



Lappeenranta University of Technology

Fundamentals of Game Development

CT60A5400

ROYAL PLACE

Game Design Document

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1. Executive Summary, Quick overview

Enemy battle tanks arrive to invade the Royal Palace and the player must position the soldier on the front line and attack the battle tanks of the enemy while preventing them from entering the Royal Palace.

2. Target Audience

This game is designed to entertain young children.

3. Main Characters

Enemy battle tanks



At a time, each of five battle tanks enter the premises of the Royal Palace through the first entrance of it., Enemy can destroy the Royal palace and Soldier must shoot at least five times to destroy a battle tank

State Soldiers

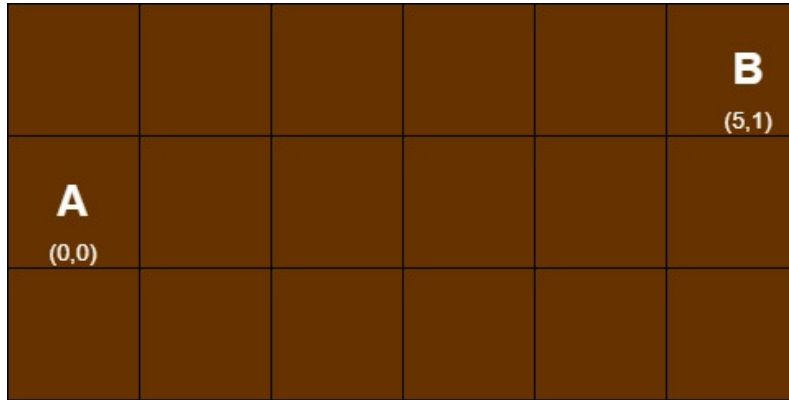


Soldiers attack and destroy enemy battle tanks preventing them from entering the Royal Palace. Soldier has an ability to get the correct target and move weapon to the target. Moreover, Soldier has a pre- predefined range(distance) for shooting.

4. Main Feature

4.1 Main mechanics

It is expected to build up the main mechanism using the Waypoint Pathing System in the Unity game engine.



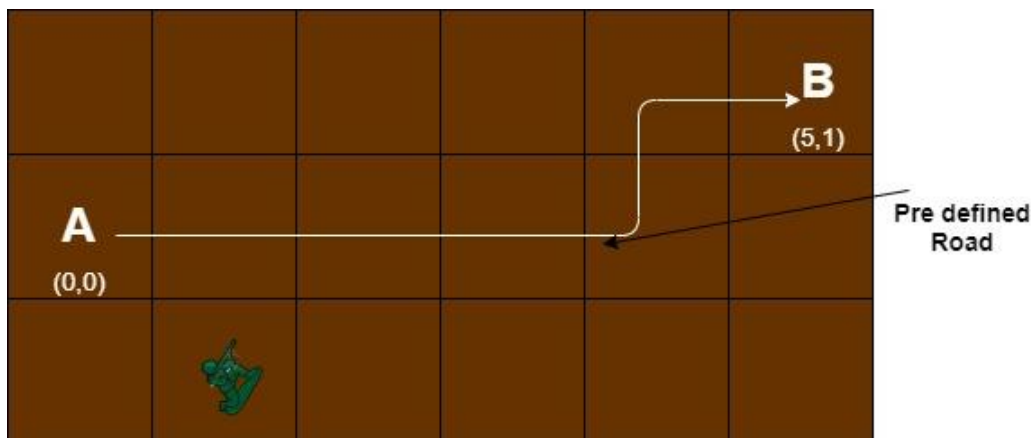
As shown in the Grid above, the path required to reach from the Game object (Enemy) at position A to the position B is developed with the support of Waypoint.

It is designed to position other game objects (Soldiers) anywhere on either side of the road with the help of Waypoint.

4.2 Movements

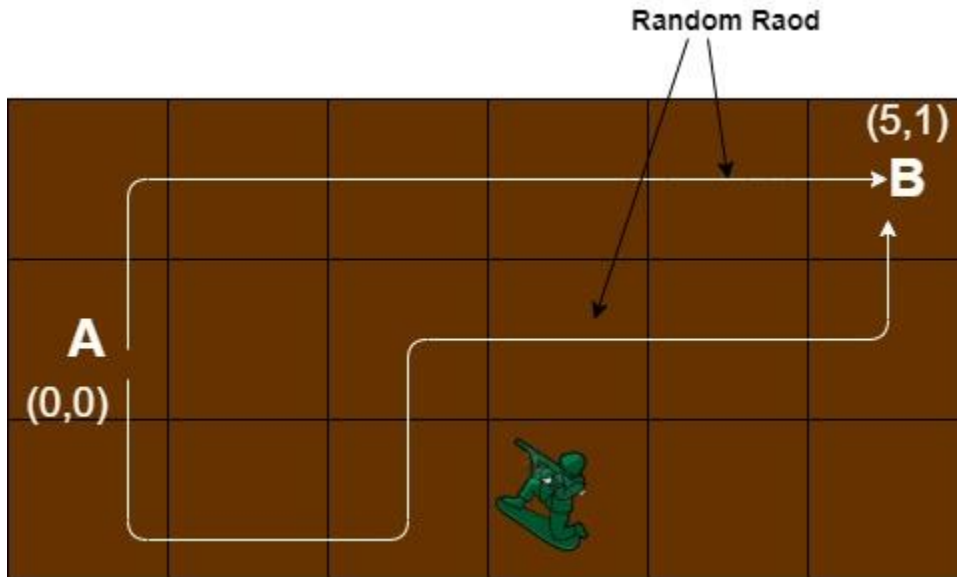
Proceeding on a pre-defined path

In the first level, enemy battle tanks try to enter the Royal Palace through a pre-defined path.



Proceeding on a randomly selected path

At level 2, enemy battle tanks do not follow a pre-defined path, but attempts to enter the Royal Palace via a randomly selected path.



It is expected to use the Breadth first search algorithm for this purpose. The main reason for using this algorithm is that it helps to identify shortcuts (path) and use multiple paths ending points for enemy.

Soldier movement

Soldiers positioned are automatically rotated to the direction of the enemy battle tanks (Player does not need to move or rotate the soldier)

4.3 Physics

Collision detection

The colliders system is used to detect the attack of the soldiers on enemy battle tank.

In addition, this system includes the facilities which enable the soldiers to aim at the right target and determine the range at which they can attack.

Further, inability to attack amidst obstacles is another feature.

E.g., Attacks on enemies do not pass through the trees, the trees act as a barrier

Particle system

The Particle system is used to indicate the firing of soldiers, to blast enemy battle tanks and the Royal Palace.

4.4 Multiplayer mode

Multi player mode is not included. Only one player can play alone.

5. Genre, Concept Art book

Genre – Defense game

Concept

The main concept hereof has been designed using Tower defense games such as “Relam Rush”

6. Enemies, NPCs, Other Objects

Enemies - Battle tanks

NPCs – Non player characters are tress, rock and other obstacles

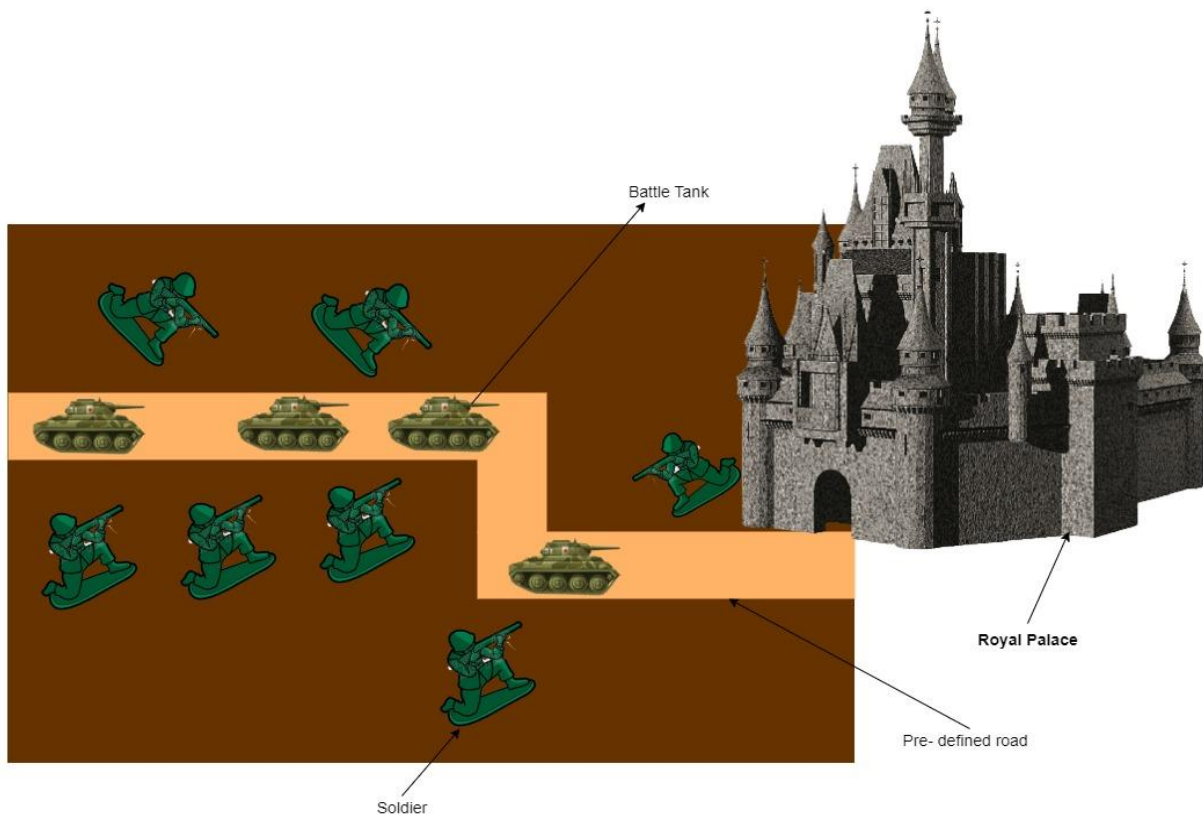
7. Story board, script

7.1 Story overview

This game consists of two levels, at the first level, enemy battle tanks enter from the first entrance of the Royal palace,

Here, the soldiers represent the front defensive line of the palace, and their task is to prevent the enemy battle tanks to enter the Royal palace.

7.2 Progression Level 1



At the time of starting the game, only two soldiers can be positioned to attack enemy battle tanks and the player will get points when they destroy the tanks.

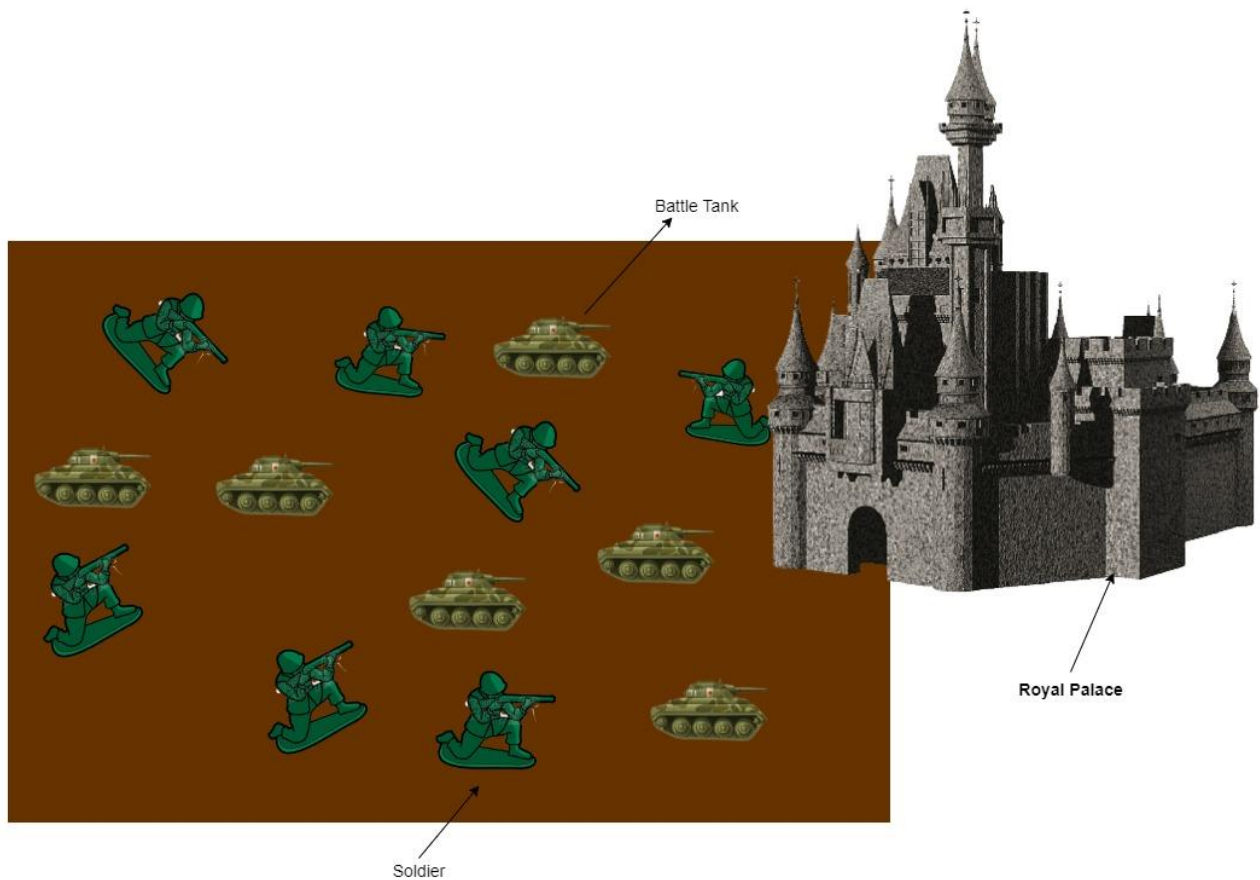
In the initial stage, the soldiers must launch five attacks to destroy one enemy tank.

Five shots to destroy the first enemy tank, six shots to destroy the second tank, and seven shots to destroy the third tank and the number of attacks to destroy a battle tank will also increase as per the time and the number of enemy tanks coming in.

Upon the scores the player gets by destroying enemy tanks, additional soldiers can be placed to attack the enemy battle tanks. At the first level, enemy battle tanks arrive through a pre-defined path, so the player can easily position soldiers to attack enemies.

Once five enemy battle tanks enter to the second entrance of the Royal palace, the enemy will blast the palace and thereby the player will lose the game.

7.3 Progression Level 2



In the second level, though the enemy battle tanks enter from the first entrance, but unlike in the first, the enemy battle tanks try to enter the Royal palace through a random path.

At the first occasion, the enemy tanks have a single entrance to the Royal palace, but this time there are two gates.

Not like in the first occasion, after two tanks enter the Royal palace and then enemy blast the place, then the player will lose the game.

To win the game, Player must prevent more than four enemy battle tanks from entering the Royal palace and score points by blasting battle tanks coming towards the e Royal palace.

8. Technical definitions, Tech guide

8.1 Platforms

Windows / Mac

8.2 Control Scheme

Soldiers can be positioned by using mouse (Right click)

Space key can be used to fire – For soldiers

8.3 Tech guide

This game is designed using unity and mid-range CPU and GPU are needed to run this game on Windows or Mac platform

9. Outsourced/Bought Assets

Unity standard assets pack

Free assets from unity assets store

Sound effects from <https://freesound.org/>

References

1 Enemy Battle Tank

<https://assetstore.unity.com/?q=WW2%20Armed%20Forces%20Demo&orderBy=1>

2 Soldier

https://assetstore.unity.com/?q=G_36_Demo&orderBy=1

3 Castle

<https://assetstore.unity.com/packages/3d/environments/fantasy/castle-supply-lite-23699>

4 Trees

<https://assetstore.unity.com/packages/3d/props/parks-and-nature-pack-lite-77362>

5 Wall and Floor

<https://assetstore.unity.com/packages/2d/textures-materials/floors/floor-materials-pack-v-1-140435>

<https://assetstore.unity.com/packages/3d/environments/historic/walls-and-floors-v-1-144638>

6 All sound effects

<https://freesound.org/>

7 Learning tutorials

Brackeys YouTube chanel

https://www.youtube.com/channel/UCYbK_tjZ2OrlZFBvU6CCMiA

8 Source code helps -

<https://www.youtube.com/watch?v=fjzZTTatAg>

<https://www.youtube.com/watch?v=WvR9voi0y2I>

<https://www.youtube.com/watch?v=-V6bkVIYQxw>

9 Other resources

<https://stackoverflow.com/>

Tower Defense games

Eg. Relam Rush

Udemy Tutorial