**Title: Developing an action game - Analysis**

**Analysis:**

**Background and Identification of the problem:**

Video games are something my friends and I enjoy playing in our spare time. One of the types of video games we enjoy is the 2d roguelike and platformer genre.

With the rise of powerful game engines which seem to improve nonstop such as unity and unreal engine, 3d games are becoming more and more prevalent as they become easier to make. This is evident from many websites giving opinions on the best games that came out this year e.g. polygon.com shows there opinion on the best games of the current year Only 2 of 20 games were 2d. Hence many people who would say they enjoy 2d games will not have as much content to play This year. I asked many of my friends and online lovers of the genre on what they are currently playing in their spare time all of which stated as a summary: that either they weren’t playing anything due to lack of anything new or they were playing older games that came out years ago.

As I study computer science my friends have asked me to make a 2D roguelike platformer action-adventure game, for all of us to play. This means we can have control on things we want inside the game to keep it fun and be able to add new fresh ideas to it to keep it interesting when it gets repetitive. Furthermore, this will give us more ideas to suggest to game developing companies to incentivise potential new games to come out.

*links to information I used above:*

*polygon.com best games of 2022:* <https://www.polygon.com/what-to-play/22956981/best-games-2022>

**Description of the current system:**

For simplicity I have decided to make this a specifically computer-based game. This simplifies the need to add support for other input methods such as controller input for console or touchscreen input for mobile. This also narrows down the current systems available. While there are many different types of applications that explore different mechanics the best example of a current system would be games such as ‘dead cells’, ‘HP sword’ and ‘celeste’. These are very famous games in the target genre. While there are others to due to my lack of artistic skills I’ve decided to choose systems that use simple pixel art type graphics.



Drawing in pixel art will be simpler as less detail is needed to produce a good result as well as taking less time to do.

Firstly, Dead Cells (the game in the picture below) makes use of a controllable player that can walk, roll, attack and jump. It also makes use of procedural world building to create new worlds to explore. This is something a lot of games that fit into this genre use and would be an interesting thing to add in order to make the game less repetitive and keep it being fun for longer. Enemies are what make the experience interesting. The way Dead cells handles enemies is by checking for when the player comes into a certain range of the enemy. If the player steps into this range, they get the enemies ‘Aggro’. This means they’ve spotted you and will run after you so that they can attack you. Due to complex terrain the ai has to be able to navigate its way around to get to the player. If it can catch up to you then it will try to hit the player. It seems dead cells enemies as well as other enemies in the other above listed systems seem to all go for slow but high range attacks. They deal high amount of damage to the player and incentivise the player to try and dodge there attacks with abilities such as the roll mentioned beforehand. The roll works by making the player immune to all damage for a certain amount of time but unable to attack. This ability can only be used again after a second or so.



The screen has a:

Powerups , Hp Bar, Inventory , Map , Gold amount , In game time

Despite having quite a lot different things on the screen attention stays on the player this is most likely done through correct use of colour. Despite this the screen could be argued to be rather cluttered and could decrease in the amount of things shown. For example while in game time and a map is useful if a map was truly needed then a button could be allocated to bring up a map. Furthermore, the in-game time isn’t very useful unless you want to try to complete the game as quick as possible.

One of the things that Dead cells makes use of a lot is interesting particles and lighting which could be something to add to make the game more appealing to look at while playing.

Looking at reviews of the game to see what people found interesting were similar things already stated such as the procedurally generated world and the interesting combat and enemy system. One of the aspects of the game reviews thought was rather unlikable about the game is the difficulty. Some friends of mine also agree that the game can be challenging and while sometimes that’s a nice thing but other times for example to de-stress can be a less attractive feature.

*links to information I used above:*

*pixel art vs vector art:* [*https://www.deviantart.com/moosader/art/Pixel-sprites-vs-Vector-sprite-134830250*](https://www.deviantart.com/moosader/art/Pixel-sprites-vs-Vector-sprite-134830250)

*dead cells : https://switchplayer.net/2018/08/07/dead-cells-review/*

**Identification of the prospective user(s):**

The game will probably be in the interest in users who have played similar types of games and have access to a computer. Furthermore, the age range of teens so 13 and above. I will attempt to use as many video game conventions as possible e.g. using the ‘w’, ’a’, ’s’ and ’d’ keys for movement as well as the space bar for jumping. This will make the controls easy to get the hang of by users who have used similar systems before which as I said is most likely the type of user who would use this system. As stated, I have many friends who play games in this genre who I’m sure would be eager to give ideas for the project via interviews.

**Identification of users’ needs and acceptable limitations:**

To understand the users’ needs I set up an interview with some of my friends who count as prospective users; All of which claim to enjoy 2d video games. I asked them all the same questions and recorded their answers. Here are the questions and the results I got from them:

Question 1:

Question:

What is your favourite 2D games do you enjoy playing?

Reason for this question:

To understand and get inspiration on current games like this I asked:

Answers:

Many of the answers was dead cells which was too be expected as it is quite famous. The second common answer was ‘Hollow night’ and the third being ‘Hades’ after doing research both games share very similar concepts when abstracting all 3 they can be summarised as the user can control a character (move around and attack using a melee weapon). There is an environment you can explore but there will be enemies along the way you must defeat in order to get to the end of the game which is usually a boss.

Question 2:

Question:

is there anything you dislike in the game you just said?

Reason for this question:

It will be useful to know improvements on the current system. Correcting things that went wrong in the current system will make the game more fun and playable.

Answer:

Most of the answers were unsure but the answers I did get were mainly: for games such as dead cells were disliking the difficulty of the game being to easy at sometimes but to hard in the others. Another dislike about current systems were the ability to save the procedurally generated world so that you can come back to it if you want to.

Question 3:

Question:

How would you solve this issue (if stated one)

Reason for this question:

It will be useful to see how they user would want a solution to the problem they had with the current system. This will give me ideas on how I will solve the problem.

Answer:

Most of the Answers to the difficulty of the game were creating a difficulty option for each specific world created depending on how the user feels at the time. And being able to save the world in an in-game menu which can be retrieved somewhere in the startup/main menu would work quite well.

Question 4

Question:

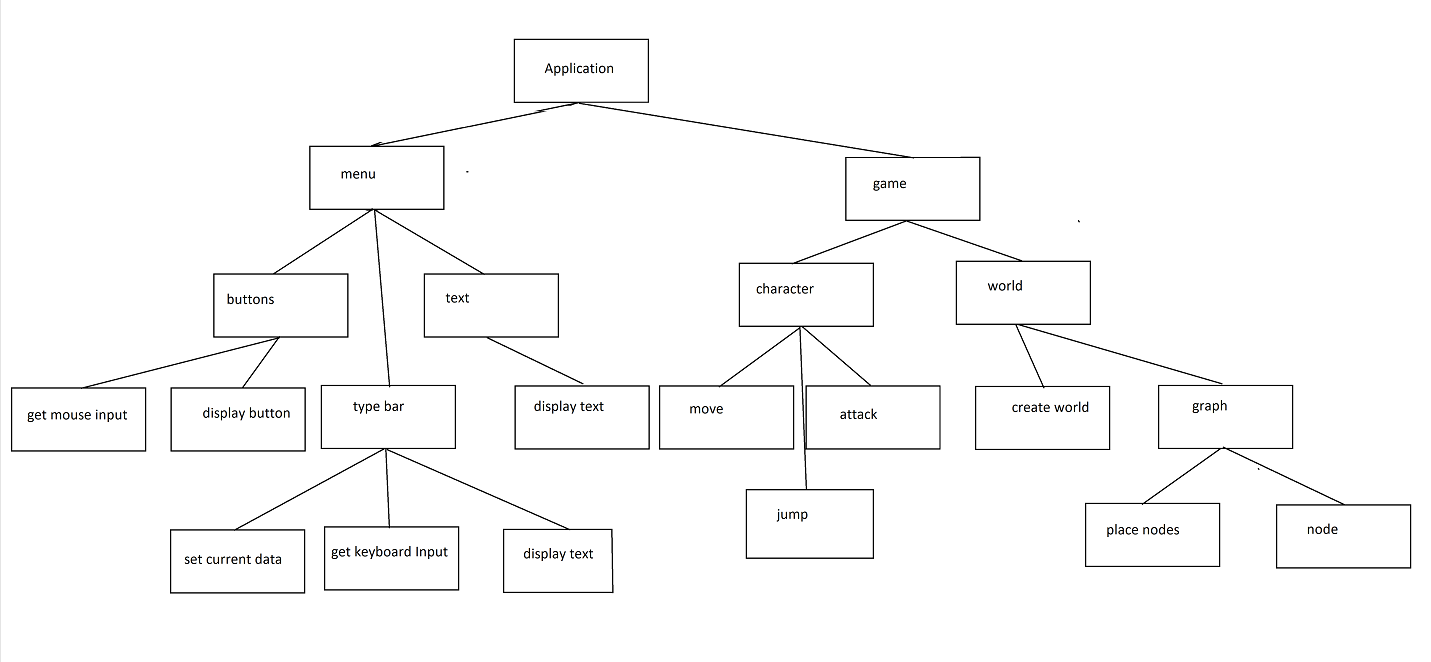
Do you enjoy sword or gun combat more?

Reason for Question:

the current systems usually have both melee and ranged combat (swords and guns) but due to time constraints and simplicity I will only be adding one weapon so it’s best I understand which one is the most enjoyable.

Answer:

The results from this were mainly a sword combat system when asked why the reason seemed to come down to gun combat makes the screen to cluttered from all the bullets on the screen. This will make it easier to do fun combat in general as the player has to risk getting close to the enemy to damage the enemy.



With the following information in mind my objectives for the project are:

THE MENU:

1. The program should have a menu when it starts to allow the users to easily select one of the following options
   1. Play
   2. settings
   3. exit

* The settings button will lead to a menu of options such as toggling Fullscreen for the application.
* The exit button will close the application.

1. Clicking play button:
2. On top of the screen there will be a create new character button.

* Clicking this will lead to a menu where the user can create a character because of time constraints inputting a name will be the only way to customize the character.
* Clicking next will create the character. When this is done user will be taken to the world menu.

1. if the user had made a characters before: Under the create new world button will be a list of all the premade characters the user has made.

* The menu should have the characters listed one by one on top of each other as rectangles. Each character will have its name and date of creation on it.
* Clicking on a character’s rectangle will load the world menu.

1. The world menu:
2. The world menu will very similarly looking to the load existing character.
3. On top of the screen there will be a create new world button.

* Clicking this will lead to a menu where the user can create a world by inputting a name, seed and selecting a difficulty for the world.
* Clicking next will create the world. When this is done the character, the user chose will be put into the world and the user can play.

1. Under the create new world button will be a list of premade worlds.

* Similarly, to the load character menu the worlds will be listed one by one on top of each other as rectangles. Each world will have its name, seed and difficulty on it.
* Clicking on a world will put load the world and place the character inside of it so the user can play.

THE GAME:

1. When the world and character has loaded The user should be able to control the ‘user’s character’ using the keyboard to move (left/ right/jump) and do an attack motion with the sword clicking the mouse.
2. The game should allow the user to explore the environment by moving and jumping around.
3. The program should have enemies Around the environment which can be found walking around a set location
4. The program should have 2 types of enemies, small enemies and a boss that is controlled by the game. Both Enemies and the ‘user’s character’ have a health points (hp) bar. The ‘user’s character’ hp bar is seen at the top right of the screen. An enemies hp bar is visible above the said enemies’ head
5. The program should have the small enemies chase the ‘user’s character’ when approached. When the small enemies get close enough, they will try to hit the ‘user’s character’. If they are close enough and manage to get a hit, the ‘user’s character’ hp bar will go down.
6. the user should be able to use the ‘user’s character’ to hit an enemy, using the attack motion stated before, the enemy’s hp bar will go down.
7. The program should detect If an enemies hp is 0 then they will disappear
8. The program should detect is the ‘user’s character’ hp is 0 in which case the screen will fade to black, and a message will be displayed saying ‘you died press any key to continue’ this will restart the game.
9. The program should allow the user to press the ***Esc*** key to pause the game and display a panel with options that will include:
   1. Back to Game – this returns the player back to the game to continue playing.
   2. Save Game – stores current position and other attributes in the game so that if user closes the game, they can load the progress the they had, when opening the application again.
   3. Settings – this will be same as section 2.b – the main menu settings
   4. Exit Game – closes the game.
10. The program should allow an end of the game where the boss has been defeated in which case a black screen will show up saying ‘thank you for playing’ and return to the menu. After a couple of seconds of being there.

**Data source(s) and destination(s)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data name | Description | Source | Destination and process | Data volume |
| saved progress | After playing the game the user may want to continue playing with the progress, they’ve achieved another time so the user will press the save button | The user (the person playing the game) | the data will have to be stored locally on the user’s computer to be retrieved later |  |
|  |  |  |  |  |
|  |  |  |  |  |
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|  |  |  |  |  |

**Data dictionary:**

CHARACTER

|  |  |  |  |
| --- | --- | --- | --- |
| Variable | Data Type | Description | Relationships |
| CharacterID | INT(4) | The key for the character entity | None |
| Name | CHAR(255) | The name of the character | None |
| HP | INT (4) | An integer that holds the amount of hp a specific character has. | none |

WORLD

|  |  |  |  |
| --- | --- | --- | --- |
| Variable | Data Type | Description | Relationships |
| WorldID | INT(4) | World entity key | Foreign key to the settings entity and the saved entity |
| Name | CHAR(255) | Stores the name of the world | None |
| seed | INT(12) | An integer that is used to create the world | None |
| dateOfCreation | DATE | Holds the date of when the world was created | None |

SAVED

|  |  |  |  |
| --- | --- | --- | --- |
| Variable | Data Type | Description | Relationships |
| worldID | INT(4) | World entity key | Links to the world entity |
| CharacterID | INT(4) | The key for the character entity | Links to the character entity |
| Xpos | DOUBLE(6,3) | A float that holds the x position on the map of the character it belongs to | None |
| ypos | DOUBLE(6,3) | A float that holds the y position on the map of the character it belongs to | none |

WORLDSETTINGS

|  |  |  |  |
| --- | --- | --- | --- |
| Variable | Data type | Description | Relationships |
| worldID | INT(4) | World entity key | Links to the world entity |
| difficultyLevel | INT(4) | A number that denotes the difficulty of the game | Links to the difficulty entity |

DIFFICULTY

|  |  |  |  |
| --- | --- | --- | --- |
| Variable | Datatype | Description | Relationships |
| DifficultyLevel | INT(4) | Difficulty level of the game | Relates as a foreign key to CHARACTER entity |
| EnemyHPMultiplier | INT(4) | A multiplier for the base enemy hp for a specific difficulty | None |
| EnemyAttackMultiplier | INT(5) | A multiplier to the base damage of an enemy’s attack for a specific difficulty | none |
| Name | ENUM | The name of the difficulty e.g. “easy” | none |

APPLICATIONSETTINGS

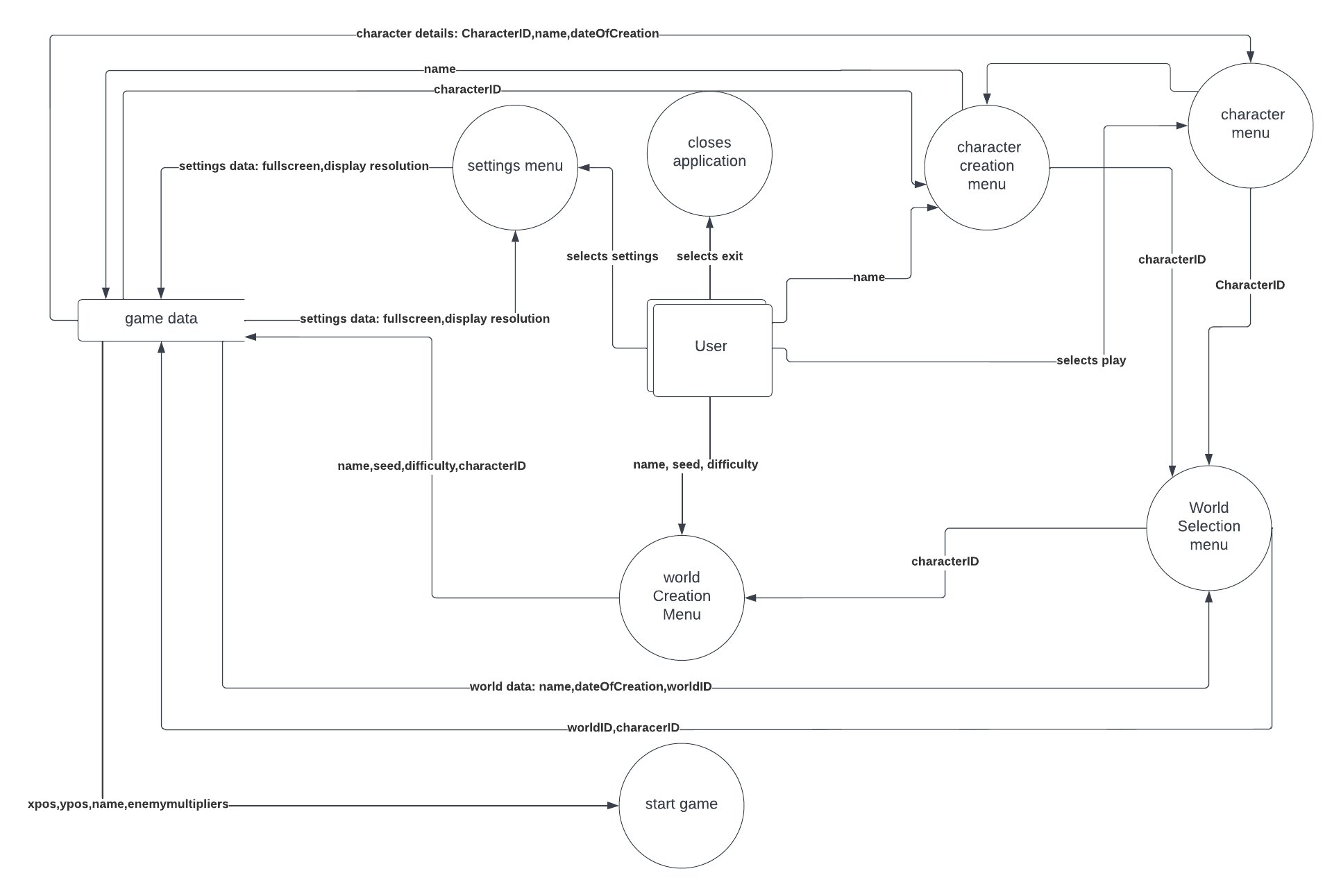
|  |  |  |  |
| --- | --- | --- | --- |
| Variable | Datatype | Description | Relationships |
| Fullscreen | Bool | A if true the application will be in Fullscreen (take up the entire space of the monitor)  If the application will be the size of a specific resolution | None |
| Resolution | ENUM | The resolution of the application window | None |
| Volume | INT(2) | Percentage for the volume of the game | None |

**Entity relationship diagram:**

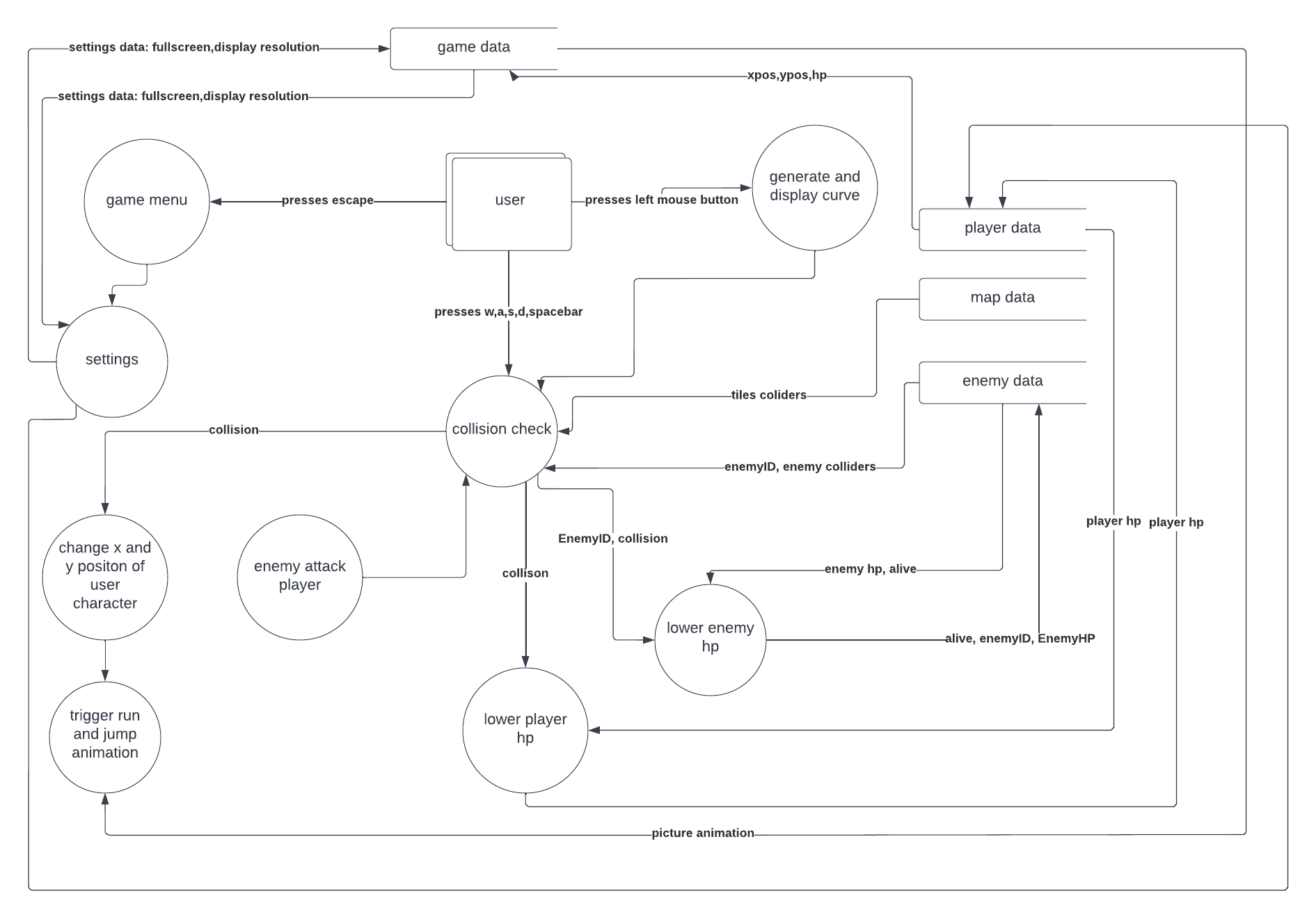
Graphical user interface, text, application, chat or text message

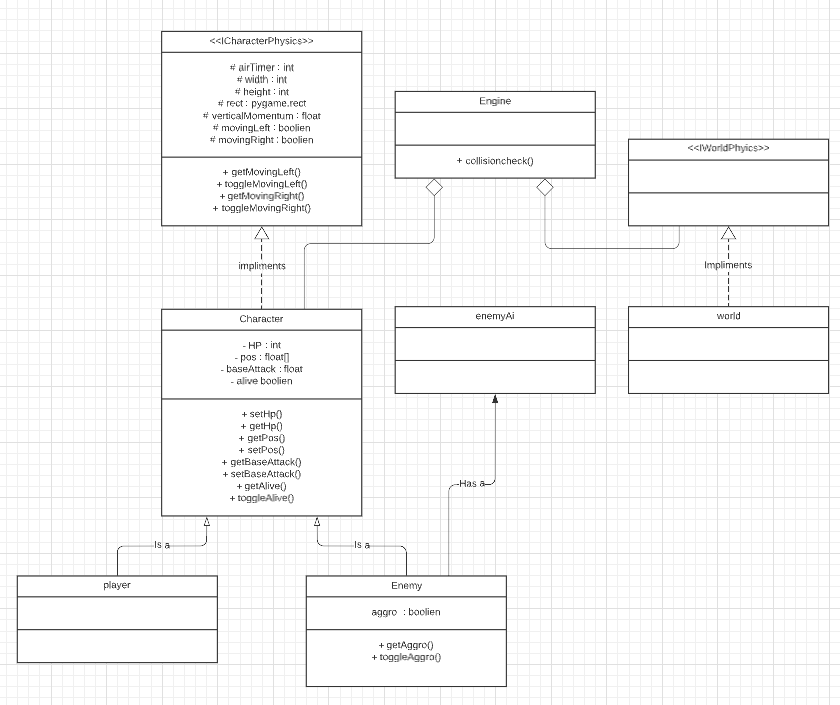
Description automatically generated

**Data Flow diagrams:**

Proposed menu system:

Proposed system for game



**Class diagrams:  
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