Project4 – Reflection Document

## Project overview:

### Theme :

High thriller Police action.

### Goal:

To catch & kill the most wanted criminal in the world.

### Background:

Hero is a Police Officer, who goes through 6 levels of extreme difficulties to catch the criminal.

Each level is filled with unique difficulties for our Hero to endure. Hero needs to defeat the Guards, Ninja & the Criminal(Boss) to win the game.

Each level will have a new enemy. After killing all the enemies, a key appears on the space. Hero needs to pick up the key to open the door. If the key is not picked up, then the door remains to be closed, and the Hero can’t enter the next level

### Gameplay components:

1. Space tracker: Each space our Hero will be in is tracked using a banner displayed on top of the screen. Also, when space/level ends, there will be a clear indication that the current space (level) is ending, and the new one is beginning. Only one the user presses the key; it will move to next space.
2. Container: Hero carries a gun, that would be the container for this game. He needs to reload the Gun by picking up the Bullets, that are scattered over the Space. For every kill of the enemies, the bullet count decreases.

For example, number of bullets to kill an enemy is as follows:

Guard: 1 Bullet

Ninja: 2 Bullets

Criminal/Boss: 3 Bullets

1. Time limit: Limit for this game is calculated by the number of steps the Hero takes before reaching the Exit Door. For every step taken, the step count limit decreases which would be clearly shown in each screen. Once Hero reached the step limit, the game ends.
2. Interaction with space structures: There are Mines, Bullets that are scattered over the space. Hero needs to pick the bullets to kill the enemies, and he should be wary of the Mines to stay away for them. Stepping on Mine would instantly kill him

### Objects that Hero will interact are represented as follows:

Hero representation: @

Guard representation: G

Bullet (set of 3) representation: B

Mines representation: X

Ninja representation: N

Boss (Criminal) representation: C

## 

### Movement of the Hero:

Movement of the Hero can be controlled using 'w', 'a', 's', 'd' buttons on the keyboard.

If you have played First Person Shooter games, then this should be a walk in the park for you.

If not, no worries, there are clear instructions on each screen to guide you through each level.

## Design Description:

The way I have designed the game is as follows:

Space:

Space is an abstract base class, which contains all the objects and the functions to interact with the objects in each Space.

Each Space will have four pointers top, left, right, & bottom. However, in my game, only the right pointer is initialized to the next Space, as those represents each level. Other pointers are initialized to NULL. Hero can enter the next level through Exit Door after completing all the tasks and picking up key in the current level.

Levels:

There are six levels in the game. Each levels are derived from the Space class, and implements pure virtual functions declared in abstract base class, Space, and also implements few other unique functions.

Level1 & Level2 would contain guards (to defeat), Bullets (to reload the gun), Key (appears after defeating all the guards), and an Exit door (opens after picking up the keys)

Level3 & Level4 would contain all the things in Level1 & Level2, plus a Mine (would kill the user if stepped on it)

Level5 would contain all the things in Level1 & Level2, plus a Ninja (powerful than guards, Hero needs to defeat him)

Level6 would contain all the things in Level1 & Level2, plus a Criminal (powerful than Ninja, Hero needs to defeat him)

## Test plan & Results:

### Level1/Space1. & Level2/Space2

|  |  |  |
| --- | --- | --- |
|  | Action | Verification |
|  | Board size – 15 X 15 | Verified |
|  | Player location – always starts with 0,0 | Verified |
|  | Banner to display the level on top | Verified |
|  | Instructions about object description on the top for each step | Verified |
|  | Player status: Number of bullets left, Level location, Step count | Verified |
|  | Number of guards | Verified |
|  | Number of Bullets | Verified |
|  | Killing a guard with bullets | Verified |
|  | Decrease bullet and guard count after the kill | Verified |
|  | Picking up bullets | Verified |
|  | Increment bullet count by 3 after picking each bullet packs | Verified |
|  | Key to appear after killing all the guards | Verified |
|  | Door should not open before picking up the keys | Verified |
|  | Door opens and level1 completes after opening the door | Verified |
|  | Hero dies if he tries to kill the Guard with no bullets in Gun | Verified |
|  | Game end banner with reason for game end | Verified |
|  | Option to restart from the the same place | Verified |
| 18) | Game ends if Hero doesn’t open the door within step count | Verified |

## Level3/Space3 & Level4/Space4:

|  |  |  |
| --- | --- | --- |
|  | Action | Verification |
| 1) | Verified all the things mentioned for Level1 & Level2 | Verified |
| 2) | Mines appear on the space | Verified |
| 3) | Hero dies when stepped on the Mine | Verified |

### Level5/Space5:

|  |  |  |
| --- | --- | --- |
|  | Action | Verification |
| 1) | Verified all the things mentioned for Level1 & Level2 | Verified |
| 2) | Ninja appears on the space | Verified |
| 3) | Hero needs 2 bullets to kill a Ninja | Verified |
| 4) | Hero dies if he has less than 2 bullets when he tries to kill Ninja | Verified |

### Level6/Space6:

|  |  |  |
| --- | --- | --- |
|  | Action | Verification |
| 1) | Verified all the things mentioned for Level1 & Level2 | Verified |
| 2) | Criminal (Boss) to appear on the space | Verified |
| 3) | Hero needs 3 bullets to kill the Criminal | Verified |
| 4) | Hero dies if he has less than 3 bullets when he tries to kill the Criminal | Verified |

## Reflection:

Things I have learned with this project:

1. Pure virtual functions
2. State retention when Hero dies and wants to replay
3. Design process with end-to-end visualization

Overall this project has strengthened my design & coding skills.