

SPACE WAR

GAME DESIGN DOCUMENT

1. Title – SPACE WAR

2. **Backstory** - Strata249, a planet located in the depths of space is under attack. Van, a smart and an intelligent alien is caught amid the deadly attack but manages to escape death narrowly and takes over an abandoned spaceship called The Helicon. With little knowledge on how to operate the ship, he wanders in space. His goal is to reach a safer and a friendlier planet. What he is unaware of is the enemies he has to face throughout his journey.

3. Game Overview

- Game Concept- The game is a 2D shooter game where each level involves Van escaping and shooting for his life and defending himself against enemy attacks who want to capture him. His goal is to reach a safer and a friendlier planet.
- Genre- Action-Adventure
- Target Audience- 3+ years
- Look and Feel – Visuals are of space which changes every 3 levels.

4. Characters and objects in the Game

- Player Spaceships – Van, the hero of our game, is an intelligent alien who is in search of a safer planet and in order to travel through space, he needs to find/earn the strongest ship possible.

- The Helicon – The ship as mentioned before is a strong one, but Van loses one health point every time the enemy ship or its bullet touches The Helicon. Hence, Van has to navigate through space very carefully in order to survive.

- Stats

- Life points – 5
- Rate of Fire – 500ms
- Speed – 250 kms/hr
- Can only fire Bullets



- Upgrade 1 – This ship costs 200 Space Gold and can be bought from the store.

- Stats

- Life points – 6
- Rate of Fire – 475ms
- Speed – 300 kms/hr
- Can only fire Bullets



- Upgrade 2 – This ship costs 500 Space Gold and can be bought from the store.

- Stats

- Life points – 7
- Rate of Fire – 450ms



- Speed – 350 kms/hr
- Can fire Bullets and rockets

- Upgrade 3 – This ships costs 700 Space Gold and can be bought from the store.

- Stats
 - Life points – 8
 - Rate of Fire – 425ms
 - Speed – 400 kms/hr
 - Can fire Bullets and rockets



- Upgrade 4 – This ships costs 1000 Space Gold and can be bought from the store.

- Stats
 - Life points – 9
 - Rate of Fire – 400ms
 - Speed – 450 kms/hr
 - Can fire Bullets and rockets at the same time



- Upgrade 5 – This ships costs 2000 Space Gold and can be bought from the store.

- Stats
 - Life points – 10
 - Rate of Fire – 375ms
 - Speed – 500 kms/hr
 - Can fire Bullets and rockets at the same time



- Objects

- Collectibles: All the collectibles travel from top to bottom of the screen with the same speed as the background.

- Spanners – If the life of the player reaches 0, its Game over. Spanners appear randomly and Van can collect them to increase health points. For each spanner collected, Van gets one health point.



- Space Gold - Space currency which can be used to buy upgrades from the store.

- Yellow - collecting one of these gives 10 Space Gold. Player can expect maximum of 20 Yellow space gold every level. Scattered randomly throughout the game world.






- Red – collecting one of these gives 50 Space Gold. Certain enemy ship (randomly selected) when



destroyed drops a red gem.

- PowersUps – Player can expect maximum of 3 random PowerUps for every level. For every 5th to 10th enemy killed, there is a probability that a power up is dropped.

- Bullet upgrade – Gains power to shoot multiple bullets at a time for 10 secs. For example –

- 1st  = can fire 2 bullets at a time.
- 2nd  = can fire 3 bullets at a time.
- 3rd  = can fire 5 bullets at a time.

To gain this bullet upgrade permanently, player can buy it from the store each for 100.

- Rate of Fire – increases player Rate of Fire for 10 secs.



- Paralyze – stops enemy bullets for 10 secs.



- Shield – Gives the player the power of invisibility for 20 secs. No enemy ship or enemy bullet can hit the player during those seconds. Can activate by K key.



- Weapons

- Bullets – Infinite bullet weapon possessed by both the player and the enemy ships. Enemy ships fire red bullets randomly and at random speed whereas the player ship gives firing control to the player, who can shoot blue bullets using space bar key. The player by default can shoot only one bullet at a time unless one of the powers is collected.



- Laser – Boss enemy secret weapon used during the combat. If the laser hits the player, two life points are lost instead of one.



- Purple Bullet – can be used by player. Does two damage to instead of one. Can be helpful while fighting Boss enemies.



- Green Bullet – can be used by player. Does three damage to instead of one. Can be helpful while fighting Boss enemies.



- **Rockets** – They are kind of weapon which are launched in the direction of the enemy. It will be in the direction of the enemy ship spawned first. This can be bought from the store for 20 Space Gold. Player can use this weapon by pressing the H keyboard key



- **Star Fire** - Burst of number of bullets which can be used by the player to escape tight situations. This can be bought from the store for 50 Space Gold. Player can use this by pressing the J keyboard key.



- **Enemies** - The number of enemies generated is dependent on the level. And hence I've used a formula $Mul = 1 + (0.2 * (level - 1))$ which can be used to calculate number, speed and location of the enemies.
 Number – $5 * Mul$ per wave.
 For Example: For level 5, Mul will be $1 + (0.2 * (5 - 1)) = 1.8$ therefore the number of enemies per wave will be $5 * 1.8 = 9$
 Waves are unlimited per level till the player achieves a certain score to move to the next level.

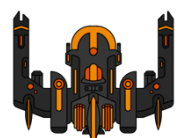
- **Valiant** - An old spacecraft that shoots red lasers bullets in the direction it is facing. Valiant comes with self-destruct and will detonate if a foe crashes into it, killing itself and the foe. They have one life point. Speed and location of Valiant is calculated using the Mul variable and a random function.
 Speed – $(100 * \text{Math.random}() * 0.02) * Mul$
 Location – $(\text{rand}(70, 770), \text{rand}(-100, -30))$



- **Exterminator** – An unmanned modern lightweight suicide bomber that moves at incredible speeds and destroys any opponent it crashes into. The exterminator will only move in a straight direction from where it spawns. It does not follow the player rather it moves at very high velocity and is hard to dodge. They also have one life point. Speed and location of Exterminator is calculated using the Mul variable and a random function.
 Speed – $(100000 * \text{Math.random}() * 0.02) * Mul$
 Location – $(\text{rand}(70, 770), \text{rand}(-100, -30))$



- **Missouri** – A ship with a brain, aims its bullet in the player direction. This enemy will only move in a straight direction from where it spawns. However, this enemy appears only after level 3 is completed and have one life point as well.
 Speed – $(200 * \text{Math.random}() * 0.02) * Mul$



Location – (rand(70,770), rand(-100,-30))

- Subtle – A highly powerful canon which stays stationary in space and shoots destructive heat seeking rockets which take away two health points for every hit. Also has very strong defense mechanism requiring at least 10 hits to destroy.
Speed 0
Location - (rand(70,770), rand(-100,-30))



- Combat Enemies –

- Boss 1 - appears after level 3 is completed. Player gains 10 score points if destroys Boss 1.
 - Number – 1
 - Weapon capability – Bullets
 - Life points – 10
 - Movement – moves right and left on x-axis.



- Boss 2 - appears after level 6 is completed. Player gains 20 score points if destroys Boss 2.
 - Number – 1
 - Weapon capability – Bullets and rockets
 - Life points – 20
 - Movement – moves right and left on x-axis



- Boss 3 - appears after level 9 is completed. Player gains 40 score points if destroys Boss 3.
 - Number – 1
 - Weapon capability – Bullets and laser
 - Life points – 30
 - Movement – moves right and left on x-axis



- Boss 4 - appears after level 10 is completed. Player gains 100 score points if destroys Boss 4.
 - Number – 1
 - Weapon capability – Bullets, laser
 - Life points – 50
 - Movement – moves right and left on x-axis



5. Gameplay

- Objectives – The main objective is to survive and navigate through space to find a safer planet. But there is a catch - to successfully complete any level, Van needs to destroy a certain number of enemy ships and not lose all health points.

- Play Flow – The Helicon will move in all directions in a 2D environment where it will collect collectibles and dodge enemy ships and bullets. Different enemy ships will travel top to bottom of the screen at different speed shooting bullets and each time player is attacked by the enemy ship or it's bullet, Van also loses a health point. If the health point hits 0, Game Over and will have to start the game again.
- Rules - Van starts with the helicon ship with 5 Health points, with each hit of any enemy or it'sbullet, Van will lose one health point. Van can also collect collectibles scattered throughout his journey to increase his health points, buy upgrades. To advance to next levels, Van needs a certain number of enemy ships destroyed which is discussed in detail in the Levels section of this document. As the level increases, the enemy ship increases.
- Store – The store can be accessed by Pause->Store in the pause UI. The store will contain
 - Spaceship upgrade
 - Upgrade 1 – 200 Space gold
 - Upgrade 2 – 500 Space gold
 - Upgrade 3 – 700 Space gold
 - Upgrade 4 – 1000 space gold
 - Upgrade 5 – 2000 space gold
 - Weapon upgrade
 - Purple Laser – 1000 Space Gold
 - Green Laser – 2000 Space Gold
 - Buy Rockets – 20 Space gold
 - Buy Star Fire – 50 Space gold
 - Power Up
 - Bullet Upgrade – 1000 Space Gold
 - Rate of Fire – 1000 Space Gold
 - Paralyze – 500 Space Gold
 - Shield – 500 Space Gold
- Database – Username, password, highest Score and highest and all other game variable will be stored to the local storage.

6. Levels

- Van starts with a Score of 0. To advance to next levels, he needs a certain number of enemy ships destroyed. His Score increases by 10 for every ship

destroyed and hence for

- Level 2 he needs a score of 200 (20 ships destroyed),
- Level 3 he needs a score of 300 (30 ships destroyed),
- Level 4 he needs a score of 400 (40 ships destroyed) and so on.

As levels increase the number of enemy ships increases too and hence it becomes harder to navigate through the journey without losing any healthpoints. For this assignment, I've implemented 10 levels.

- For Assignment 3, I've implemented 4 new levels which are one on one combat with the Boss enemy 1, 2, 3 and 4
After completion of every 3 levels, there will appear the Boss enemy and the player has to destroy this enemy and not lose all life points.

For Example

- After level 3 – Boss 1 will appear
- After level 6 – Boss 2 will appear
- After level 9 – Boss 3 will appear
- And finally, after completion of level 10, Boss 4 will appear.

If the player destroys Boss 4, he wins the game. He can do so by collecting collectibles and upgrading weapons and ships.

7. HUD and Mechanics

- HUD
 - Top left
 - Score - Number of enemy ships destroyed.
 - Audio control
 - Bottom left
 - Level Number
 - Health Points
 - Space Gold
 - Centre
 - Indicator of health point lost (Blue to Red) or Health point gained by collecting spanner (Blue to Green).
 - Top Right
 - Pause
 - Space Shop
 - Bottom right –
 - Number of Collectibles
 - Number of powerups bought
 - Number of Shield bought
 - Number of Rockets bought
 - Number of Star Fire bought
- Controls
 - Movement in the game –
 - Right arrow key – To move right on the screen
 - Left arrow key – To move left on the screen

- Up arrow key – To move up on the screen
- Down arrow key – To move down on the screen
- Spacebar – To shoot Bullets.
- H key – Rocket launch
- J key – Star Fire launch
- K key – Activate shield
- R key - Restart

8. Game Flow Chart

