**Archer Defense TD**

Design Document

# Towers

Towers are the units which are deployed by the player to attack the incoming enemies. They are deployed on specific areas on the map defined by the level maker (me). They attack enemy units which come in their range.

## Types of towers

There is only 1 base type of tower, called Archer, and several enhanced archers which can be trained.

## Tower skills & experience

Experience is defined as the number of shots fired for now.

As the archer gains experience, he gains skill points. The player can choose what this archer specializes in: attack damage, attack speed, attack range. A player can mix and match different skill points in different areas. For now, the archer will gain skill points 7 times during its lifetime.

The effect of each skillpoint will increase slightly so that the more the player focuses on one specific skill, the bigger effect it will have on that specific skill. The idea is that the player should use the strategy which works best for the current environment. Levels will be designed so that on some levels it’s important to focus on damage, while on others on utility, while some levels need a mix, etc. Some levels will require that archers skilled in range, for example, be placed in certain spots to reach multiple “lanes”.

Skillpoint distribution:

Level 1: Attack Damage OR Attack Range

Level 2: Attack Range OR Attack Speed

Level 3: Attack Damage OR Attack Speed

Level 4: Attack Damage OR Attack Speed

Level 5: Attack Damage OR Attack Range

Level 6: Attack Range OR Attack Speed

Level 7: Attack Range OR Attack Speed

## Tower specializations

As opposed to tower skills, tower specializations are enhancements which provide unique abilities to the towers instead of just increasing stats.

3 specialization paths will be available:

* Rapid-Fire Specialization
* Sniper Specialization
* Utility Specialization

### Rapid-Fire Specialization

The Rapid-Fire path focuses on increased attack rate. It specializes in more attacks as opposed to stronger, fewer attacks. The main advantage of Rapid-Fire archers is that they are good at clearing waves which have a large number of weak enemies. The main disadvantage of Rapid-Fire archers is that they are not very good at killing strong single targets.

|  |  |  |
| --- | --- | --- |
| Enhancement # | Title | Description |
| 1 | Multi Shot |  |
| 2 | Bounce Shot |  |
| 2 | Attack Ramp |  |
| 3 | Berzerk |  |
| 3 | Piercing Arrows |  |

### Sniper Specialization

The Sniper path is focused on strong, deadly attacks. They are executioners. They are great against single targets. They also specialize in precision which allows for unique range-less attacks.

|  |  |  |
| --- | --- | --- |
| Enhancement # | Title | Description |
| 1 | Headshot |  |
| 2 | Knockback |  |
| 2 | Executioner |  |
| 3 | Double Shot |  |
| 3 | Infinite Range Attack |  |

### Utility Specialization

The Utility path is used when special enemies are encountered. They offer debuffs which are not offered by other specializations and will be used mostly in fighting specific types of enemies.

|  |  |  |
| --- | --- | --- |
| Enhancement # | Title | Description |
| 1 | Slow on Attack |  |
| 2 | AOE Slow |  |
| 2 | Healing Reduction |  |
| 2 | Multi Shot |  |
| 3 | Taunt |  |
| 3 | Vulnerability |  |
| 3 | Stun |  |

## Tower Unlocks

### Skillpoints

Skill upgrades are locked behind experience. As the archer gains experience he gains more skill points to spend. Following is the requirements for each skillpoint:

|  |  |
| --- | --- |
| Skillpoint # | Requirement |
| 1 | 10 attacks fired |
| 2 | 30 attacks fired |
| 3 | 75 attacks fired |
| 4 | 150 attacks fired |
| 5 | 300 attacks fired |
| 6 | 500 attacks fired |
| 7 | 1000 attacks fired |

### Enhancements

Enhancements are locked behind a silver price and skill requirements.

|  |  |
| --- | --- |
| Enhancement # | Requirement |
| 1 | Skill level: 3 & 100 silver |
| 2 | Skill level: 5 & 200 silver |
| 3 | Skill level: 7 & 300 silver |

# Enemies

Enemies are the units which must be killed in order to win the game. They follow a set path to reach their destination, and it’s the job of the player to defeat the enemies before they reach the base by placing towers and using abilities.

## Enemy Types

The aim with having different enemy types is to equip them with different strengths and weaknesses. This will give the player the responsibility of deciding how best to combat specific types of enemies. Some enemies will be easy to kill but numerous, some will be hard to kill but slow, some will be fast, some will heal, etc.

Following are the different stats and abilities which can be adjusted to achieve the above:

* Max HP <-> more DPS
* Movespeed <-> slow
* Dodge chance <-> atk speed
* Out of combat shield <-> tower coverage
* Summon other enemies <-> multishot
* Disable towers ⬄
* Slow towers attack speed ⬄
* Heal other enemies ⬄ healing reduction
* Speed up other enemies ⬄ kill him first
* Build up an attack which can be stopped by the player clicking ⬄ player clicks on him
* Flying units which require high attack range archers ⬄ atk range
* Enemies which are stronger as groups ⬄ more DPS

### Enemy 1

Enemy 1 is a simple unit with low health and movespeed. It has nothing unique about it.

### Enemy 2

Enemy 2 is a simple unit with moderate health and low movespeed. It has nothing unique about it.

### Shieldon

Shieldon is a simple unit with low health and movespeed. It generates a shield when out of combat that continues to grow while OOC up to 50% of its HP.

### Disabler

Disabler is a wizard with medium health and low movespeed. It periodically shoots projectiles to a random nearby tower, disabling it for a few seconds.

### Guarded knight

Guarded knight is a boss enemy who rides a horse and is accompanied by several guards. As the guards die, the movespeed of the whole fleet is reduced. When there are no guards left, the knight is very slow and vulnerable.

### Deflector

Enemy 3 is a simple unit with low health and movespeed. It generates a shield when out of combat that continues to grow while OOC up to 50% of its HP.

### Side Dasher

Enemy 3 is a simple unit with low health and movespeed. It generates a shield when out of combat that continues to grow while OOC up to 50% of its HP.

### Healer

Enemy 3 is a simple unit with low health and movespeed. It generates a shield when out of combat that continues to grow while OOC up to 50% of its HP.

### Rallier

Enemy 3 is a simple unit with low health and movespeed. It generates a shield when out of combat that continues to grow while OOC up to 50% of its HP.

# Shop Upgrades

By winning levels, players gain currency which they can spend to purchase upgrades in the shop.

A tree-like structure.

First upgrade after level 2.

More silver

More lives

More AD

More AS

More AR

Multishot targets more people

Berzerk gets more AS

Headshot deals more damage

# Abilities

TO BE DISCUSSED

Aside from placing and upgrading towers, the player also has access to a set of different abilities which he can cast during the game. Different abilities have different uses in different scenarios.

## Ability types

AD increase

Infinite range for a specific tower

Artillery in a specified area

A wall which forces enemies to wait

Silver increase

# Level Design

## Paths

As a general guideline for designing levels, the important factors are:

* Length of the path
* Curvature of the path
* Number of entrances
* Number of exits

Longer paths = more tower coverage = easier for the player

More curved paths = more tower coverage = easier for the player

More entrances / exits = less coverage = harder for the player

So, as a general rule, as the game gets harder and harder:

* Length should decrease
* Curvature should decrease
* Number of entrances / exits should increase

As for the number of waves, it is almost arbitrary. For now, I will choose it randomly.

The starting gold determines how many towers the player can put initially. Gold is earned slowly by killing enemies. Initial gold should be not too little and not too much. It is semi-arbitrary.

## Strategies

### General Strategies (Apply almost every level)

1. Towers are better on curves and bends
2. Quickly deciding on which skills to upgrade
3. Using artillery when enemies are projected to group
4. Towers should be placed in bases which are between paths, even if it requires range skill focus
5. Choosing appropriately between upgrading damage and AS/AR. If an enemy will die in 2 shots anyways, it’s better to upgrade AS/AR.
6. Utilizing MORE towers against weaker enemies
7. Adapting to the types / number of enemies for each lane
8. Enhancing multishot on curves and bends against hordes of enemies

### Specific Strategies

1. Towers should be placed early in the path against shieldons
2. Use AOE towers against waves of clumped enemies
3. Prioritize guards against guarded knight
4. Setting tower focus to disablers, healers, etc.
5. Upgrading damage against enemies who get stronger with each attack

## Spawning Strategies

Fundamentally there are several parameters to consider when designing a squad:

* Enemy Types
* Paths
* Density
* Count

Type is clear, the type of enemies.

Path is which path the enemies take to reach the base. This depends on the level, but there is a fixed number of paths possible per level.

Density is how crowded it is, or the delay between spawns.

Count is how many enemies.

Using these 4 parameters, an infinite number of wave formations can be designed. For example:

* Type = weak simpleton enemy, Path = 1, Density = medium, Count = 10
* Type = strong enemy, Path = 2, Density = low, Count = 5

Obviously this only defined basic formations where a platoon is of a single type.

There are general guidelines for the differences between different formations. If, for example, we have 2 formations to compare:

* Density = high, Count = 10
* Density = low, Count = 10

For a fixed path, enemy type and count, each have their own strengths and weaknesses:

* Formation 1 is dense, which makes it susceptible to AOE damage.
  + Weak against AOE towers and artillery.
* Formation 2 is not dense, which makes it susceptible to strong single-target damage
* Against Formation 2, towers will be able to shoot a lot more shots since they can focus one target at a time.

For a fixed path, type and density, higher count in most cases = more pressure, unless the towers are strong enough where the higher count only means more gold to the player.

Paths will be a specific strategy which depends on the level. Some paths will have natural strengths or weaknesses and so make it harder or easier.

A level is nothing but a combination of different waves, and a wave is nothing but a combination of different squads. If there are infinite number of ways to design a squad, well there are infinite(er) ways to design a wave, and infinite(est) ways to design a level.

## Level 1

Objectives:

1. Introduce the player to the main game mechanics:
   1. Placing archers
   2. Upgrading skill points
   3. Using artillery
2. Test the player’s ability to prioritize bends and curves
3. Test the player’s ability to adapt and place more towers as his gold increases
4. Test the player’s ability to upgrade skill points on time
5. Test the player’s ability to use the artillery on clumps of enemies

## Level 2

Objectives:

1. Upgrading AD in order to reduce the number of shots it takes to kill Enemy 2
2. Well-timed artilleries
3. Give player more practice on the skill system

## Level 3

Objectives:

1. Placing towers early in path against shieldon

# Strategy

The main aim of this game is to test the player’s strategic faculties (his brain) whether or not he can use the given tools in the correct way in order to defeat the difficulties posed by the level / enemies he is facing.

Following are the tools which the player has to work with in order to defeat the levels:

|  |  |  |
| --- | --- | --- |
| # | Tool | Description |
| 1 | Tower placement | The placement of the towers is potentially the most important tool the player has to work with. If the player places towers in places which will rarely ever shoot the enemies, he is likely going to lose. |
| 2 | Tower skill focus | The skills the player chooses to focus on for each tower (AS/AD/AR) will have a great impact on the difficulty of the level. |
| 3 | Tower enhancement focus | Which enhancements he chooses to pursue on each tower will greatly impact the game. Different enemies/levels need different enhancements in order to defeat them. |
| 4 | Abilities | What abilities he takes into battle, which are limited in number, will affect the game. Also, which abilities he uses and when he uses them will also have a great effect. |
| 5 | Shop upgrades | The shop upgrades the user prioritizes will affect which enhancements / abilities are strong and in turn affect the difficulty of the game. |
| 6 |  |  |
| 7 |  |  |
| 8 |  |  |

## Tower placement

The player has complete freedom where to place towers. This is the core of the strategy involved. Each map will have certain choke points where towers will effectively cover more ground than in other areas. If the path loops or curves within the range of a tower, this means the tower can attack enemies more times in that area.



In the figure above, it’s clear that the tower in the part of the path which is curved will cover more ground. So, the player must prioritize such spots with their most powerful towers.

Some levels will have tower bases which offer stat boosts to the tower placed on them. The player must utilize this to win some levels.

Some levels will have spots which are in the center of 2 paths but not covering much of them. The player should place towers there and aim to focus on attack range.

## Tower skill focus

The player has complete freedom what skills he chooses to focus on for all towers. 3 options are provided: Attack Range, Attack Speed, Attack Damage.

On regular enemies (without any special abilities or powers), the aim is that attack speed and attack damage will be relatively equal. However, each of them will have its own time where it’s necessary to choose the right skill.

Attack range will be necessary for tower bases which are far away but have the possibility of reaching multiple parts of a path. Focusing on attack range in those tower bases is essential and will provide a great power spike when enough range is acquired to reach both parts of the path. Another use for focusing on attack range is with Sniper’s more-damage-with-range enhancement.

Attack speed will be very useful for clearing large numbers of enemies, especially with multi shot. It will also be useful if I add chance-based on hit effects to towers or % health based damage.

Attack damage will be needed to ensure that certain enemies are kill within X number of shots. It could completely change the game if the tower is just short of killing an enemy in one shot vs one shotting it. It will also be overall better for single-target DPS than attack speed.

## Tower enhancements focus

The player has complete freedom what enhancements he chooses for all towers. However, the enhancements he chooses will greatly affect the difficulty of the level.

Rapid archers are great for clearing large numbers of enemies which aren’t particularly strong.

Snipers are great for single-target damage and long range.

Utility archers are great against certain types of enemies, such as fast enemies and healers.

## Strategies

1. Towers are better on curves and bends
2. Towers should be placed early in the path against shieldons
3. Towers should be placed in bases which are between paths, even if it requires range skill focus
4. Using artillery when enemies are projected to group
5. Choosing appropriately between upgrading damage and AS/AR. If an enemy will die in 2 shots anyways, it’s better to upgrade AS/AR.
6. Upgrading damage against enemies who get stronger with each attack
7. Setting tower focus to disablers, healers, etc.
8. Enhancing multishot on curves and bends against hordes of enemies
9. Utilizing MORE towers against weaker enemies
10. Prioritize guards against guarded knight

# Timeline

Level 1: introduce towers, skill mk1, enemy 1, enemy 2

Level 2: introduce enemy shieldon, artillery

\* First shop upgrade \* (AR increase)

Level 3: introduce skill mk2

Level 4: introduce enemy disabler

\* Second shop upgrade \* (AD increase)

Level 5: introduce multishot tower enhancement, guarded knight boss

Some needed particles:

On tower placement

Blood particles on low health enemies

When a new skillpoint is available

When a skillpoint is used

When an enhancement is applied