

CISC 226

Project Progress Report

Group 16

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1.0 Executive Summary

With most planned features being completed we are very happy with our game's progress so far. Our game, *Tower Offense*, is a classic tower defense game with the added twist of having the player physically in the scene interacting with towers, enemies and resources. We hope our game will be engaging and enjoyable for all gamers, but we have aimed our game at players who enjoy achieving victory over their foes by outwitting them. To engage with these types of players our games key features are focused on the player, the enemies, the towers, UI as well as level creation. We have made great progress in each of these elements regarding the game's core functionality such as movement, receiving and giving damage, different types of enemies, different types of towers, an inventory with a crafting system, etc.. However, we have many more features we wish to implement to give the players a truly unique and challenging experience.

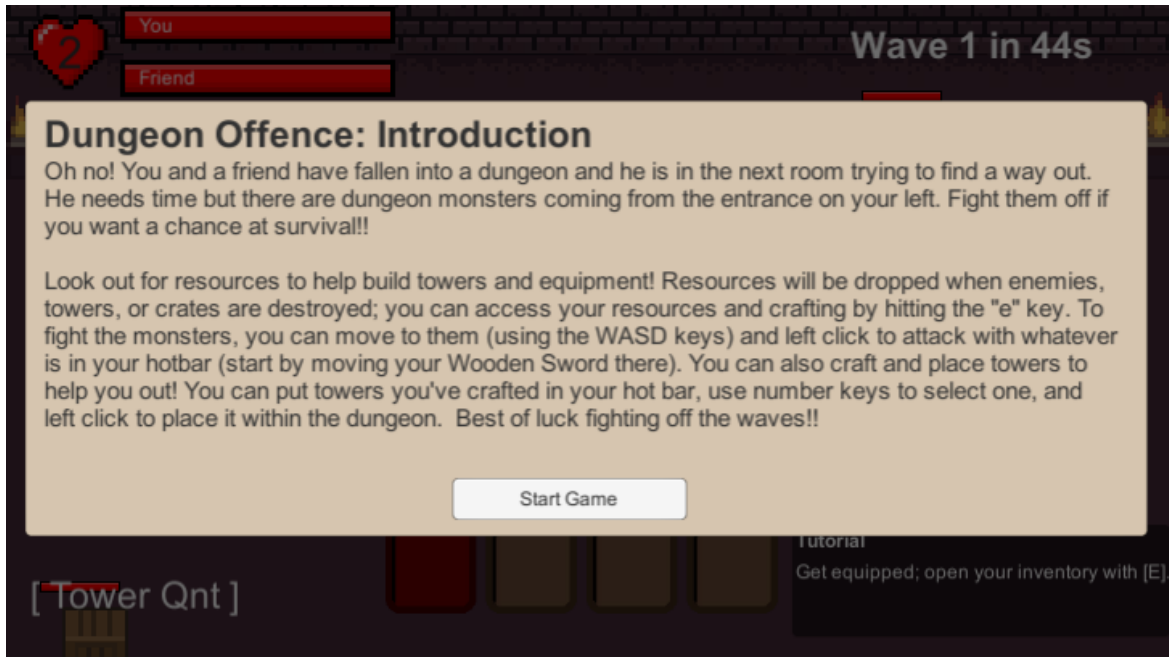
2.0 Game Design

2.1 Synopsis

Our game is a tower defense game that is set in a dungeon, with a "16-bit" graphics and music style. However, unlike regular tower defense games where the player only places the towers on the map and watches the enemies enter, the player is in the game and gets to interact with enemies, towers, and objects in the dungeon. The story behind our game is the player finds themselves in a dungeon with their friend and there is no visible way out. The friend goes ahead to find an exit but the player notices that they are not alone in the dungeon and has to fight against the oncoming waves of dungeon monsters to protect himself and his friend. In order to fight the enemies the player needs to collect resources and craft different items (weapons and towers) to help them fight off the waves of dungeon enemies. Resources are dropped by objects in the room, enemies, and even towers. The player will have to strategize how they wish to use their resources because each tower and weapon costs a different amount - they can go the conventional tower defense route, or take a more hands-on offensive approach.

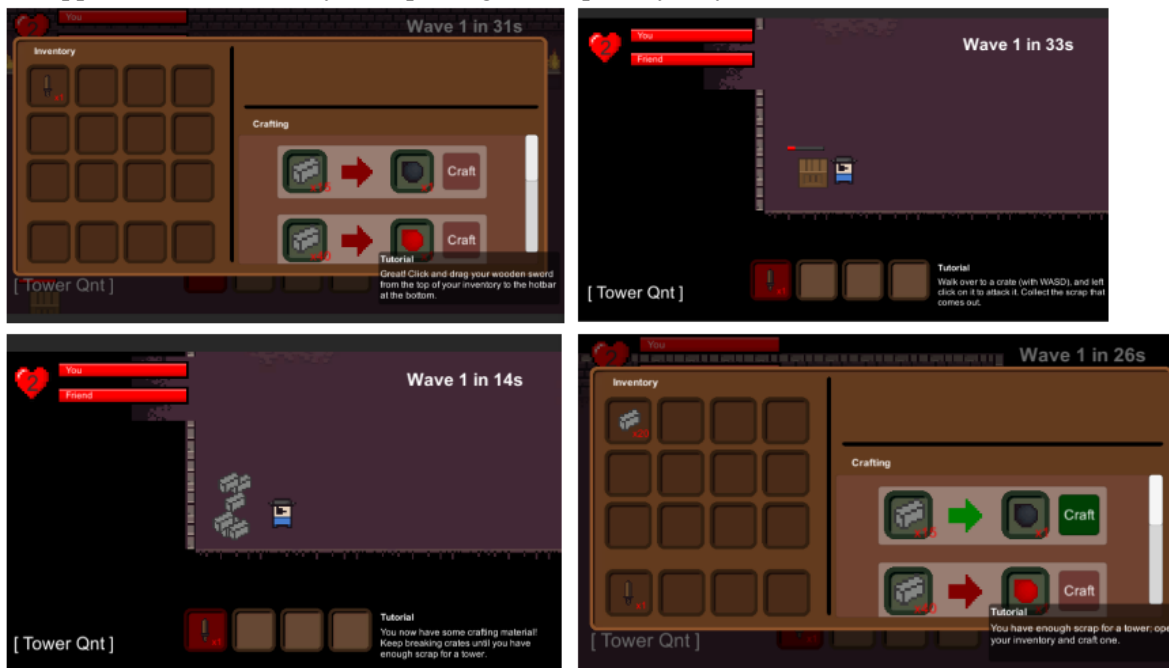
2.2 Game Overview and Description

Our game is targeted towards players who adhere to an achievers playstyle and enjoy some mix of construction and solution games. It is a single player game where the player is tasked with defending himself and his friend from the waves of enemies. The player will open to a welcome screen that sets the stage for the game (see Figure 1.0). Once the player is ready to proceed they will hit the start game button and appear in the middle of the dungeon.



(Figure 1.0)

Once the player enters the game they will have plenty of time to traverse the dungeon, interact with the crates to get resources to begin building towers or weapons, and familiarize themselves with the inventory by equipping a weapon. Figure 1.1 depicts the user opening their inventory for the first time to equip a weapon, they may then go to a box to attack it, one the box is destroyed it will drop resources which would appear in their inventory after picking them up. They may now craft the basic tower.



(Figure 1.1)

As the game progresses and the player collects more resources they will be able to craft more weapons and towers; all of which can be viewed in the inventory by scrolling down the crafting window. When an item is crafted the player will have access to it but it must be placed in their hotbar if they wish to use it. Once weapons are placed in the hotbar they are ready to be wielded by left clicking. Towers on the other hand will be placed after they are stored in the hotbar and selected. Now that the player is equipped to fight and has towers to place they are ready to defend themselves from the waves of dungeon monsters. However, the monsters will fight back as you can see from Figure 1.3, the player began with 2 extra lives (refer to Figure 1.2) and has now been reduced to 0 extra lives due to being attacked over the past 4 waves. Even the towers are not safe. As you can see the bottom tower in Figure 1.3 has a significantly depleted health bar compared to the other two because it has been attacked by the enemies.



(Figure 1.3)

Scoring for our game is based on survival and stopping the enemies from getting to the other side. As already discussed the player will lose lives by being attacked by the enemies. If the player dies then the game is over, and they must restart the given level. However, in addition to the player surviving they must also ensure the enemies also do not make it to the end of the level as they will then damage the player's friend, who's health is depicted by the second health bar in the top left corner of Figure 1.3). If the player and their friend are able to survive all the waves in a given level then they will be able to proceed to the next level. Each level will have a simple rule with different objects, decoration, and features for the player to interact with. Once the player has defeated all waves in all of the levels then the player wins the game!

2.3 Core Design

The core features we will need for our game are as follows:

- Player can walk around in the world
- Player can collect resources
- Player can craft items (towers, weapons, and armour)
- Player can use weapons to attack (enemies and dungeon objects)
 - A variety of weapons with different attack types
- Player can place towers
- Player can repair towers
- Player can reload towers
- Player can view minimap & preview other rooms
- Enemies can pathfind their way through the map to the exit
- Enemies can attack player
- Enemies can attack tower
- Different enemy types to present unique challenges within the level
- Towers can shoot enemies
- Different types of towers with different attack styles

After we are able to implement the core features to a satisfactory standard we will look to implement some optional features to enhance the game.

- Procedurally generated levels to allow for longer playtime.
- Items that can have different effects
 - Setting enemies on fire
 - Freezing enemies
 - Increasing player attack ability, speed, and/or health
- Towers that have unique effects
 - Setting on fire or freezing
- Enhanced tower targeting (first enemy, last enemy, closest enemy, strongest enemy, etc.)
- End of game statistics
 - Enemies killed by player vs. tower

2.4 Logistics

- Our game's target platform is WebGL.
- The tilemap and sprites were used from 0x72's 16x16 dungeon tile map set: <https://0x72.itch.io/16x16-dungeon-tileset>. In the future we plan to create our own tilesets and sprites.
- Character design: Characters are simple 16-bit style pixel art.

3.0 Development Status

We are currently at the point where our game is functioning and playable, however there are still some missing key-features for it to embody our novel idea and enhance the user experience. Our game can be broken down into the following sections: player actions, enemies, towers, UI, and finally level creation and interaction.

Players can move around the map, perform attacks using melee weapons, take damage from enemy attacks, and pick up resources lying on the ground. There are currently three different swords that the player can wield. However, based on our play testing feedback we are looking into enhancing the attack animation and the visualization of taking damage. We also would like to add more melee weapons, implement ranged attack weapons for the player (e.g. bows), and have attacks knock back enemies. Additionally we would like to add armour, equippable through the inventory, which reduces damage taken. If we have enough time we may also explore additional equippable items.

Enemies are integral to the game because they will present the user with new and challenging interactions. Enemies are currently able to move toward the exit, but they can also change direction to pursue a player or a tower if near enough. They can also attack the player and other towers. They drop different amounts and different types of resources when killed. There are currently three different types of enemies, and they have different movement speeds, health, and attack damage. The next features we are looking to implement for enemies are ranged attacks and variations on movement and pathfinding behavior.

The other important feature of our game is the towers. Currently our towers can be placed on the dungeon floor; they can detect enemies within their range, point toward them and shoot them. They can also take damage from both the enemies and the player. When they are destroyed, they drop some of the resources that were used to make them. There are currently 4 different towers: Basic, Fast, Bomb, and Sniper. The next features to implement for our towers are the ability to be upgraded, reloaded, and repaired by the player. We plan to overhaul the enemy targeting system so towers don't attempt to shoot through walls, and potentially target the strongest closest enemy, rather than just the closest. We are also planning to implement towers that do spray damage (e.g. a flamethrower) as well as other different types of projectiles.

The UI has been a newer element to be integrated into the game and so there are quite a few elements to add. However, at this point we have an introduction screen, a basic inventory/crafting interface, and a "hotbar" where items can be placed for quick use. There is also a HUD containing health bars for both the player and his friend, as well as the amount of lives remaining. A large component of the UI which has yet to be implemented is the map. This includes a minimap on the HUD which displays warnings, and a larger map which allows the player to view any room in question. The next steps for the existing UI would be to fully implement inventory and crafting, adding new crafting recipes, adding a UI for tower upgrading and repairing, and making the different UI elements fast to use.

The final aspect of our game is level design. Currently we have a single playable level. This level has various breakable crates in it as well as walls which prevent objects and projectiles from leaving the level. It also has an enemy spawn point and an enemy goal, as well as pathfinding markers for the enemies to use for making their way to the goal. We would like to add other objects to the scene, like rocks, walls, puddles, and other decorations. In an attempt to balance the game we are also hoping to add debris which restricts tower placement, preventing the player from surrounding the entrance. A stretch goal would be to have infinite level generation.

Some potential barriers that could prevent us from completing this game include not being able to find a proper balance within the game after all aspects are added. Another barrier is the universal increase in course workload as the end of the term nears, which could even further reduce the effective time we have to implement and balance things. A final barrier could be that our concept of levels would require too much work to properly implement more than a handful - they may be too ambitious for this course.

4.0 Play-Testing Report

4.1 Kevin's Play-Testing

Demographic: Low 20's and novice player.

Positives:

- Good game concept
- Smooth player movement
- Liked the 2D style
- Liked the different types of enemies and towers

Negatives:

- Health bars of towers, enemies, and player are hard to see.
- Purpose of the double health bar for the player is unclear.
- Animated enemy attacks would be clearer.
- Minor balancing issues (towers too strong)
- Tower death is not noticeable enough.
- Enemies entering in a single line are difficult to interact with.
- Bug when dying, your past self is a "ghost"

4.2 Kennan's Play-Testing #1

Demographic: Upper teens, experienced player.

Positives:

- Enjoyable concept
- Building army of towers is satisfying

Negatives:

- Not enough time for tutorial
- Scrolling in crafting list doesn't work
- Not clear that the bottom slots in inventory were hotbar
- Occasionally got caught on walls randomly
- Crafting buttons hard to click on
- Maybe have an option to fast-forward a wave counter / start wave instantly

- Melee combat is "weird" - too hard to hit something without also getting hit
- Hard to drag items in inventory

Suggestions:

- Could have a training dummy on a level for tutorial
- Maybe make towers randomly target an enemy so all towers don't gang up on a single one
- On tutorial level, could only start wave timer after user has broken a crate

4.3 Kennan's Play-Testing #2

Demographic: Upper teens, novice player.

Positives:

- Cute visuals
- Sounds work well with what's happening in the game
- Collecting items is satisfying

Negatives:

- Item pickup range could be higher
- Felt a little repetitive
- Lives system was not explained at all
- Position the cursor actually clicks at isn't super clear
- Gameover event is not clear

Suggestions:

- Should see friend at end of level
- Could have an end-of-level stats screen. Maybe a score?
- "There should be confetti at the end of a level so I feel more accomplished"

4.4 Josh's Play-Testing #1

Demographic: Upper teens, Semi-casual.

Positives:

- Player control is good
- Animation looks smooth
- Art style is cool

Negatives:

- Health bar could be more obvious

- Make inventory close on escape key
- Enemies can freeze you in a corner
- Tutorial should pause wave timer
- Can't use scroll wheel for crafting list
- Crafted things move to hotbar right away
- Spending a lot of time in inventory

4.5 Josh's Play-Testing #2

Demographic: Upper teens, Casual.

Positives:

- Controls are smooth

Negatives:

- Resources are annoying to collect
- Need more time for tutorial
- Should have best sword equipped all the time unless another item is selected
- Better equipment replaces older equipment?
- Towers need "ghost" for placement
- Scroll wheel unusable for crafting
- Attacks should go in facing direction
- Wave rest time should be higher
- Inventory is very inconvenient

5.0 Milestones to Completion

Date	Milestone
March 17 - 19	Finish implementing inventory/crafting, start tower GUI. General GUI polish.
March 22 - 26	Implement armor, implement level decorations, create multiple levels, finish tower GUI, add tutorial levels. Work on unifying sprite design.
March 29 - Apr 2	Add more craftable items/towers, add more enemies, create music, create art, create main menu, level selection, pause screen. Rigorous playtesting for bugs. Being looking into post-processing effects and polish.
April 5 - 9	Finish post-processing and graphical polish. Final balancing/playtesting, bug fixes, adding anything we didn't have time for earlier, stretch goals if time, prepare for the final show.