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*Tower defence game*

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# Analysis

## Research

### Background and Problem Definition

## Objectives

1. The game should not be repetitive.
   1. There should be different turrets.
      1. Firstly, there should be at least two different turret templates.
      2. Then there should be upgrades available for each turrets (at least one, but more should be able to come.)
   2. There should be different enemies
   3. There should be different levels
      1. First, will be set levels, in which enemies come and go, in a set order (determined by a config file), and score will be determined by money remaining, money used, and hearts remaining.
      2. Then there will be an infinite ‘gauntlet’ mode, in which enemies are thrown semi-randomly (there will be checks not to be too slow, or too fast), and score is determined based on factors like time between enemies, enemies killed and the above factors for the set levels.
2. The game should be able to differentiate users.
   1. A user can select a difficulty, and have that kept for them.
   2. Each user should be able to keep a unique account.
      1. A password will be required, of a certain length.
      2. As well as a username of a certain length.
      3. The password will be hashed using SHA256, and stored in that way.
      4. The kept attributes of a player will be:
         1. Overall Score,
         2. Levels complete and score for each,
         3. Gauntlet high score,
         4. Email address for score emailing
            1. Optional ‘You have the new high score on this machine message’.
3. The game should be as efficient as possible.
   1. Storage Space Efficiency
      1. All turret, enemy, and level data will be stored on a Github repository, and fetched at runtime.
4. The players should be able to share statistics.
   1. The email will be stored, so a python script could be used to email others about the score.
   2. There will be a leaderboard for set levels, and for the Gauntlet.
      1. On the leaderboard, it will be in rows, sorted by score, and only display the top 10, and it will show the username, a message, and their score.
         1. In case of any unsavoury language, each word will be checked against a database (<https://raw.githubusercontent.com/RobertJGabriel/Google-profanity-words/master/list.txt>), and censored appropriately (eg. F\*c\*).
5. Running Example:
   1. The user will be presented with a main menu, with a Welcome Screen and two buttons to either login or to see the leaderboard.
      1. If they click on the leaderboard, then it will show it, as in 4.2.1
   2. If they click login, a new window will open to login, with an simple GUI to create a user, or to login.
      1. The details are stored locally on a cfg file.
   3. Once the user has logged in, they will be able to choose to replay a level, or to progress to the next.
      1. If they choose to progress to the next level, it will be the same as a previous only a different level shown.
         1. Then the level will be shown, with a grid system for the tiles, an enemy base, a home base, and GUI for purchasing towers, as well as to inform about lives and money.
            1. The grid system is that each icon has an ID, and dependant on a cfg file, it dynamically shows different tiles to change up the level.
            2. At the enemy base, the enemies spawn, and they slowly make their way across ‘path’ squares, and attempt to get to the home base. If they reach the base, then the player loses an amount of lives, and points for the end of the level. If the player runs out of lives, then Game Over.
            3. To combat the enemies, the player can buy turrets, and these can shoot the enemies, to kill them before they reach the base. The turrets get better, but so do the enemies, and turrets can be upgraded.
            4. In the shop, the player buys the turrets.
      2. The player could also play the Gauntlet, which is the same, only the level never ends until game over.

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# Design

# Technical Solution

# Testing

# Evaluation