Tower Defender

# Valentin Dimitrov, CTS6 Patryk Schneider, CTS6

Chart, scatter chart

Description automatically generated

# Game Description

A 2D game of type tower-defense. Enemies are trying to swarm your base from the entry point. Defeat them to earn credits, which you can spend to build defensive buildings.

# Controls

Normal mode

* WSAD to move
* Left-click 🡪 shoot regular bullet
* Right-click 🡪 shoot HBG bullet
* TAB 🡪 enter building mode

Building mode

* Left-click 🡪 place Regular tower
* Right-click 🡪 place Slower tower
* TAB 🡪 enter regular mode

# Features

* 2D Gameplay
* Controllable avatar which can shoot enemies
* 3 Types of enemies
* 2 Types of towers
* Toggle between building mode and action mode

# Implementation features

* Map
  + Divided into a grid of 525 squares (25x21)
  + On each square, player can place a building
* Player character
  + A picture containing diagram

    Description automatically generatedCan move around the map
  + Can shoot monsters
  + Collides with towers
* Aliens
  + 3 Types of monsters
    - Diagram

      Description automatically generated with medium confidenceSlow – a lot of HP, slow movement speed, a lot of credits
    - Medium – average HP, movement speed and credits



* + - Fast 🡪 small HP, fast movement speed, not a lot of credits

![A picture containing shoji, building

Description automatically generated](data:image/png;base64,iVBORw0KGgoAAAANSUhEUgAAADIAAAA1CAIAAACMWC9eAAAAAXNSR0IArs4c6QAAAONJREFUaEPtl9ENgzAMBUkngzGYgJmYgDFgs9ZSaBvRqOgs0yL0UD4gPMhxthCk8T42z21IQ3n4mj9653Pd29FL+u4vLOJNtoitk2aTXhCgMmp5IKuRLdkiBkhWvSVbxADJqrf+ZWvqpnIQjG02rIgGNC9LOWzGTRaDlZk2EDbjJgvAqjJlRDdZAJa7Ul8uFBaxel1b/dx3bVt1YfN2lmhaszG2qmRuJkOLwbIbZbJy+DxlXfp9JS0WVkSy6H5WWPuO3gnZki1igGTVW7JFDJDsSXuLPMIPs/qwIbJP2lvCukARH0W2VfL3bO2rAAAAAElFTkSuQmCC)

* + - Immune 🡪 average HP, immune to turret fire – must be killed by the player

A picture containing shoji, building

Description automatically generated

* Buildings
  + Turret building 🡪 shoots at nearest enemy in range of the turret
    - Cost: 200 credits
    - Despawn time: 90 seconds

![Shape

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* + Slow building 🡪 slows enemies in a radius
    - Cost: 150 credits
    - Despawn time: 45 seconds

A picture containing shape

Description automatically generated

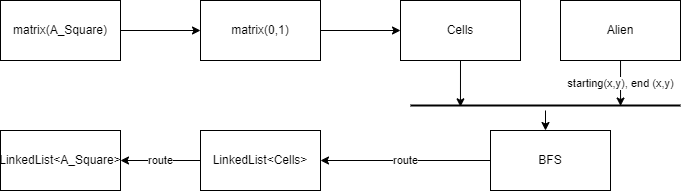
* Bullets
  + Regular bullets 🡪 shot by Player using left click, shot by turrets
  + HBG bullets (green) 🡪 spawn randomly around the map, shot by player using right-click, destroys enemies around

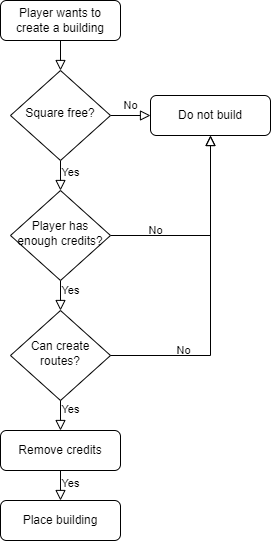
Chart, scatter chart

Description automatically generated



* “AI”
  + Pathfinding done using BFS-algorithm
  + Provides shortest possible path to the destination (or no path if it is not possible to create one)



* Building
  + - Player can spend credits earned from defeating monsters to build towers
    - Towers can be placed on any square if 3 base conditions are met
      * The square is not occupied
      * New building will not block path to the destination from spawn and for any Alien already spawned on the map
        + Whenever new building is about to be placed, routes are calculated for every existing alien and the spawn point, and they are updated
        + Player has enough credits