**Tower Dream**

**Testing Plan**

Team 15

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**1. User story: As a user, I would like to create an account.**

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| Test Plan 001 | Identification and Classification | Test case 001 - Register and Login  Case: Basic Register  Module: User Portal  Severity: 1 |
|  | Instructions | Click on “New User” |
|  | Expected Result | Register page pops up |

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| Test Plan 002 | Identification and Classification | Test case 002 - Register and Login  Case: Legal Register  Module: User Portal  Severity: 1 |
|  | Instructions | * Fill up the information boxes with right format (only allows English letters or the numbers) * Click “OK” |
|  | Expected Result | A new box pops up saying “Registration successful” |

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| Test Plan 003 | Identification and Classification | Test case 003 - Register and Login  Case: Illegal Register 001  Module: User Portal  Severity: 2 |
|  | Instructions | * Try to register using username that already exists * Click “OK” |
|  | Expected Result | Pop up error information “Username already taken” for user. |

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| Test Plan 004 | Identification and Classification | Test case 004 - Register and Login  Case: Illegal Register 002  Module: User Portal  Severity: 2 |
|  | Instructions | * Try to register for username that has illegal characters * Click “OK” |
|  | Expected Result | Pop up error information “Please only use alphanumeric [a-z][0-9] for username” for user. |

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| Test Plan 005 | Identification and Classification | Test case 005 - Register and Login  Case: Legal Login  Module: User Portal  Severity: 2 |
|  | Instructions | * Enter correct account and password * Click on “Finish” |
|  | Expected Result | Shows “Login successful” for user. |

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| Test Plan 006 | Identification and Classification | Test case 006 - Register and Login  Case: Illegal Login 001  Module: User Portal  Severity: 2 |
|  | Instructions | * Enter empty information * Click on “Finish” |
|  | Expected Result | Shows “Illegal input” for user. |

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| Test Plan 007 | Identification and Classification | Test case 007 - Register and Login  Case: Illegal Login 002  Module: User Portal  Severity: 2 |
|  | Instructions | * Enter wrong account information * Click on “Finish” |
|  | Expected Result | Pop up error information “Account does not exist” for user. |

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| Test Plan 008 | Identification and Classification | Test case 008 - Register and Login  Case: Illegal Login 003  Module: User Portal  Severity: 2 |
|  | Instructions | * Enter wrong password * Click on “Finish” |
|  | Expected Result | Pop up error information “Password incorrect” for user. |

**4. User story: As a user, I would like to traverse the main menu to choose what I want to do.**

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| Test Plan 001 | Identification and Classification | Test case 009 - Main menu options  Case: View main menu  Module: User Portal  Severity: 1 |
|  | Instructions | * After login, traverse the main menu |
|  | Expected Result | Be able to view the main menu |

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| Test Plan 002 | Identification and Classification | Test case 010 - Main menu options  Case: Main menu options  Module: User Portal  Severity: 2 |
|  | Instructions | * Click play game |
|  | Expected Result | Be able to enter the game |

**2, 5. User story: As a developer, I would like to implement defenses. As a user, I would like to upgrade defenses.**

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| Test Plan 001 | Identification and Classification | Test case 011 - Defenses Side  Case: View defenses  Module: User Portal  Severity: 1 |
|  | Instructions | * Click on “New Game” * Wait until the game starts |
|  | Expected Result | Be able to view the defenses available |

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| Test Plan 002 | Identification and Classification | Test case 012 - Defenses Side  Case: Upgrade defenses  Module: User Portal  Severity: 2 |
|  | Instructions | * Click on “Upgrade defenses” * A information box pops up * Choose to upgrade selected defense |
|  | Expected Result | Be able to upgrade the defensive unit |

**3, 6. User story: As a developer, I would like to implement offensive units.**

**As a user, I would like to upgrade offensive units.**

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| Test Plan 001 | Identification and Classification | Test case 013 - Offensive Side  Case: View offensive units  Module: User Portal  Severity: 1 |
|  | Instructions | * Click on “New Game” * Wait until the game starts |
|  | Expected Result | Be able to view the offensive units |

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| Test Plan 002 | Identification and Classification | Test case 014 - Offensive Side  Case: Upgrade offensive units  Module: User Portal  Severity: 2 |
|  | Instructions | * Click on offensive unit * A information box pops up * Click upgrade on selected unit |
|  | Expected Result | Be able to upgrade the offensive unit |

**7. User Story: As a user, I would like to have progression in terms of leveling and experience.**

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| Test Plan 001 | Identification and Classification | Test case 015- Case: Gain Experience  Module: User Portal  Severity: 2 |
|  | Instructions | * Clear the level |
|  | Expected Result | User gains experience. |

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| Test Plan 002 | Identification and Classification | Test case 016 - Case: Different Experience Amount  Module: User Portal  Severity: 2 |
|  | Instructions | * Clear a stage |
|  | Expected Result | Add random amount of experience to player when they clear a stage |

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| Test Plan 003 | Identification and Classification | Test case 017 - Case: Level Up  Module: User Portal  Severity: 2 |
|  | Instructions | * Level up when experience bar is full. |
|  | Expected Result | * Level up the player * Reset the experience bar * Give player bonus for leveling up |

**8. User Story: As a user, I would like to defend against a variety of enemies.**

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| Test Plan 001 | Identification and Classification | Test case 018 - Case: Different Enemies  Module: User Portal  Severity: 2 |
|  | Instructions | * By playing the game, players have to defeat different type of enemies. |
|  | Expected Result | See different enemy along with playtime and different stages |

**9. User Story: As a user, I would like to be able to log out of my account.**

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| Test Plan 001 | Identification and Classification | Test case 019 - Case: Logout of the game  Module: User Portal  Severity: 2 |
|  | Instructions | * Click on the menu button and go to menu * Click on the Logout button in the menu to log out |
|  | Expected Result | * Logout the player * Go back to the login scene |

**10. User Story: As a user, I would like to start with an appropriate amount of currency and to be able to obtain currency by defeating enemies/waves.**

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| Test Plan 001 | Identification and Classification | Test case 020 - Case: Have currency at the start  Module: User Portal  Severity: 2 |
|  | Instructions | * Start the game and look at the concurrency amount |
|  | Expected Result | * Have an appropriate starting currency * Have different starting currency at different stages. * Display the currency to the user |

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| Test Plan 002 | Identification and Classification | Test case 021 - Case: Gain gold by defeating enemy  Module: User Portal  Severity: 2 |
|  | Instructions | * Defeat enemy in the game |
|  | Expected Result | * Gain gold by defeating an enemy * Gain more or less gold depend on the defeated enemy type |

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| Test Plan 003 | Identification and Classification | Test case 022 - Case: Gain bonus gold by defeating a wave  Module: User Portal  Severity: 2 |
|  | Instructions | * Defeat a wave of enemy |
|  | Expected Result | * Gain bonus gold by defeating a wave of enemies * Gain more or less gold depending on the defeated wave number |

**11. User Story: As a user, I would like to sell defenses during the game.**

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| Test Plan 001 | Identification and Classification | Test case 023 - Case: Be able to sell defensive units  Module: User Portal  Severity: 2 |
|  | Instructions | * Click “sell” button for the unit |
|  | Expected Result | * The defensive unit that was sold should be destroyed. * A portion of the value should correctly return to the player’s currency. * The position that the sold unit was at should be vacant for future units. |

**12. User Story: As a user, I would like to have my progress saved after I close the game.**

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| Test Plan 001 | Identification and Classification | Test case 024 - Case: Progress saved on proper exit.  Module: User Portal  Severity: 1 |
|  | Instructions | * User clicks exit from the menu. |
|  | Expected Result | * All progress made by the user so far should be saved. * All progress are restored the next time the game is launched. |

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| Test Plan 002 | Identification and Classification | Test case 025 - Case: Progress saved on random exit.  Module: User Portal  Severity: 1 |
|  | Instructions | * User closes the game during run-time. |
|  | Expected Result | * All progress up until the last “checkpoint” made by the user should be saved. * All progress are restored the next time the game is launched. |

**14. User Story: As a developer, I would like my AI to choose optimal targets in their actions.**

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| Test Plan 001 | Identification and Classification | Test case 026 - Case: Tower enemy detection  Module: User Portal  Severity: 1 |
|  | Instructions | * Play the game * Enemy walks into tower range |
|  | Expected Result | * First enemy to walk into range should be attacked * Should not switch target if still in range * Once target is out of range, finds the next closest target |

**15. User Story: As a user, I would like to know the time until the next wave spawns.**

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| Test Plan 001 | Identification and Classification | Test case 027 - Case: Preparation time at the start of the game  Module: User Portal  Severity: 3 |
|  | Instructions | * Start the game and give a certain amount of preparation time. |
|  | Expected Result | * The user should be able to see a timer or timer-like indication about the preparation time. * When the time ends, the first wave will spawn. |

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| Test Plan 002 | Identification and Classification | Test case 028 - Case: Preparation time in between waves.  Module: User Portal  Severity: 3 |
|  | Instructions | * After defeating a wave, the user is given a shorter preparation time until the next wave. |
|  | Expected Result | * The user should be able to see a timer or timer-like indication about the preparation time. * When the time ends, the next wave will spawn. |

**16. User Story: As a user, I would like to know how much longer I have to defend until I beat the wave.**

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| Test Plan 001 | Identification and Classification | Test case 029 - Case: The wave begins after the preparation time ends.  Module: User Portal  Severity: 3 |
|  | Instructions | * The wave of enemies will spawn after the preparation time ends. |
|  | Expected Result | * The user should be able to see a timer or timer-like indication about the duration of the wave. * When the time ends, the wave will stop spawning. |

**17. User Story: As a user, I would like to freely move the camera.**

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| Test Plan 001 | Identification and Classification | Test Case 030 - Case: The camera is centered on your side.  Module: User Portal  Severity: 1 |
|  | Instructions | * The camera will be pan towards the direction keys chosen. |
|  | Expected Result | * The Camera will properly move in the pressed direction. |

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| Test Plan 002 | Identification and Classification | Test Case 031- Case: The Camera is on the edge of the map  Module: User Portal  Severity: 1 |
|  | Instructions | * The Direction input key pressed is towards the direction of the edge of the map. |
|  | Expected Result | * The screen should not move beyond the borders of the map. |

**18. User Story: As a user, I would like to have a shop where I can purchase towers, units, and upgrades.**

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| Test Plan 001 | Identification and Classification | Test Case 032- The User is at the start game screen.  Module: User Portal  Severity: 1 |
|  | Instructions | * The user selects either the towers, units menu, or upgrades option. * The user clicks on an item to buy with enough gold. |
|  | Expected Result | * The user is allowed to build the tower, purchase the unit successfully or obtain the upgrade. * The user will be charged the correct amount of gold and it will be taken from the user’s gold count. |

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| Test Plan 002 | Identification and Classification | Test Case 033-The User is at the store selection page.  Module: User Portal  Severity: 1 |
|  | Instructions | * The user attempts to purchase an item without enough gold. |
|  | Expected Result | * The user will not be able to purchase the item. * The user will be notified that the item cannot be purchased with some sort of indication such as sound. |

**20. User Story: As a user, I would like to see how much currency and resource I have.**

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| Test Plan 001 | Identification and Classification | Test Case 034- The user is on the game screen.  Module: User Portal  Severity: 1 |
|  | Instructions | * The user looks at the gold count and resource count. |
|  | Expected Result | * The user is able to clearly see the amount of gold, the user owns. |

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| Test Plan 002 | Identification and Classification | Test Case 035- The user is on the store page.  Module: User Portal  Severity: 1 |
|  | Instructions | * The user looks at the gold and resource bar. * The user is purchasing something. |
|  | Expected Result | * The user is able to see the bar. * The user is able to see changes to the bar near instant when the user purchases something. |

**21. User Story: As a user, I would like to read the rules of the game anytime.**

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| Test Plan 001 | Identification and Classification | Test Case 036 - The user is on the main menu screen.  Module: User Portal  Severity: 2 |
|  | Instructions | * The user selects the option to read the rules and basic instructions. |
|  | Expected Result | * The user is able to read and understand how the rules work. * The user is able to return where they came from. |

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| Test Plan 002 | Identification and Classification | Test Case 037- The user is in game.  Module: User Portal  Severity: 3 |
|  | Instructions | * The user enters the pause menu and attempts to read rules. |
|  | Expected Result | * The user is able to enter the same page as from the main menu. * The user is returned to the paused game menu. |

**22. User Story: As a user, I would like to be able to see enemy’s health.**

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| Test Plan 001 | Identification and Classification | Test case 038 - Seeing enemy health bar when hit  Module: User Portal  Severity: 2 |
|  | Instructions | * Tower hits enemy |
|  | Expected Result | * Enemy’s hp shows above their head |

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| Test Plan 002 | Identification and Classification | Test case 039 - Seeing enemy health when enemy is not damaged  Module: User Portal  Severity: 3 |
|  | Instructions | * Enemy is spawned but is not damaged |
|  | Expected Result | * Enemy’s hp does not show above their head |

**23. User story: The application should be supported by the two most popular operating systems: Microsoft Windows and MacOS.**

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| Test Plan 001 | Identification and Classification | Test case 040 - Running the game on Windows PC  Module: User Portal  Severity: 1 |
|  | Instructions | * Launch the game on a Windows PC |
|  | Expected Result | * Game should not crash. |

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| Test Plan 002 | Identification and Classification | Test case 041 - Running the game on MacOS  Module: User Portal  Severity: 1 |
|  | Instructions | * Launch the game on a Mac OS PC |
|  | Expected Result | * Game should not crash, and should run just like on windows |

**25. User Story: As a developer, I would like to store information securely on the database**

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| Test Plan 001 | Identification and Classification | Test case 042 - Storing login information on the database  Module: User Portal  Severity: 1 |
|  | Instructions | * Go to register account page * Click register account * Enter desired account information * Complete registration |
|  | Expected Result | * Username and password provided by the user are the same as the information stored in the database. |

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| Test Plan 002 | Identification and Classification | Test case 043 - Storing saved game information on the database  Module: User Portal  Severity: 1 |
|  | Instructions | * Play the game a bit * Choose the option to save and close the game |
|  | Expected Result | * Game information is stored on the database * When user reenters the game, the game state should be the same as when they pressed the save and close button |

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| Test Plan 003 | Identification and Classification | Test case 044 - Close the game without saving  Severity: 1 |
|  | Instructions | * Play the game a bit * Close the game without saving |
|  | Expected Result | * Game state should be the same as when the player first launched the game last |

**28. User Story: As a user, I would like the game to be balanced in terms of difficulty**

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| Test Plan 001 | Identification and Classification | Test case 045 - Enemy unit balancing  Module: User Portal  Severity: 3 |
|  | Instructions | * User plays the game * User encounters different enemies |
|  | Expected Result | * Over time, the user should not always lose to one type of enemy |

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| Test Plan 002 | Identification and Classification | Test case 046 - Player unit balancing  Module: User Portal  Severity: 3 |
|  | Instructions | * User plays the game * User employs different strategies and builds |
|  | Expected Result | * Over time, the user should not always rely on one strategy simply because other strategies don’t work |