]

Layout Design

The design specifications for the user interface (UI) in the game "Heros" are divided into three modules: Title Screen, Instructions, and Pause. The detailed designs are as follows:

1. Display Title Screen

This screen will appear when the player opens the game. In this menu, players can choose the Play button to start the game, access the Instructions, and find Help. An example of an display title screen display design can be seen in Figure 6.

Figure 6. Display Title Menu

2. Display About

The about screen displays information about the game developers, supervising lecturer, and all the institutions involved in the game's development. This screen has a back button to return to the menu. An example of an about display design can be seen in Figure 7.

Figure 6. Display About

3. Display Instructions

The instructions screen displays how to play the game and the keyboard and mouse controls. This screen also has back and main menu buttons. An example of an instruction display design can be seen in Figure 7.
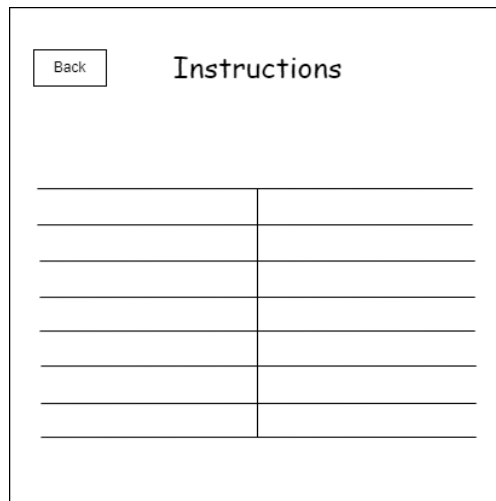

Figure 7. Display Instructions

4. Display Pause

The pause screen can be accessed when the player presses the "Esc" key on the keyboard. This screen contains a resume button to continue the game and a back to main menu button to return to the main menu. An example of a pause display design can be seen in Figure 8.
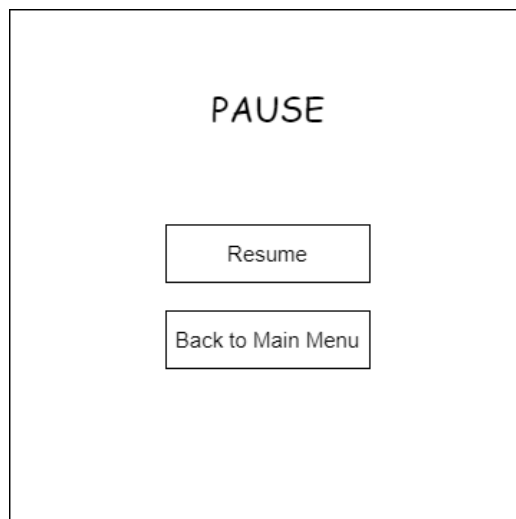
Figure 8. Display Pause

5. Display Gameplay

This screen will appear when the player starts the game. In the gameplay screen, there is a health bar located in the top left corner, the player's acquired gold displayed below the health bar, information about the currently equipped weapon in the bottom right corner, and a mini-map in the top right corner. An example of an gameplay display design can be seen in Figure 9.
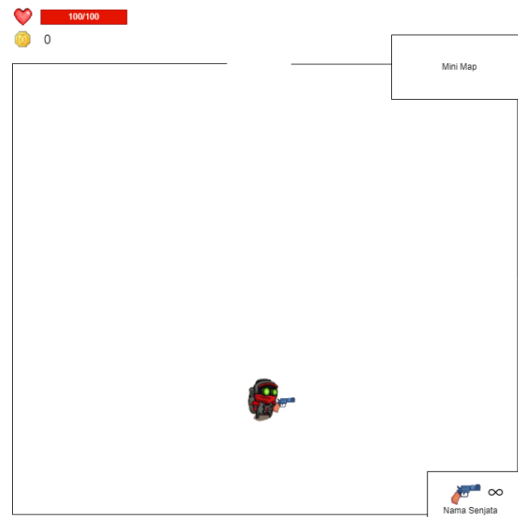

Figure 9. Display Gameplay

4. CONCLUSIONS AND SUGGESTIONS

Based on the explanation above, it can be concluded that the game "Heros" is a single-player game with a roguelike shooter genre that can be played on a website platform and requires internet access. In this game, players will enter a dungeon controlled by monsters and must navigate through multiple rooms and face monsters to progress to the next levels and eventually reach the final level.

ACKNOWLEDGEMENT

REFERENCES

[1] Andersen, Johny; Pragantha, Jeanny dan Haris, Andana, Darius. "PERANCANGAN GAME TOP DOWN ROGUELIKE SHOOTER "ARCANA MEMORIES" PADA PC", Jurnal Ilmu Komputer dan Sistem Informasi, Vol.9, No.1, 2021.

[2] Bates, B. (2004). Game Design. Boston: Thomson Course Technology PTR.

[3] ChillyRoom. (2023) Soul Knight, https://play.google.com/store/apps/details?id=com. ChillyRoom.DungeonShooter&hl=en&gl=US.

[4] Halpern, J. (2018). Developing 2D Games with Unity: Independent Game Programming with C#, New York: Apress.

[5] Gamelab (2023). https://www.gamelab.id/news/211-berkenalan-dengan-fitur-fitur-unity-3d.

[6] Harris, J (2020). Exploring Roguelike Games, Boca Raton: CRC Press.

[7] Schell, J. (2020) Tenth Anniversary: The Art of Game Design. Boca Raton: Taylor & Francis Group.

[8] Maulana, M. (2023) 17 Game Roguelike/Lite Bikin Nagih Yang Harus Kamu Coba, https://gamebrott.com/17-game-roguelike-lite-bikin-nagih-yang-harus-kamu-coba.

[9] Salamah, G, U. (2021). Tutorial Visual Studio Code, Bandung: Media Sains Indonesia, 2021.

[10] Visual Studio Code (2023). User Interface, https://code.visualstudio.com/docs/ getstarted/userinterface.

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