

# Game Design Document: Save Thy Body

## Introduction:

Ever since the dawn of civilization, tower defense has been a part of man's life, fighting to defend their territories, or seeking protection from something, it all depended on towers. Since, that is not possible nowadays, we have tower defense games. Some of the popular games are Kingdom Rush, Plants vs Zombies etc., The essence of tower defense is about protecting oneself from enemies

**Genre:** Tower Defense, Strategy, Wave Clearance

**Targeted audience:** 10+

## Gameplay:

Like any other game, "Save Thy Body" too starts with a menu screen. The menu screen contains two buttons, "Start" and "Quit" respectively, and we all know what they do. Upon clicking on the "Start" button, the player is taken to a level selection page, there exist buttons displaying all the levels available in the game from 1-20. Any level can be selected to play. Upon selecting a level, the game begins, displaying the map. The player must navigate the map, to find the spawn location for the creeps and also the organ, that they will attack and destroy. Once the spawn location is found, the player must strategically place towers to protect the organ. The game uses a currency system for the towers. The Tower buttons are found at the right-hand side of the screen, the Blue Tower has the highest range among the available towers. It shoots one projectile at a time and is the cheapest. The Green Tower slows down the creeps, and the Red Tower has burst fire, i.e. shoots multiple projectiles at a time, but has a higher cool down. This tower is the costliest. The creeps spawn in waves, every 25 seconds and there are 5 waves in each level.

## Level Design:

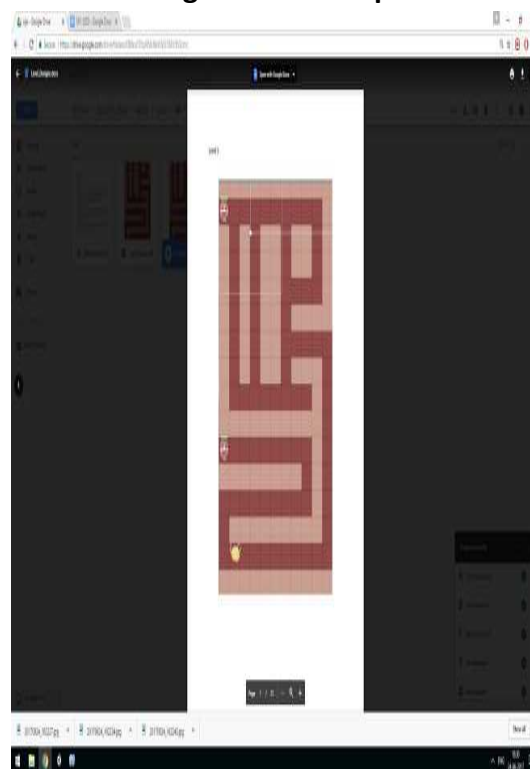
To load a level the level manager would take an input of an integer from the Static Level class which is edited by the game manager. Then the file Level#.txt is loaded. The txt file contains a series of 0(s) and ones separated by a '-'. This defines the Level all the levels of the game.

Examples of the level design:

### Level 1:

```
000000000000-  
111111111110-  
01010010010-  
01010010010-  
01010011110-  
01010010000-  
01010011111-  
01010010001-  
01111111101-  
00000000001-  
11111111101-  
00000000101-  
11111111101-  
10000000001-  
11111111111-  
00000000000
```

**Fig 1: Level1 Map**



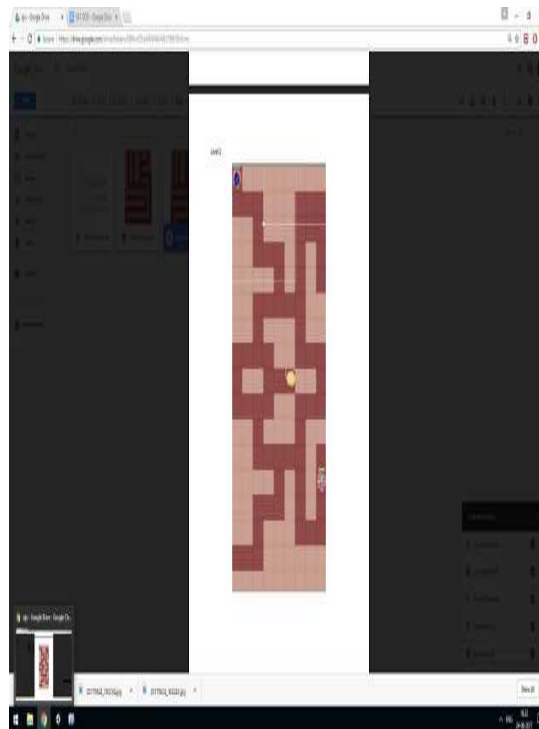
Each row of the text file represents the row to be Created.

0 - refers to peach tile  
1- refers to the red tile

**Level 2:**

100000000-  
111000111-  
001000111-  
001110101-  
000010101-  
001111100-  
001000100-  
111100111-  
100111001-  
111100111-  
001000100-  
001111101-  
000010101-  
001110101-  
001000111-  
111000000-  
000000000

**Fig 2: Level2 Map**



### Level 3:

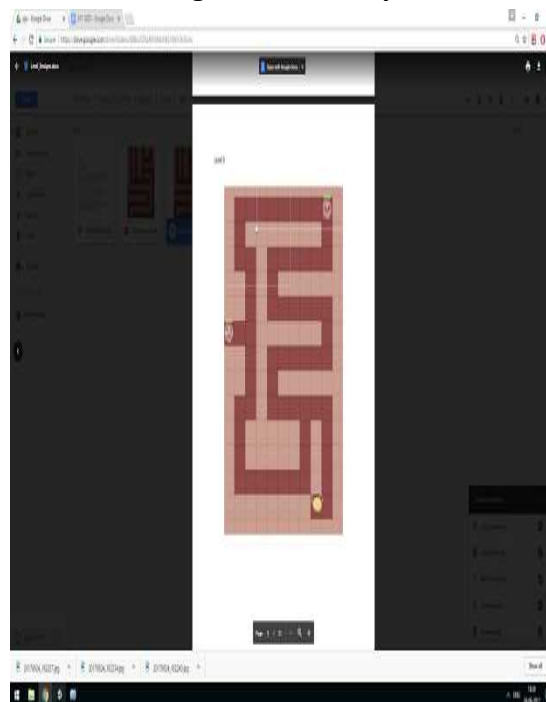
```

00000000000-
01111111110-
01000000010-
01101111110-
00101000000-
00101111110-
11100000010-
00101111110-
00101000000-
01101111110-
01000001010-
01000001010-
01111111010-
00000000110-

```

00000000000

**Fig 3: Level3 Map**

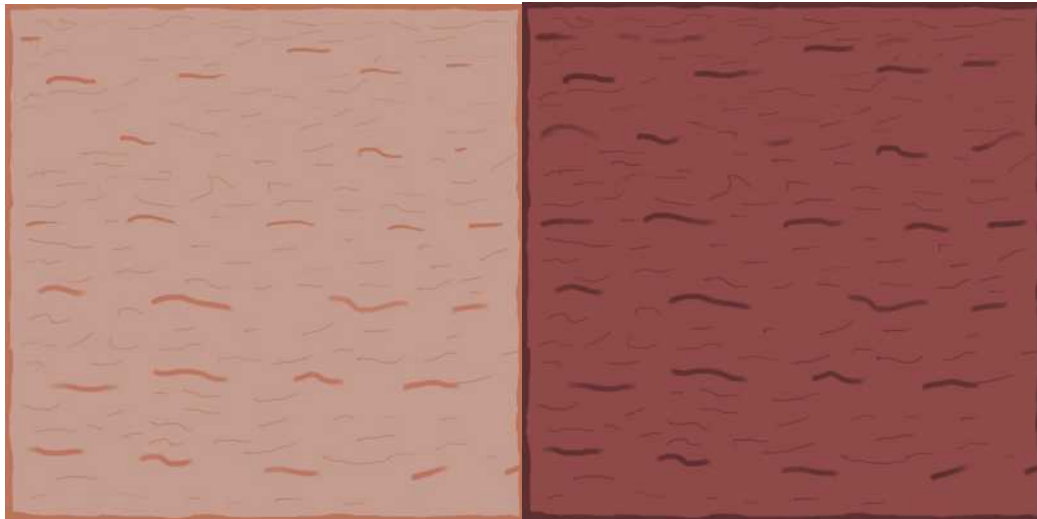


### **Assets and design:**

The assets were designed to represent the internal body structure of a human, mostly the tissues. The tile systems represent the path and the surrounding tissue around the path.

**Fig 4: Peach Tile**

**Fig 5: Red Tile**

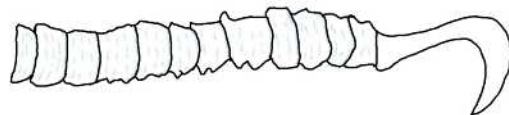


Much work has been put into designing the microorganisms. They are designed to represent their real-life counterparts to a certain extent

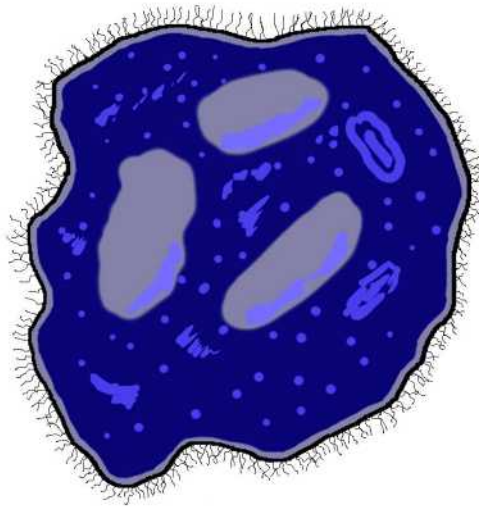
**Fig 6: Virus MoB**



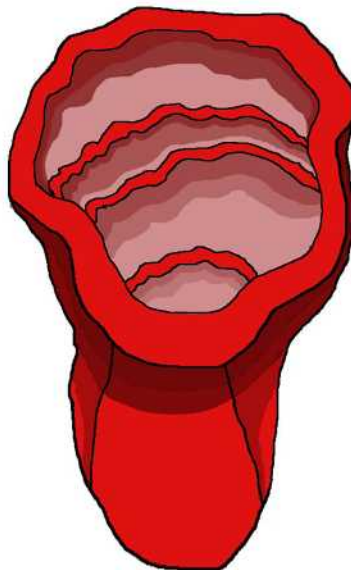
**Fig 7: Parasite MoB**



**Fig 8: Amoeba MoB**

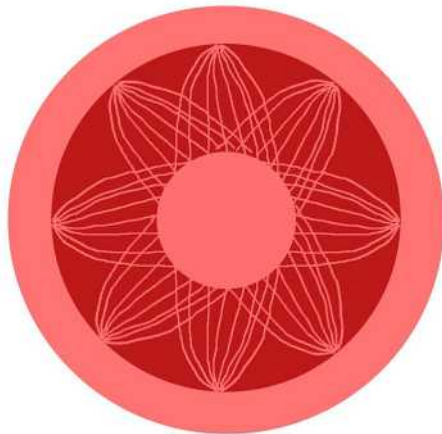
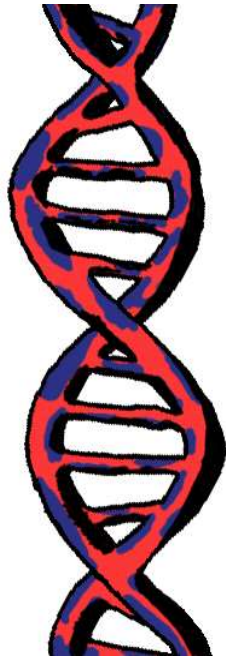


**Fig 9: Tower type 3**



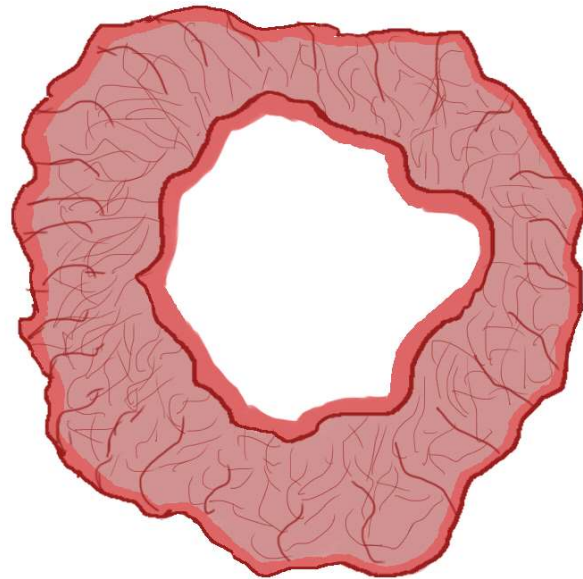
**Fig 10: DNA Helix**

**Fig 11: Bullet type 3**

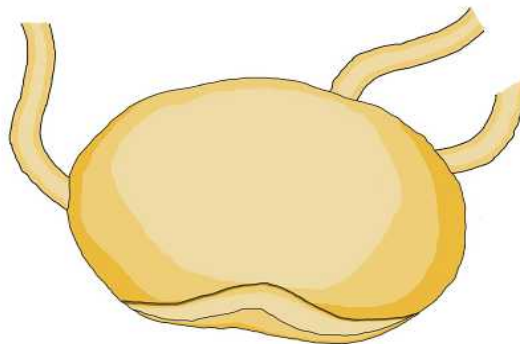




**Fig 12: Spawner**



**Fig 13: Lymph node**



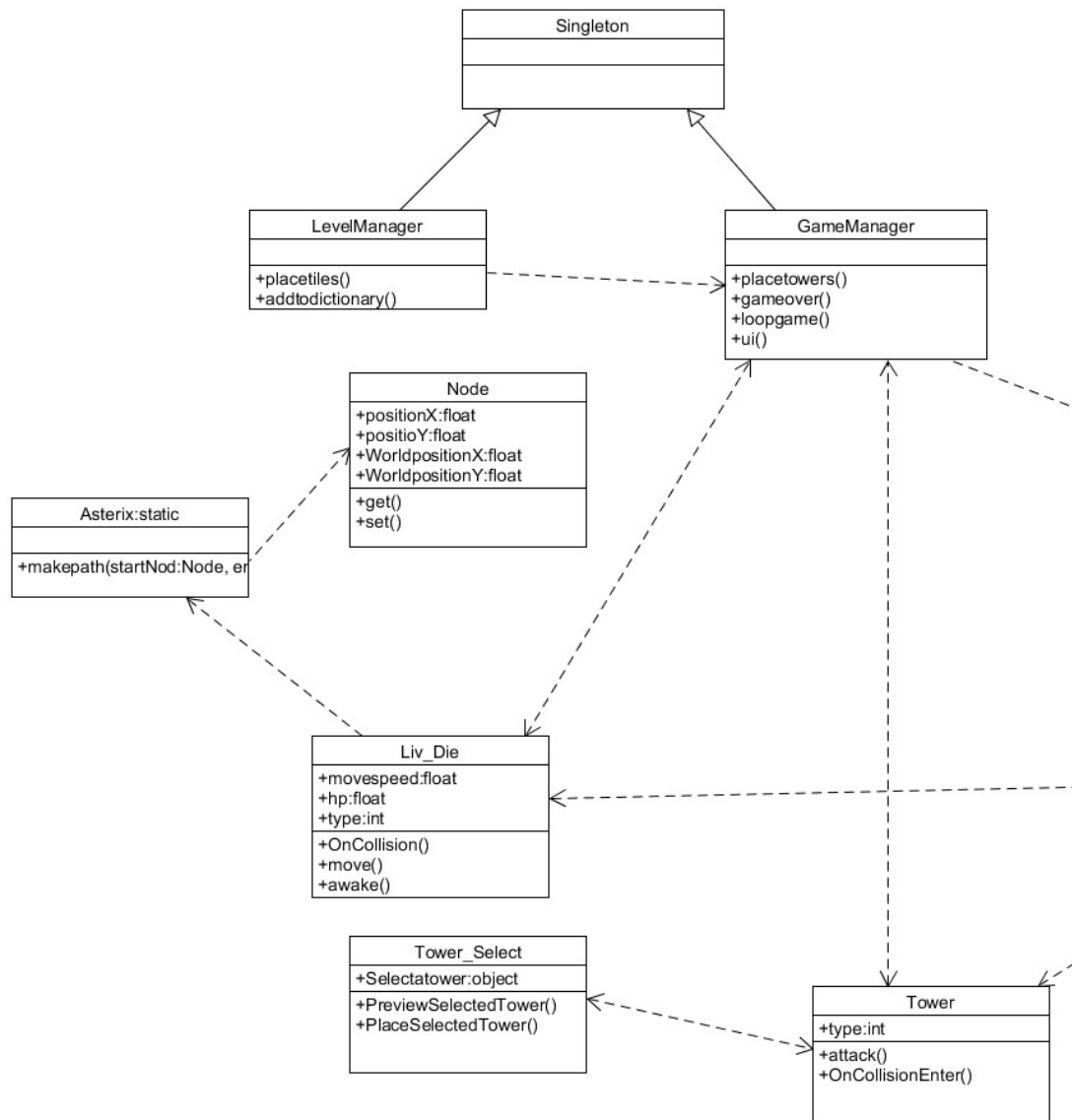
**Fig 14: Health Symbol**

**Fig 15: Tower Type 1**

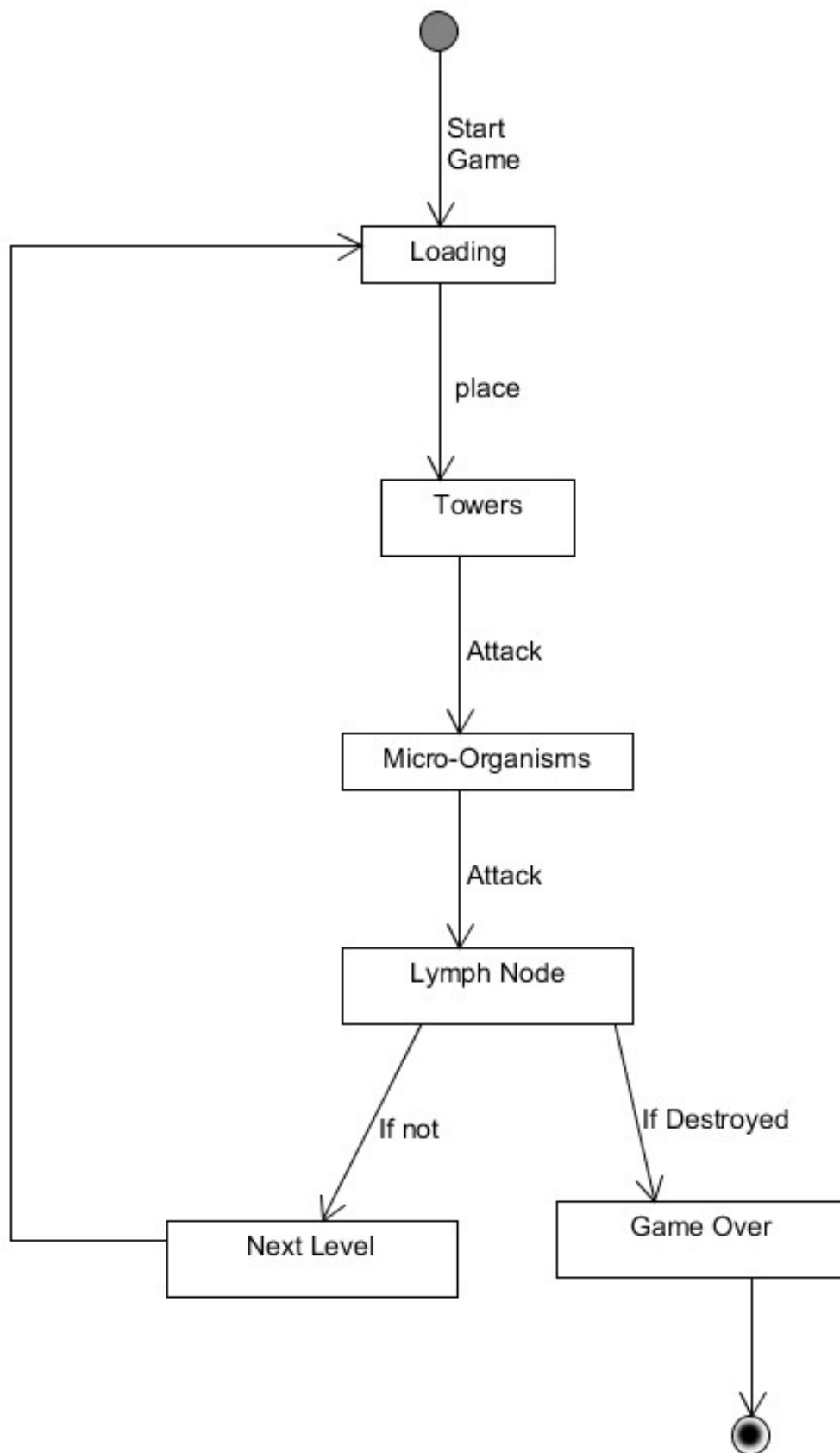




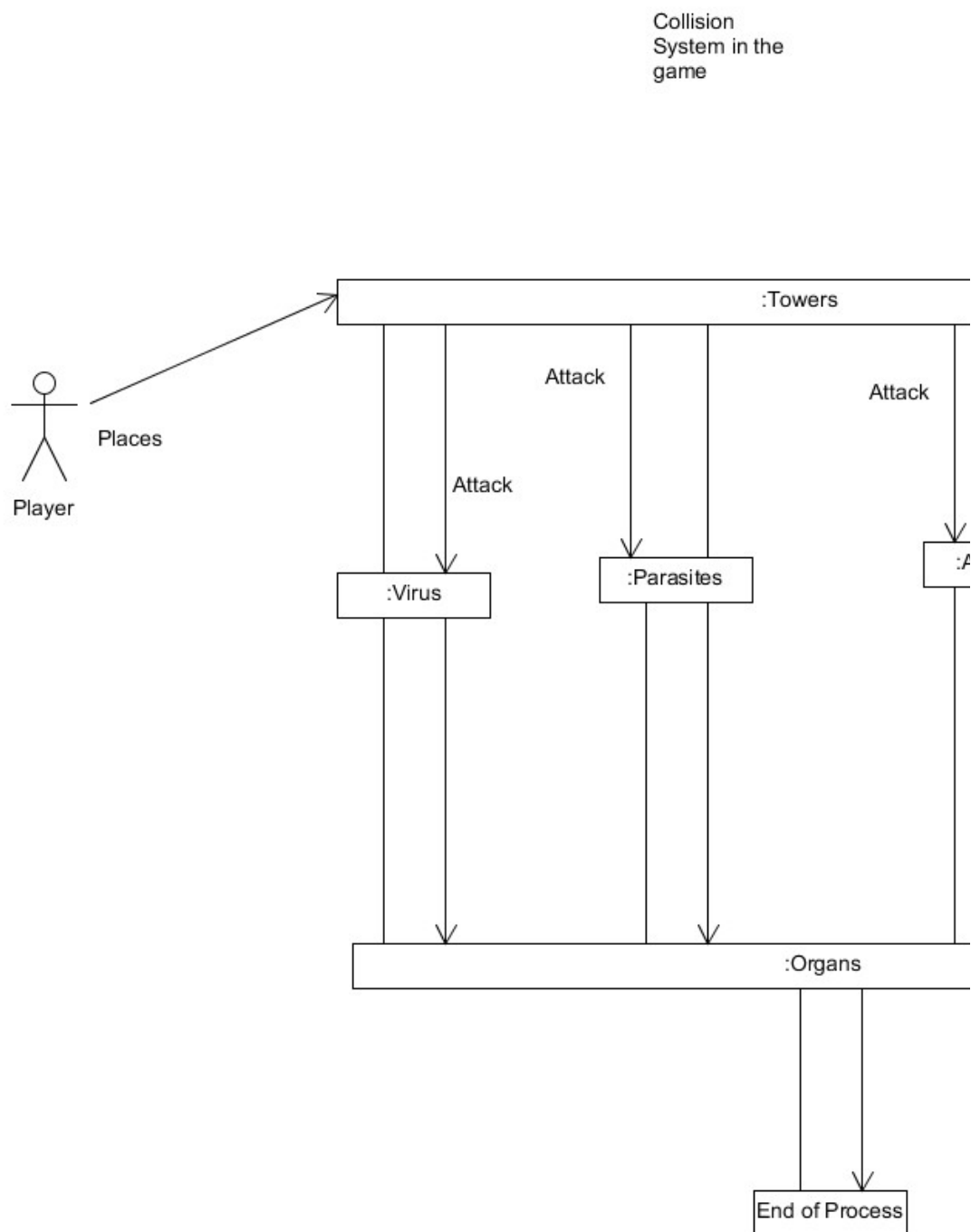
**UML Diagrams created to set the layout to program on:**  
**Class Diagram:**



## Activity Diagram

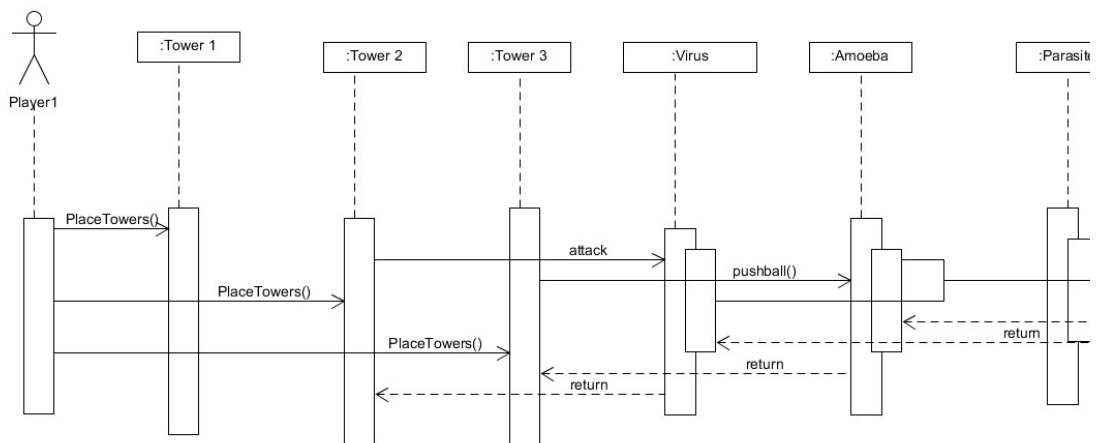


## Collaboration Diagram



## Interaction Diagram

Interaction Between Objects





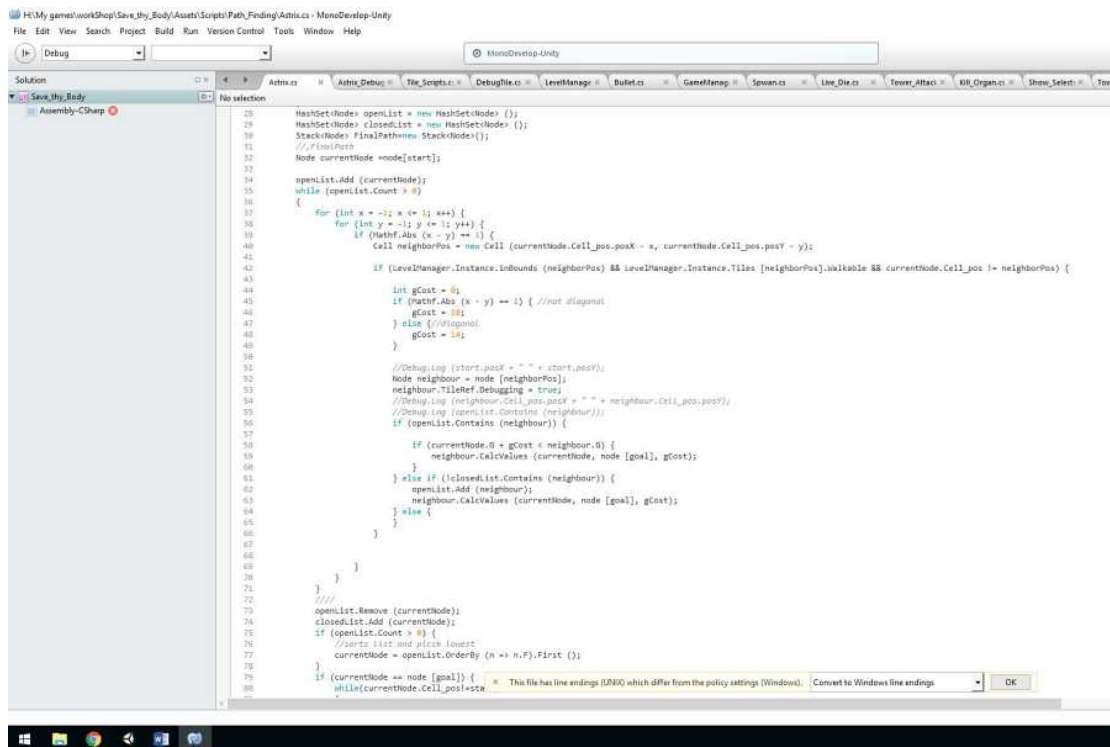
## **Programming and Code Snippets:**

Some of the Class files used in the game are explained below with code snippets

### **Astrix:**

This class implements the A\* algorithm the modification done to the a\* algorithm was to only consider the perpendicular neighbors for its nodes. The Algorithm recursively jumps from node to node until the pointer node is on the destination. After which by backtracking the final path is established.

For path finding

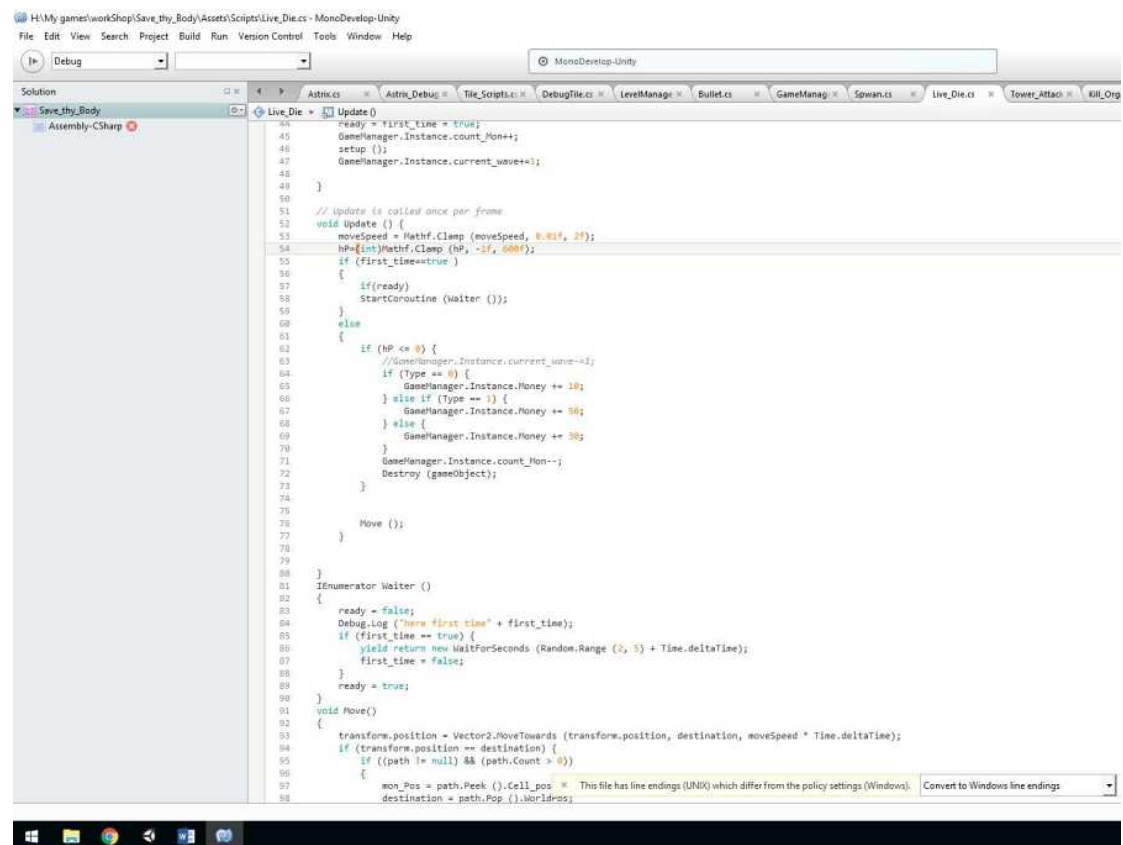


## Live\_Die:

This class dealt with Movement, collision, HP, damage of the MOBs in the game.

This was attached to every monster being created into the game.

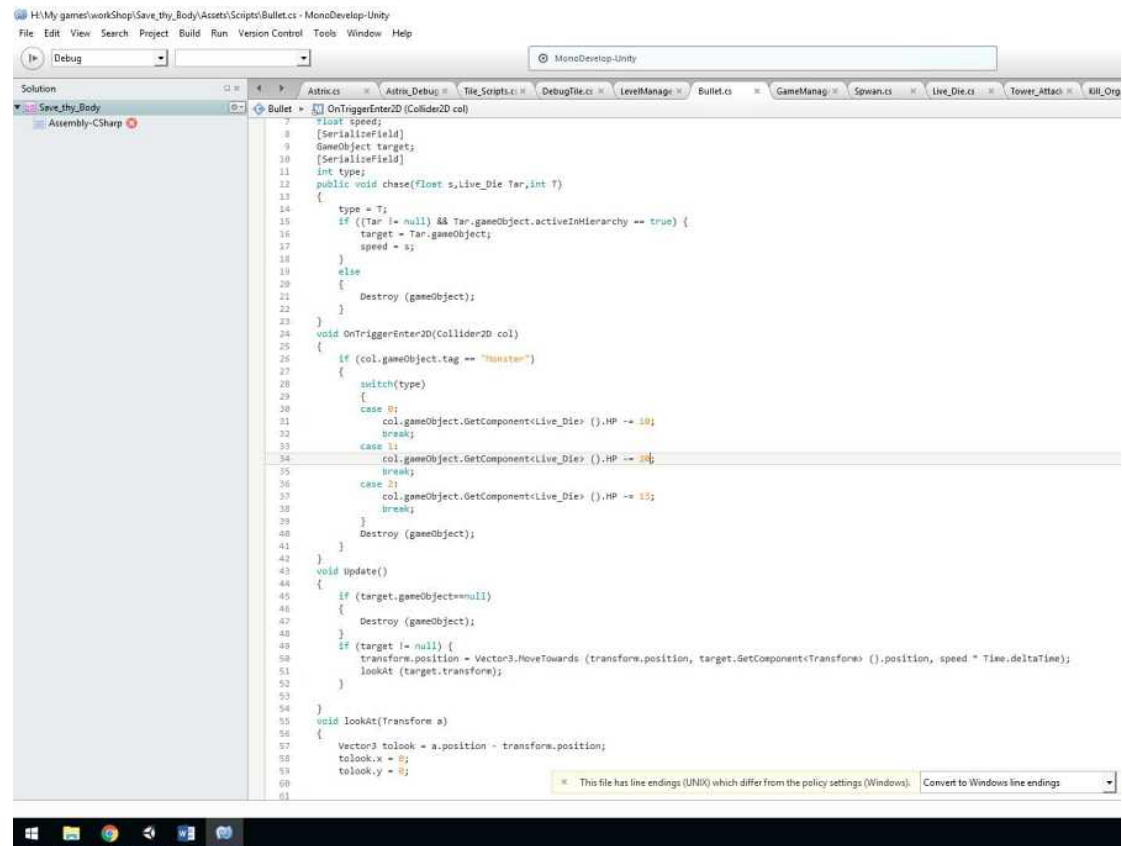
For Monster's behaviour



**Bullet:**

This script was designed for the projectile it defines the damage and move speed of the bullet and what sprite to render.

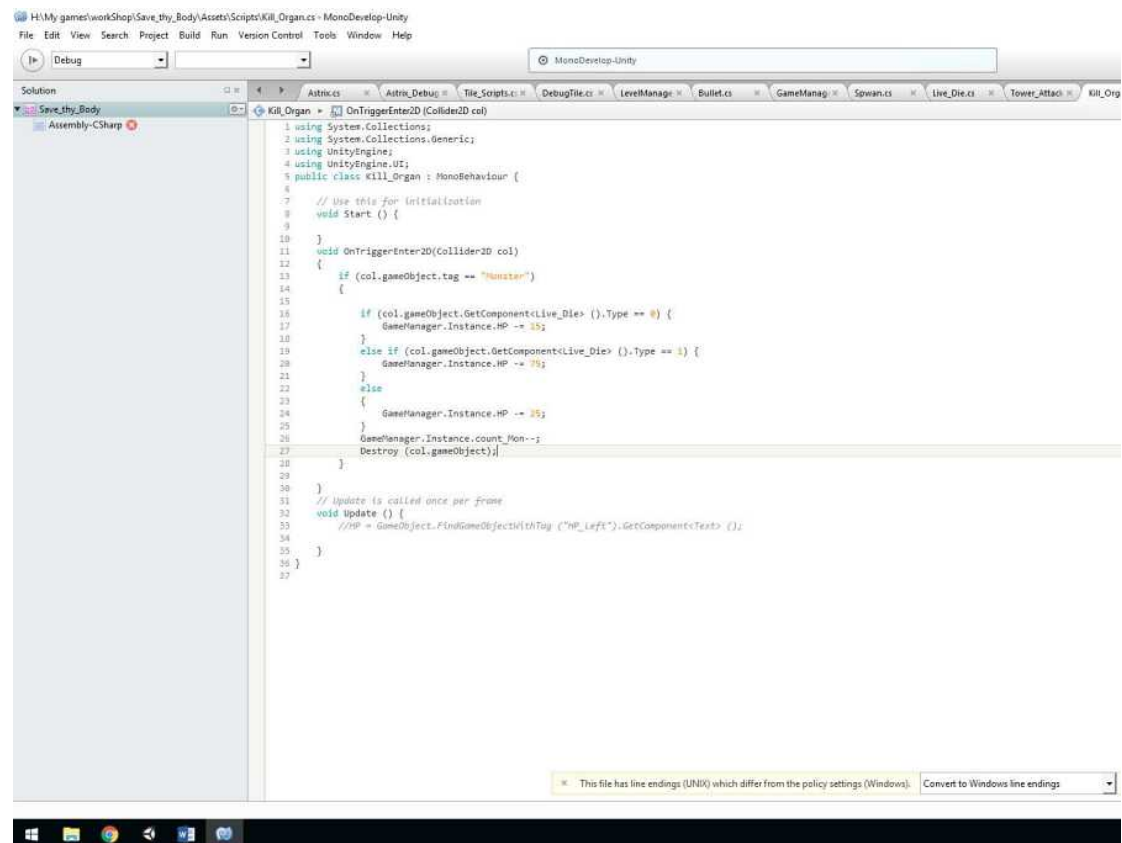
For Bullet Behaviour



## Kill\_Organ:

This class defines the condition of the goal. It is attached to the object players need to protect.

For killing the organ



**Audio and its Selection:**

The game takes place inside the body the ambience must simulate the same. The Body is sick and the universal audible sound of a sick person is coughing. Keeping these in mind the audio was designed to make the player feel as though he was inside the body. The music was also selected to induce horror and mild tension into the player.

The final music file used was an edited and mixed file merges using audacity and the credit for the sources are listed below.

Soundtrack	Author
The Haunting	Tanner Helland
Caves Cave Sound Effect	<a href="https://www.emp3s.co/mp3/cave-sound.html">https://www.emp3s.co/mp3/cave-sound.html</a>
cough_3x-Mike_Koenig-1796660265	<a href="http://soundbible.com">http://soundbible.com</a>
male_cough-Mike_Koenig-144979711	

## Bug Reports:

Alpha Testing For the game : Save Thy Body				
Section Number	Reporter	Bug	Bug Discription/ Fix	Status
1	Sijo	Towers Dont attack	The collision was not detected Becuase it did not have a nidgid body	Fixed
2	Kame	Towers Attack too fast	The attack speed was not balanced	Fixed
3	Sijo	Bullets Try to hit dead targets	The bullet scrip was refering to a Dead object.	Fixed
4	Nitin	The Monsters from other spawners moved incorrectly	The Monsters could not differentiate between the 2 different spawners	Fixed
5	Sijo	Bullets Collide with objetcs	Bullets collide with objects in its path instead of its targets.	To be F
6	Kame	There was a bug while creating level	The spawner coordinated did not fit the new map	Fixed
7	Sijo	Monsters block pathways	When the monsters used a collider they block path ways	Fixed
8	Nitin	The level tiles overlapped	Some of the asset tiles overlaped , resetting pixli per unit fixed this	Fixed
9	Kame	Tile and monster reslution dont match	The import settings needs to be fixed.	Fixed
10	Sijo	Game timer running on pause screen	timescale of the game needs to be set to zero	Fixed
11	Kame	Game starts with the instruction panel	The instruction panel componet must be disabled by default	Fixed
12	Nitin	Players can select their old towers	This highlights the towers range.. confusing layer	To be F
13	Kame	Animation for the amoeba is not fluid	More frames must be added	Fixed
14	Sijo	Animation for the virus is not fluid	More frames must be added	To be F
15	Sijo	After Main menu game taking a very long time to load	Need to add a loading Screen	To be F
16	Nitin	Game does not end even after the lymph node is destroyed	Check the Scene Change Code	Fixed
17	Sijo	The Virus is too fast	The amoeba's buff to virus making it too fast	Fixed
18	Kame	3rd Tower's bursrt fire not beeing seen	all the bullets are instantiated at the same time	Fixed
19	Sijo	The game dose not have level progression	players can access all the levels from the start	To be F
20	Sijo	Bullet and Monsters dont hit each other	Need to add a rigid body to either one of them	Fixed
21	Kame	Earing currency is very Hard	Gold Dropped form Monsters is low.. so every wave 75 currency is awarded to palyer	Fixed
22	Sijo	Spelling mistakes in the Instruction panel	Spellings were wrong in the instruction panel	Fixed
23	Nitin	Monsters staing ontop of organ	Destroy monster if it touches the organ	Fixed
24	Sijo	Bullets collide with eachother	Turn it into a trigger	Fixed
25	Nitin	Camera movement going out of bounds	clamp between world start point and the last tile placed	Fixed

## Look and Feel:

The game is easy on the eye and the art style is compatible with the theme, the music was selected after careful consideration to compliment with the theme. The UI is straightforward and easy to understand.

**For More details refer work file link and individual documents.**

## References

### Audio files:

- Anon, (n.d.). [online] Available at: <https://www.emp3s.co/mp3/cave-sound.html> [Accessed 19 Apr. 2017].
- Koenig, M. (2017). *Cough 3x Sounds | Effects | Sound Bites | Sound Clips from SoundBible.com*. [online] Soundbible.com. Available at: <http://soundbible.com/1863-Cough-3x.html> [Accessed 21 Apr. 2017].
- Koenig, M. (2017). *Male Cough Sounds | Effects | Sound Bites | Sound Clips from SoundBible.com*. [online] Soundbible.com. Available at: <http://soundbible.com/1864-Male-Cough.html> [Accessed 22 Apr. 2017].
- Tannerhelland.com. (2017) [online] Available at: <http://www.tannerhelland.com/dmusic/TheHaunting.mp3> [Accessed 22 Apr. 2017].

### Path finding

- Dotnetperls.com. (2017).[online] Available at: <https://www.dotnetperls.com/dictionary> [Accessed 20 Feb. 2017].
- En.wikipedia.org. (2017). Pathfinding. [online] Available at: <https://en.wikipedia.org/wiki/Pathfinding> [Accessed 15 Apr. 2017].
- En.wikipedia.org. (2017). Software design pattern. [online] Available at: [https://en.wikipedia.org/wiki/Software\\_design\\_pattern](https://en.wikipedia.org/wiki/Software_design_pattern) [Accessed 1 Mar. 2017].
- Tower Game Tourorials. (2016). [video] Available at: [https://www.youtube.com/playlist?list=PLX-uZVK\\_0K4uNwvKian1bscP9mVvOp1M](https://www.youtube.com/playlist?list=PLX-uZVK_0K4uNwvKian1bscP9mVvOp1M) [Accessed 5 Feb. 2017].