



Game Design Document



Table of Contents

1. Introduction:	3
1.1. What is Swarm?	3
1.2. What's New?	3
2. Story	3
2.1. Premise	3
2.2. Narrative	3
3. The Game World	3
3.1. Introduction to Insecterra	3
3.2. The Terrestrial Layer	4
3.2.1. Environment	4
3.2.2. Geometry	4
3.2.3. Sections	5
3.2.4. Access to Other Layers	7
3.2.5. Adapted Insectoids	8
3.3. The Canopy Layer	9
3.3.1. Environment	9
3.3.2. Geometry	10
3.3.3. Access to Other Layers	10
3.4. The Subterranean Layer	11
3.4.1. Environment	11
3.4.2. Geometry	11
.....	12
3.4.3. Access to Other Layers	12
4. Characters	12
4.1. Insectoids	12
4.1.1. Statistics	12
4.1.2. Adaptation	14
4.1.3. Combat	14
4.1.4. Characters	19
Lady Dectrix	22
4.2. Workers	24
4.2.1. Combat and Statistics	24

4.2.2.	Behavior	24
4.2.3.	Role in Swarm	25
4.3.	Sentinels	25
4.3.1.	Vanguard Sentinels	25
4.3.2.	The Guardian Sentinel	27
5.	Gameplay	28
5.1.	Overview	28
5.2.	Game Loop	28
5.2.1.	Pregame: Insectoid selection	28
5.2.2.	Core Game Structure	28
6.	User Interface	29
6.1.	Controls	29
6.2.	HUD	30
6.2.1.	Adaptation Cooldowns	30
6.3.	HUD	31
7.	Out-of-game Client	31
7.1.	Player Profile	31
7.2.	Starting a Game	31
7.3.	Matchmaking	31
7.4.	Character Selection	32
7.5.	Post-game Statistics	32
7.6.	Social Networking	32
8.	Audience, Platform, and Marketing	32
8.1.	Target Audience	32
8.2.	Platform	32

1. Introduction:

1.1. What is Swarm?

Swarm is a bug-themed, third-person multiplayer online battle arena (MOBA) where the common central mechanic of pointing and clicking with a mouse is replaced with fast-paced fighting mechanics via handheld controls (like Playstation or XBOX controller). Swarm fuses the strategy of a MOBA with the high-speed decision making of a fighter game.

1.2. What's New?

While Swarm is derivative of the common MOBA, it is truly unique because fighting mechanics do not currently exist in any MOBA. Imagine a game like DotA but its pointing and clicking replaced by controls similar to those of Super Smash Bros. Swarm also uses third-person follow-cam view, as opposed to all MOBA's (with the exception of "Smite"), which use a top-down, isometric view.

2. Story

2.1. Premise

Two powerful bug colonies must compete for territory. Knowing each other's strengths, the colonies both know that attacking each other directly will leave them without a colony, even in the case of victory. The best way to destroy a colony is to destroy its progeny, the larvae, which are all in the same place, nursing and helpless. When the next generation is eliminated, the colony will crumble at its foundation. The world of bugs is cruel. There is no consideration for one's life, just the existence of one's kind. The choice is clear: genocide or extinction.

2.2. Narrative

Every selectable player character has a unique identity and a backstory. Each has a dialogue set with several lines and vocal expressions that are descriptive of its personality and history. Some lines are chosen periodically at random, and others are triggered by certain actions and events.

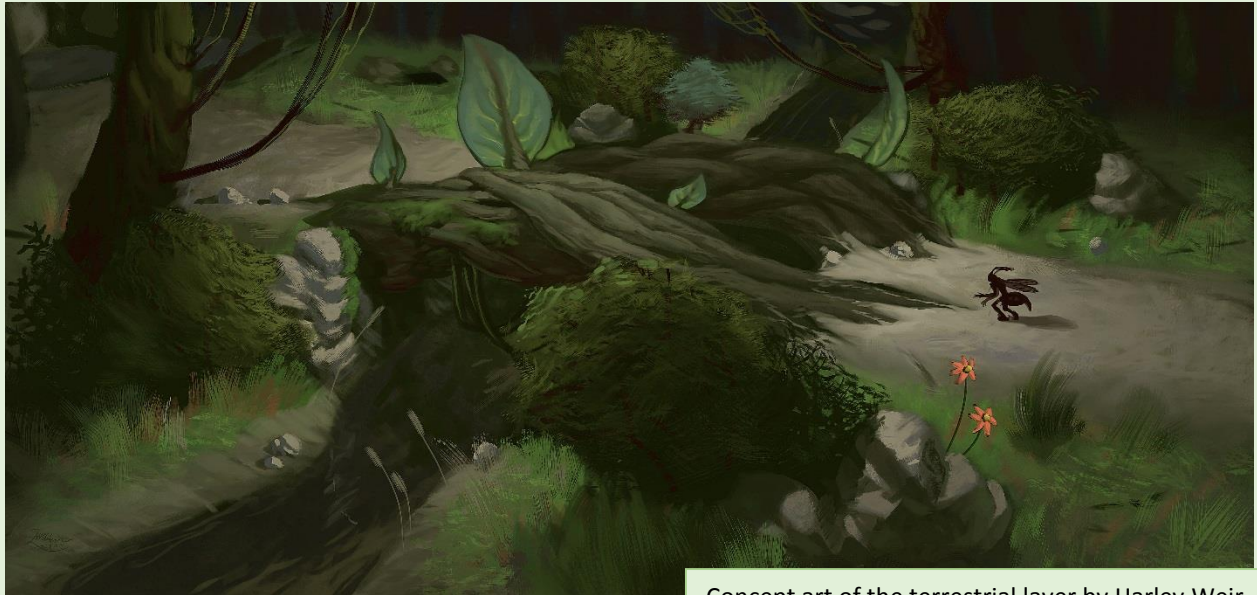
3. The Game World

3.1. Introduction to Insecterra

Insecterra is an exotic land filled with diverse natural features. Most of it is inhabited by plants, scenic or monstrous, and it is dominated by militant bugs. Insecterra is currently a battleground

between two colonies. Unlike most battlegrounds, Insecterra has three layers with distinct environments, one on the ground, one in the sky, and one underground.

3.2. The Terrestrial Layer



Concept art of the terrestrial layer by Harlev Weir

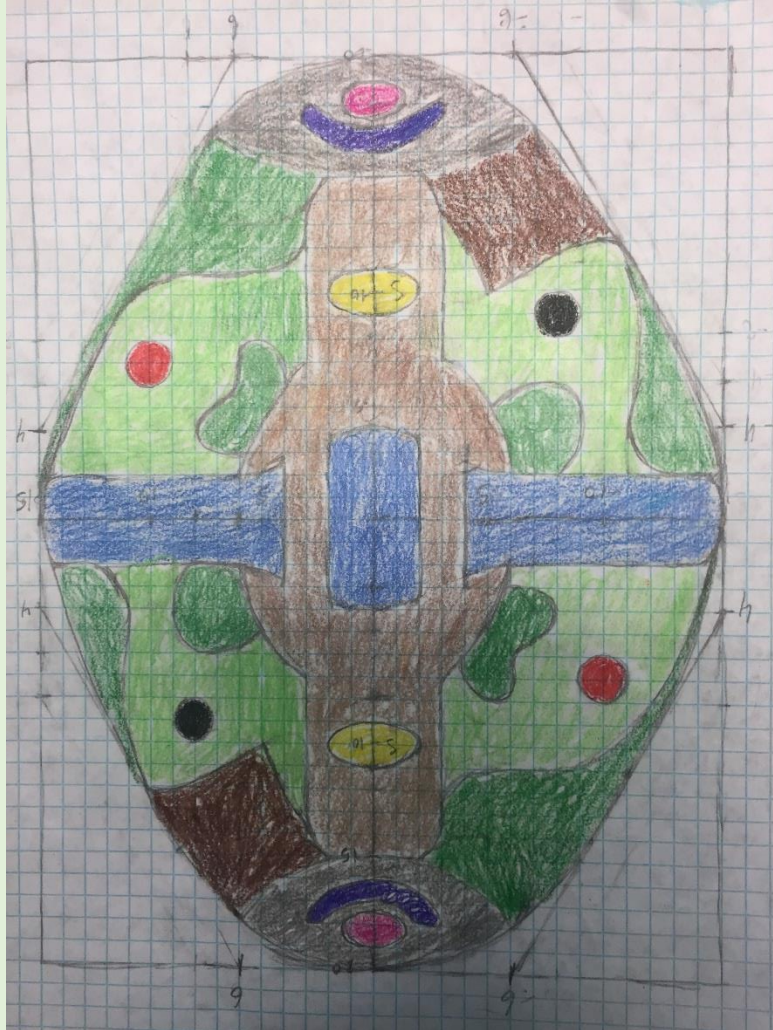
The Terrestrial Layer is vertically the centermost of the three layers in Insecterra. It is also the largest, in terms of area. It is the sole layer that contains the team bases, which are where insectoids and workers spawn and contain a nest and a guardian sentinel. The Terrestrial Layer is connected to the other two layers, the Canopy Layer above and the Subterranean Layer below. There is no way to travel between the other two layers without crossing the Terrestrial Layer.

3.2.1. Environment

The setting of the Terrestrial Layer is the ground of something much like a temperate, yet somewhat tropical forest. Common physical features include grass, weeds, flowers, dirt, mud, rocks, etc. There are some specific locations that contain shallow water. Plenty of sun should reach the majority of the layer, but some places have light to heavy shade through partial blockage by the foliage in the Canopy Layer.

3.2.2. Geometry

The Terrestrial Layer is a horizontal cross-section of earth shaped like a diamond with rounded edges. It is longer from base to base than it is on the other axis, a 4:3 ratio to be exact. Everything on this cross-section or growing from it, up to a certain elevation, is considered part of the Terrestrial Layer.



Schematic of the cross-section of the terrestrial layer on the horizontal plane

3.2.3. Sections

The terrestrial layer can be divided into multiple distinct sections with essential landmarks.

3.2.3.1. Base

There are two bases, located at opposite ends of the longer diagonal of the diamond-shaped layer. The base is somewhat almond-shaped, occupying the area formed between the rounded corner of the layer, at which it lies, and an arc facing toward the corner. The terrain of this area is different from all the terrain around it. The ground is made of smooth, gray stone. The entire base is slightly elevated.

3.2.3.2. Primary Lane

At the middle of the base, on the side facing toward the other base, emerges a straight path of soft dirt terrain that marks the pavement for the main “lane” area of the layer. The base is sloped

at this point to make it easy to enter the lane. At each end of the lane, on the far side from the base, is the team's Terrestrial Sentinel.

3.2.3.3. Pond Battleground

The lane diverges into an elliptical area with the same dirt pavement, with its longer axis perpendicular to the bases. In the center of the area is a moderately deep pond, which converges into fairly shallow stream on the two ends of the ellipse's shorter axis. On each side where the pond begins to transition to river, there is a bridge that connects each team side across the body of water. The bridge is made of thick tree roots sticking out of the ground on both ends of the water. Between these two bridges is an open area of pond. Below the bridges is a small gap of air above the pond.

3.2.3.4. Forest

There are four quadrants of open area divided by the primary lane and the river extending sideways from the pond. There are two types of quadrants, each team side having one of each. They are identical but opposite on each team's side. That is, each quadrant is adjacent to only the other type of quadrant. Unlike the paved dirt terrain in the lane, the forest ground is covered in grass.

3.2.3.4.1. C-Forest

Facing away from a base, the C-Forest is the quadrant on the same side as the access point to the canopy layer from the base. To the bottom right of this quadrant is access to the lane, near the sentinel. Toward the middle top is the river, which can be crossed to access the other team's S-Forest, described below. Near the center is a secondary access point to the canopy layer. Both the canopy layer and its access points are described later in this document. The ground between this quadrant and its nearest base is blocked by the beginning part of the path from the base to the canopy layer, which is due to the path starting too low to be passed from below.

3.2.3.4.2. S-Forest

The S-Forest is essentially the same as the C-Forest, except it is on the opposite side of its adjacent base, the same side as the base entrance to the subterranean layer. Another difference is that the secondary access point near the center gives access to the subterranean layer. Both the subterranean layer and its access points are described later in this document. Lastly, instead of the ground between this quadrant and the nearest base being blocked by part of the path to the Canopy Layer, it is blocked by impassable plants above the base entrance to the Subterranean Layer.

3.2.4. Access to Other Layers

Among all three layers, the Terrestrial Layer has the most connections to any other layer. Directly from each team base, there is exactly one access point to each other layer.

Facing from one base toward the other, the access point on the right side of either base leads directly to the subterranean layer. It is much like a cave opening leading to an underground tunnel. It quickly curves downward until it reaches the middle of the arena underground, making the subterranean layer.

The access point on the left of the base is the start of a path that leads to the canopy layer. At the team base is the base of a severely slanted tree, growing almost completely horizontally. From there, it curves and rises dramatically until it reaches the middle of the arena at a high elevation to form the canopy layer.

On the Terrestrial Layer there are also four other access points to other layers, two to the canopy layer and two to the subterranean layer. Each forest quadrant (refer to sections under “Forest”) has one of these access points. For each access point to one layer at the base, the forest quadrant nearest to that access point has a secondary access point to the other layer. For example, the forest quadrant closest to the access point to the canopy layer on the left side of team 1’s base contains an access point to the subterranean layer.

The C-Forest access points are short toadstool mushrooms with bouncy caps. Insectoids can approach the mushrooms from above, by hopping, flying, etc. and the mushroom bounces the insectoids all the way up to the canopy layer. When reaching sufficient elevation, the insectoid can move in the air to land on a nearby branch in the layer.

The S-Forest access points are holes in the floor of the terrestrial layer that insectoids can simply fall through to enter the subterranean layer. Below the holes are tall mounds of dirt insectoids can land on and scale downward.

3.2.4.1. Unconventional Access

All of the aforementioned access points are conventional forms of inter-layer travel. Any insectoid with any skillset can traverse them thoroughly simply on foot. Additionally, there are multiple forms of unconventional access that are exclusive to insectoids that have the appropriate skillsets. They offer much more flexibility and are much more efficient than the standard methods of traveling between layers. The most common types of inter-layer transportation are flying, digging, and climbing.

For flying, there is a vast open area in the vertical space between the Terrestrial Layer and the Canopy Layer. Any insectoids that can freely fly as part of their controls can freely travel between the two lanes to and from any open points.

Digging can occur between the Terrestrial Layer and the Subterranean Layer at any point where there is open space above the access point in the former and below that in the latter. Besides digging, there are other forms of terrain deformation, some of which can fully penetrate the width of soil between the two layers.

Some insectoids can climb on any surface, even under it. Two common examples are the underside of a tree that forms the Canopy Layer, and any part of the ceiling of the Subterranean Layer.

Since gravity exists throughout the arena, no special skills are required in order to fall from the Canopy Layer to the Terrestrial Layer, but to fall from the Terrestrial Layer to the Subterranean layer requires some recently created opening between the two layers via terrain deformation.

3.2.5. Adapted Insectoids

Most insectoids can function well in the Terrestrial Layer, and all of them can access it easily. The only requirement is to be able to walk on land. The Terrestrial Layer has the most diverse features that make certain types of insectoids even more adept in it than the average.

Aquatic insectoids have a significant advantage due to the major presence of water. They can submerge themselves to disengage from non-aquatic enemies or engage them by surprise and possibly use the water to activate or amplify their adaptations.

Agile insectoids that can hop between the two bridges with ease will have a notable advantage against more stationary insectoids. It can also be advantageous to have ranged attacks and adaptations because staying on a different bridge than your opponent can not only be defensive but also offensive. It can be especially useful when combined with agility. Having both can grant incredible control over a stationary or melee opponent.

While all of these advantages apply to fighting in the layer, mobility and innate inter-layer access can be most useful in the Terrestrial Layer. Their reasons for being advantageous have nothing to do with the properties of the layer itself, but the Terrestrial Layer's unique adjacency to two other layers makes these two qualities more valuable than they could be in either other lane. If an insectoid in the terrestrial layer can easily transport itself to at least one of the adjacent layers quickly, it can have much more control of the entire arena. On the other hand, an insectoid in the Canopy Layer, for example, that could help an insectoid in the Subterranean Layer could not do so as efficiently due to the greater distance. Furthermore, having direct access to either or both of the adjacent lanes can greatly diminish the opponent's adaptation to predict incoming ganks. In addition to having a greater potential to help teammates on other layers, it is easiest to be helped by teammates from the other layers. That also means it is easiest to be attacked by the opponent's teammates from the other layers.

3.3.The Canopy Layer



Concept art of the canopy layer by Harley Weir

The canopy layer is vertically the highest of the three layers in Insecterra. The primary structure of the layer constitutes another path between the two colony bases, which is longer than that by the terrestrial layer. Unlike the terrestrial layer, the canopy layer is not a continuous surface. There is plenty of empty space through which creatures can have a clear view of parts of the terrestrial layer or even fall!

3.3.1. Environment

The Canopy Layer is on the top of the foliage growing from the ground in the Terrestrial Layer. It is among branches and leaves and heavily exposed to the sky. Most of the surface area consists of wooden branches and leaves.

3.3.2. Geometry

The primary substance of the layer is a pair of large wooden branches that begin from the respective left sides of the two bases and slope upward until they reach above the center of the Terrestrial Layer to make an S-shape from base to base. They slope mostly horizontally to form a smooth walkway up to the Canopy Layer from their respective bases. At the bases themselves, the branches emerge from under the ground, almost completely horizontally sloped. Where the branches reach a certain elevation, secondary branches emerge from the main branches and bend in different directions. Some of these branches are more prominent than others and are traversable by foot. Some of them have large leaves growing out of them, some of which are also traversable by foot but are somewhat more flimsy. There are two major branches that spread toward the Terrestrial Layer's access points to this layer, which provide a path to the primary branches.



Schematic of the cross-section of the canopy layer on the horizontal plane

3.3.3. Access to Other Layers

Only the Terrestrial Layer is accessible from the Canopy Layer directly, whereas the Subterranean Layer is not. There are two direct routes to the Terrestrial Layer: the bases of the branches at each base. However, having such a discontinuous topography, the layer has many open areas through which insectoids can fall directly onto the Terrestrial Layer.

3.4. The Subterranean Layer



Concept art of the subterranean layer by Harley Weir

The subterranean layer is vertically the highest of the three layers in Insecterra. The primary structure of the layer constitutes another path between the two colony bases, which is longer than that by the terrestrial layer. Unlike the other two layers, the subterranean layer is limited to local light sources. It is also the only layer completely covered by ceiling. Certain insectoids can scale its walls and walk on its ceiling, upside down.

3.4.1. Environment

The Subterranean Layer is a network of underground tunnels. From wall to wall, the layer is made of dirt and stone and has scattered pools of water. There is no sun, but parts of the layer are lit by glowing fungus and reflection from the water. Most of the lighting in the layer is dim, if at all present.

3.4.2. Geometry

A network of tunnels, the Subterranean Layer is primarily a large S-shaped tunnel. Each end emerges from the respective right side of each base. Near each end of the tunnel, another tunnel branches out toward the center of the layer, meeting the original tunnel near the center of the layer and forming a loop with part of the primary tunnel. At the center of the layer, is a large, somewhat circular area. Two secondary tunnels emerge from the area, leading toward the secondary access points to the Terrestrial Layer and ending in a cul-de-sac-like area around the access point. Another tunnel exists between the cul-de-sac and the looping tunnel at the nearest end of the primary tunnel. However, the surface of this tunnel is covered in water.



Schematic of the cross-section of the subterranean layer on the horizontal

3.4.3. Access to Other Layers

Only the terrestrial layer is accessible from the subterranean layer directly, whereas the canopy layer is not. There are two direct routes to the Terrestrial Layer: the bases of the branches at each base. However, having such a discontinuous topography, the layer has many open areas through which insectoids can fall directly onto the Terrestrial Layer.

4. Characters

4.1. Insectoids

Insectoids are anthropomorphic bugs with human-like fighting capadaptation and a variety of other adaptations. Each insectoid strongly resembles a real-world insect in appearance and has a skillset and personality reflective of its real-world characteristics.

Insectoids are the sole units in Swarm that players can control directly. They are the player characters. Each player is capable of controlling exactly one insectoid per match and controls it throughout the duration of the match. Before every match, players select which insectoids they will play in the match.

4.1.1. Statistics

All insectoids have a set of base statistics that determine how they operate in combat. Insectoid statistics have two main categories. The first is Level 1, which is the base stat at insectoid level 1. The second is increase per level, which is a constant amount that stats increase every time an insectoid increases in level. Insectoid statistics shared among all insectoids are listed in the table below.

	Level 1	Increase per level
Maximum health		
Health regeneration		
Maximum stamina		
Stamina regeneration		
Strength		
Exoskeleton		
Potency		
Immunity		
Agility		
Movement Speed		

The information in the table is unique for each insectoid.

To make sense of the elements in the table, the following definitions is necessary:

Health: the amount of damage that can be withstood before dying.

- Health is capped at a maximum amount.
- If remaining health is below the maximum, health is recovered at a certain rate over time.

Stamina: the primary resource required to participate in combat.

- Stamina is capped at a maximum amount.
- If remaining stamina is below the maximum, stamina is recovered at a certain rate over time.
- Adaptations do not cost stamina.

Strength: the value that determines the capacity to inflict physical damage.

- Most combat attacks deal damage proportional to strength.
- Some adaptations deal damage proportional to strength.

Exoskeleton: the value that determines the capacity to resist physical damage. Physical damage taken is modified using the following formula:

$$Physical\ Damage_{Modified} = \frac{Physical\ Damage_{Initial}}{1 + \frac{Exoskelton}{100}}$$

Infectivity: the value that determines the capacity to inflict infection.

Exoskeleton: the value that determines the capacity to resist infection. Infection suffered is modified using the following formula:

$$Infection_{Modified} = \frac{Infection_{Initial}}{1 + \frac{Immunity}{100}}$$

Agility: the speed of combat in frames per second. Animation speed and combat execution speed increase in sync.

Movement Speed: the rates of travel through various media, in game units. Movement speed has multiple categories.

- Land speed: the rate of travel on a solid surface.
- Airspeed: the rate of travel in the air.
- Swim speed: the rate of travel in water.
- Represented as a vector (e.g. <5, 2, .5>)

4.1.2. Adaptation

Each insectoid has a unique set of five adaptations. One adaptation is a passive adaptation, which functions automatically and cannot be affected by the player directly in any way. The remaining four adaptations are active adaptations, which must be activated by the player to take effect. Both passive and active adaptations can have cooldowns. When an adaptation is activated, it may have a specific duration, or cooldown, that must elapse before it can be activated again. Most active adaptations have cooldowns, and most passive adaptations do not.

4.1.3. Combat

Every insectoid has a set of basic combat moves. Unlike adaptations, combat moves have no cooldowns and do not use the same resource as adaptations. Combat moves require stamina as a resource. Every insectoid has a weak but fast attack, strong but slow attack, shield, dodge, and some form of upward propulsion, such as jumping or flying. These moves are generally used much more often than adaptations. Some insectoids have greater strength in their combat than their adaptations compared to other insectoids. All combat moves expend stamina, depending on the move and insectoid.

4.1.3.1. Stamina

All combat moves use stamina, a resource that is separate from the resource used for many adaptations. Stamina is expended and regenerates relatively quickly. It is designed to limit fights to short and frequent occurrences and encourage players to spend time on the more strategic elements of the game. Stamina should be sufficient to enable effective trades and team fights but not non-stop fighting.

4.1.3.2. Attack

Attacks are the most frequently used form of offense in Swarm. Some insectoids specialize in combat while others barely rely on their combat at all. Most insectoids lie somewhere in between. Attacks vary among insectoids, but they all have three common stages, all of which last a few frames.

The first stage is the wind-up phase. During the wind-up phase, the animation for the move begins as a blend between the insectoid's position upon input and the attack animation. It is nothing more than a visual indication that a move has begun to execute. Effects such as damage are not yet executed. At any point before the next stage, the move can be cancelled by executing another move or is forcefully cancelled when the insectoid receives damage from a combat move or an adaptation.

The second stage is the active phase. During the active phase, targets that collide into the move's hitbox take damage. The animation contains the most frames among all three stages, and none of frames during this phase are ever blended. Unlike during the wind-up phase, the move cannot be cancelled during the active phase by using another move or taking damage. New input from the player and damage from other combat moves is ignored. The duration of the active phase is the longest, in terms of frames.

The third stage is the recovery phase. During the recovery phase, no more damage is inflicted. The animation is a blend between the end of the move and animation corresponding to the current player input. For example, if at the end of a punch attack, the player makes no input and the insectoid is on the ground, the animation will blend between the end of the punch and the insectoid's idle animation. In fact, during the recovery phase, the insectoid can blend into the wind-up phase of a new move, according to input from the player.

4.1.3.3. Shield

Shields enable insectoids to deny damage or recoil from enemy insectoid attacks. The insectoid assumes a defensive position and blocks all incoming damage from combat attacks. Adaptations, on the other hand, ignore shields yet do not interrupt them. Using the shield continuously expends stamina.

The shield is effective against attacks coming from all directions in 3D space, even simultaneous attacks. Therefore, the appearance of the defensive position alone may be ambiguous if it does not appear to be defensive from all sides. An effective way to indicate to players that the shield is effective from all sides is to display a spherical guard around a character when it uses the shield. This approach is used in the Super Smash Bros. franchise, as shown in Figure 1 below.

4.1.3.4. Dodge

Dodging is a follow-up to shielding. While an insectoid's shield is active, the player can input a direction and quickly dash a short distance in that direction. The shield is deactivated during the dash. Dodging only negates damage by avoiding the hitbox of the attack the player intends to dodge. If the hitbox of the attack or even that of a different attack collides into the insectoid in its dodging path, the insectoid takes damage from the attack that hits it.

4.1.3.5. Combos

While there are two combat moves, insectoids can execute combos by using the two moves three times in succession, in any combination. The particular combo depends on the particular order of the attacks used.

C-C-C-Combo Table

<u>Combo Name</u>	<u>Button 1</u>	<u>Button 2</u>	<u>Button 3 (Special)</u>
AAA	A	A	A
AAX	A	A	X
AXA	A	X	A
AXX	A	X	X
XAA	X	A	A
XAX	X	A	X
XXA	X	X	A
XXX	X	X	X

4.1.3.6. Progression

Insectoids progress throughout each game of Swarm, beginning at their weakest level of power and rising in power over time, up to a maximum. Insectoids progression resets at the beginning of each game.

4.1.3.6.1. Insectoid Level

Insectoids begin at level 1 and eventually reach level 20. Insectoids level up in order and cannot skip levels. Upon leveling up, certain insectoid statistics increase by an amount determined by their scaling statistics.

4.1.3.6.2. Adaptation Level

Every time an insectoid levels up, the player can choose to level up one of its adaptations by one level. Adaptations begin at level 0, at which they are unuseable. They can be activated once upgraded to level 1 and can be upgraded up to a maximum level of 6. Adaptations become more effective as they level up. The only exceptions are the passive adaptation with range 1-3, and the ultimate adaptation with range 0-3.

Leveling up adaptations is restricted in the following ways:

1. The passive adaptation is automatically set to level 1 at insectoid level 1. The player cannot choose to activate another adaptation until reaching insectoid level 2.
2. None of the three standard adaptations (not passive or ultimate) can reach a level exceeding twice the level of any of the other standard adaptations at any given time. For example, a standard adaptation cannot be raised to level 3 when any other is at level 1. The only exception is raising a standard adaptation to level 1 when any other is at level 0. However, a standard adaptation cannot be raised to level 2 when any of the others is at level 0.

3. Ultimate adaptations cannot be leveled up higher than any other adaptation at any given time. For example, an ultimate adaptation cannot be upgraded to level 1 until all four other adaptations have been upgraded to at least level 1. Consequently, the earliest levels at which ultimate adaptations can be upgraded are 5, 10, and 15.
4. Passive and ultimate adaptations must be maximized in level by the time the insectoid reaches insectoid level 20.
5. Since insectoids are limited to 20 levels, they cannot maximize all of their standard adaptations. Since all adaptations reach at least level 3, standard adaptations can be given “extra” levels past level 3. There are 6 “extra” levels to allocate among the three standard adaptations. As a corollary, there are 10 ways to choose how many times to level up each standard adaptation before reaching insectoid level 20.
 - a. Two out of three adaptations can be set to level 6 (3 ways).
 - b. All three adaptations can be set to level 5 (1 way).
 - c. The three adaptations can be set to levels 4, 5, and 6, in any order (6 ways).

4.1.3.6.3. Experience

Insectoids level up by gaining experience (XP). There is an exponential relationship between insectoid level and experience needed to level up. In mathematical terms,

$$XP_1 = 0 \text{ and}$$

$$XP_{\text{Level}} = B(1 + c)^{\text{Level} - 2}, \text{ where Level} > 1 \text{ and } c \text{ is some constant such that } 0 < c < 1.$$

XP is obtained through the death of nearby enemy units, up to a certain range, which includes workers, insectoids, and sentinels. Each unit grants a flat amount of experience upon death that is constant throughout a match. If there are multiple recipients of experience from a unit, the experience is divided among them in a way that varies under specific conditions.

Workers provide a varying amount of experience that correlates with the intrinsic power of the particular type of worker.

Insectoids provide an amount that correlates with their level.

Vanguard sentinels all provide a flat amount that is greater than that of any worker or insectoid.

Guardian sentinels provide a flat amount that is greater than that provided by a vanguard sentinel.

4.1.3.7. Crowd Control


Crowd control is a category of effects from attacks and adaptations that limit the voluntary behavior of an insectoid or worker. There are a wide variety of effects, yet some effects are combinations of other effects.

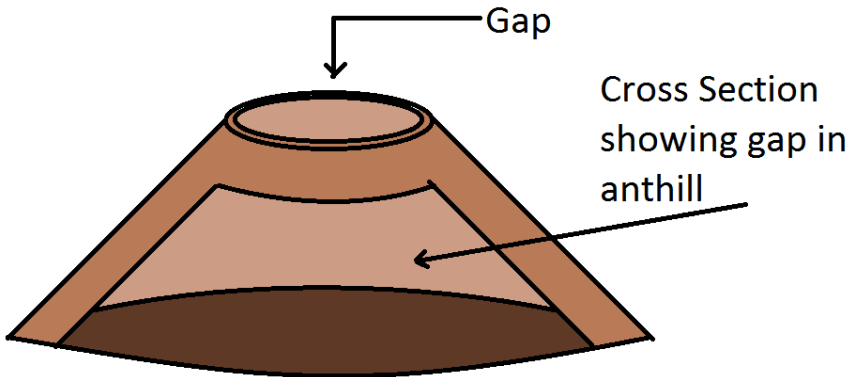
Crowd control types are typically categorized into two groups: hard and soft. Hard types of crowd control completely remove control of the character, whereas soft crowd control reduces it to an extent. Below is a table of crowd control types and their effects.

Type	Effect	Components	Soft or Hard
Slow	Reduces movement speed	Percent reduction, Duration	Soft
Stun	Inhibits all actions	Duration	Hard
Root	Inhibits all movement	Duration	Soft
Silence	Prevents use of adaptations	Duration	Soft
Knock-up	Propels up into the air	Height, Speed	Soft
Knock-back	Propels away from and in the direction of the impact, meanwhile preventing all actions	Distance, Speed	Hard
Cripple	Prevents use of combat	Duration	Soft
Sleep	Inhibits all actions for a duration or until damage is taken again	Duration	Hard
Terrify	Causes the victim to run away from the inflictor slowly, meanwhile unable to perform any actions	Duration	Hard
Freeze	Inhibits all actions but player's attempted movement reduces duration	Duration, Movement limit	Hard
Ground	Prevents flying	Duration	Soft
Lure	Causes the victim to run toward the inflictor slowly, meanwhile unable to perform any actions	Duration	Hard
Haul	The victim is transported in the direction willed by the inflictor and cannot perform any actions	Distance, Speed	Hard

4.1.4. Characters

There are currently three insectoid characters under development, and they are described in detail below. There are currently several more designed insectoids awaiting development. The list will expand as more insectoids undergo development.

<div>Warmica</div> <div>“The Shaker of Mounds”</div>	
<div>Race: Ant Primary Role: Bruiser Secondary Role: Support Combat Type: Melee Favored Layer: Subterranean</div>	
Passive Adaptation	March
<p>After running while outside of combat for a short duration, Warmica’s movement speed increases and his next damaging combat move or adaptation does increased damage.</p>	
Adaptation 1	Use your head!
<p>Warmica charges forward and headbutts whatever is in front of him, causing severe impact upon whatever his head hits.</p> <ul style="list-style-type: none">-If the headbutt hits an enemy, the enemy takes damage.-If it hits a wall of terrain, the wall shakes violently, causing a piece of the terrain to fall to the ground near the point of impact.-If the piece of terrain falls on an enemy, it inflicts damage to the enemy and deteriorates. Otherwise, it stays where it lands for a duration as a moveable object.	

Adaptation 2	Need a Lift?
<p>Warmica lifts a movable object, enemy, or ally in front of him over his back. He can hold one at a time, indefinitely at the continuous cost of stamina. Activation while holding something causes Warmica to throw what he is holding toward the direction of his aim.</p> <ul style="list-style-type: none"> -Objects Warmica throws disappear upon collision. -Enemies Warmica throws take damage upon being thrown. -Enemies impacted by anything Warmica throws take damage. 	
Adaptation 3	Mound Pound
<p>Warmica slams the ground directly below himself, forming an ant mound above the ground. Whatever is caught in the attack is trapped inside the ant mound, until it can escape through its opening on top or until the ant mound fades over a short time. Enemies caught take damage. Warmica can hold up to two charges of this adaptation.</p>	
	
<p>Activating this adaptation inside an existing ant mound creates a temporary tunnel to the adjacent layer through the ant mound. Mound Pound only works on dirt surfaces.</p>	
Ultimate Adaptation	P.O.W.
<p>Warmica does a quick, short hop and then slams the ground with his feet. The impact propels Warmica high into the air.</p> <p>If Warmica is inside a mound upon using this adaptation, it collapses as he ascends after the impact. Enemies trapped inside the mound take high damage and are trapped under the remains and stunned until the mound fades after a certain duration. Allies are expelled from the opening on top of the mound as it collapses.</p>	

If Warmica is outside a mound, the impact causes a tremor in a large area around the location of impact that lasts a short duration. Enemies in the area take high damage and are slowed for the duration of the tremor.

Vexpula

“The Princess Bee”

Race: Wasp
Primary Role: Mage
Secondary Role: Assassin
Combat Type: Melee
Favored Layer: Canopy



Passive Adaptation

Servant's Oath

Every time one of Vexpula's servants performs its duty, it gives up its life, along with a permanent increase in Exoskeleton and immunity, for Vexpula.

Adaptation 1:

Drone Strike

Vexpula summons a drone at her location and commands it to fly in a straight line, up to a certain range, in the direction of her aim. The drone impales the first enemy it collides into with its stinger, inflicting damage and hauling it through the remainder of its trajectory. When the drone reaches its maximum range, whether it has collided into an enemy or not, it disappears and activates Servant's Oath once.

Adaptation 2:	Honey Cart
<p>Vexpula summons a healer bee bearing honey, which appears a set distance from where she aims. The bee flies at a constant speed toward Vexpula, following her if she moves. If it reaches Vexpula, she recovers a certain amount of health, and the bee disappears. If it collides into an enemy, it damages and slows the enemy significantly and disappears without delivering the honey to Vexpula. In either case, the healer bee activates Servant's Oath once, upon disappearance.</p>	
Adaptation 3:	Her Majesty's Sting
<p>Vexpula winds her stinger back, and leaps toward a target location of her choice on the ground. As she arrives toward the location, she dives stinger-first from the air toward the surface and finally slams her stinger against it. If she stings an enemy, the enemy is momentarily stunned.</p>	
Ultimate Adaptation:	Hive Breakout
<p>Vexpula drops her hive down from the sky at a target location, knocking enemies below it down to the ground in its drop and inflicting high initial damage in its landing area as it lands. Immediately after the hive lands, bees from inside the hive swarm around the hive for a short time, inflicting additional damage upon all enemies near the hive.</p>	

Lady Dectrix	
"The Vicious Vixen"	
Analogue: Black Widow Spider	
Primary Role: Warrior	
Secondary Role: Assassin	
Combat Type: Ranged	
Favored Layer: Canopy	
Primary Resource: Health	
Secondary Resource: Energy	

Passive:	Black Web Whip
<p>Lady Dectrix wields a whip made of strands of her unique black web. The web thrives off the continuous suffering of its victims. Every time Lady Dectrix strikes an enemy with the black web whip, it gets excited and becomes more flexible and limber, raising Lady Dectrix's attack animation speed on each consecutive hit. The effect wears off if there is no following strike in a very short duration.</p>	
Adaptation 1:	Tongue-lashing
<p>Lady Dectrix's tongue is dripping with her deadly poison. Upon drawing the next lash, she licks the tip of her whip, applying the poison to it. Her next strike will poison the target, causing it to suffer continuous damage over a short time. During that time, her subsequent strikes with her whip will do bonus damage.</p>	
Adaptation 2:	Widow's dungeon
<p>Lady Dectrix releases pheromones that spread around her up to a certain range, producing an alluring scent in an area around her. The scent remains within the bounds of the area for a duration. Any enemy insectoids caught by the pheromones at any point is unable to exit the bounds of the area by its own volition. They can, however, be forcefully expelled by certain forms of crowd control.</p>	
Adaptation 3:	Bondage
<p>Lady Dectrix shoots a spider web in a line in front of her. The web wraps around and stuns the first enemy it hits for a short duration. The duration is increased for every time Lady Dectrix whips the stunned enemy up to a certain number of times.</p>	
Ultimate Adaptation:	Love Bite
<p>Lady Dectrix closes in on an enemy insectoid and bites its neck with her poisonous fangs. The bite inflicts moderate initial damage and then more damage after a short delay. During the delay, the upcoming damage will increase for every time Lady Dectrix strikes the target with her whip.</p>	

4.2. Workers

Workers in Swarm are the primary substance of a colony in Swarm. They make up the majority of the colony and are bred frequently from the colony nest. There is an unlimited supply of workers for each colony. Therefore, unlike insectoids, workers are dispensable pawns in a battle between colonies.

There are various types of workers. The appearance of a worker is a combination of bug and beast attributes that altogether do not make it resemble any particular type of real-world bug.

4.2.1. Combat and Statistics

Workers interact in 3D space with insectoids and other workers. They can receive damage from insectoids the same way other insectoids do through basic combat, but they attack differently than insectoids. Workers attack on regular, timed intervals (auto-attack) and normally don't have multiple attacks and never any combos.

A worker has a subset of the statistics of insectoids. Workers have the following statistics: Health, Strength, Infectivity, Exoskeleton, Immunity, and Movement Speed.

4.2.2. Behavior

Workers are programmed to reach the other base via a direct path between the bases in a particular layer. They are assigned layers based on their adaptations or lack, thereof. For example, workers that can swim will most likely be sent to the Terrestrial layer, and workers that cannot fly will *not* be assigned to the Canopy layer.

While working toward their primary objective, workers can be distracted. They are also programmed to fight enemies they encounter and aid allies in danger. In order of priority, from most important to least, the following are the actions workers will take.

1. Attack the nearest *enemy insectoid* that has recently attacked a nearby *ally insectoid*.
2. Attack the nearest *enemy worker* that has recently attacked a nearby *ally insectoid*.
3. Attack the nearest *enemy worker* that has recently attacked a nearby *ally worker*.
4. Attack the nearest *enemy sentinel* that has recently attacked a nearby *ally worker*.
5. Attack the nearest *enemy insectoid* that has recently attacked a nearby *ally worker*.
6. Attack the nearest *enemy worker*.
7. Attack the nearest *enemy insectoid*.
8. Travel toward the *enemy nest*.

Note that workers are not aggressive toward sentinels. Sentinels automatically attack the nearest worker, provoking the group of workers to attack the sentinel.

Each worker has two ranges that determine what it can attack: attack range and signal range. A worker's attack range is how far away an enemy can be from the worker to take damage from it. If a worker is out of the attack range to attack its target, it will take the shortest path to its target. A worker's signal range is how far away a worker can be from an *ally* that is under attack by an enemy to receive the ally's signal for aid. The signaled worker's distance from the enemy is irrelevant. Once a worker receives a signal, its assigned target becomes the enemy that attacked the ally from which the signal came, provided the worker's current target has lower priority than

the new target. Signals last a short duration after they are received. After the short duration, the duration can be refreshed if the signal continues to be sent. If the signal is not refreshed, the worker abandons its target.

4.2.3. Role in Swarm

The primary role of workers is to aid their ally insectoids in infiltrating the enemy colony's base. Insectoids are not powerful enough to do so on their own due to interference from the enemy sentinels. The damage output of the sentinels is much too high for insectoids to sustain, so they must use workers as decoys to take the sentinel damage.

Workers have a few secondary roles, as well. They can aide insectoids in fighting other workers and insectoids. Workers also exert pressure in each lane that can oblige enemy insectoids to occupy themselves with clearing them in order to protect their base. They also contribute to damage caused toward enemy sentinels and the enemy nest.

4.3. Sentinels

Sentinels are powerful, stationary creatures that restrict access to a colony base. They have the highest damage output and duradaptation of any creature in Swarm. Due to their immense power, enemy insectoids and workers cannot pass them and enter the base without working together to destroy them. Each colony has four unique sentinels. Three of them occupy one of each layer, and the remaining one occupies the base. The three in the layers are called vanguard sentinels, and the one at the base is called a guardian sentinel.

Any insectoid targeted by a sentinel is condemned to receive the sentinel's attack until it dies or exits the sentinel's escape range. Workers are targeted until they die, exit range, or an insectoid becomes the target. Workers never replace an insectoid within the sentinel's escape range as the sentinel's target.

4.3.1. Vanguard Sentinels

Vanguard sentinels occupy part of their layer. All three types of vanguard sentinels share a set of common characteristics.

1. All block the path to their respective colony bases. They are located precisely where no enemy could enter the base without entering their attack range.
2. All can only attack one target at a time. That means enemies could potentially pass the sentinel while it is attacking another enemy.
3. All have a limited attack range in 3D space.
4. When a vanguard sentinel attacks an enemy, the attack will follow and always reach the target.
5. Their attacks all become stronger, indefinitely, upon each consecutive attack toward the same target.
6. None can regenerate health.
7. None can be resurrected once destroyed.

4.3.1.1. Taraxarat

Location: Terrestrial layer

Appearance: Taraxarat is a dandelion with a spiky, towering stem. The stem has large, razored leaves. Taraxarat's flowerhead has a face in the middle wearing an aggressive facial expression.

Attack: A Taraxarat shoots balls of pollen from its mouth at a single target within a range. The ball of pollen ignores collision with non-targets and explodes upon colliding with the target.

A unique feature the terrestrial sentinel has among the sentinels is that it has a second form when it is killed. Like a real dandelion, the terrestrial sentinel has a reproductive stage, or "seed stage," in which its petals and stamens are replaced with seeds.

Attack (seed stage): A Taraxarat no longer has ammunition of its own and therefore cannot shoot individual enemies. Instead, it periodically releases parachuted seeds that drift toward the location of the sentinel's target enemy. When these seeds land on the ground, they disappear and germinate for a short duration, growing up to be miniature versions of the Taraxarat at its first stage. These miniature Taraxarat have the same behavior as Taraxarat at its first stage, but they are much weaker, have a shorter range, and do not have a seed stage.

4.3.1.2. Kudamon

Location: Canopy layer

Appearance: A Kudamon is fruit creature that resembles the face a dragon. It is magenta with green spikes, much like the dragon fruit. From the canopy branches, it is suspended by the neck.

Attack: Kudamon squirts juice at a single target in a continuous stream. The juice inflicts damage and grounds targets for a short duration.

4.3.1.3. Hook and Slash

Location: Subterranean layer

Appearance: Hook and Slash are a pair of plant roots that emerge next to each other from the walls of the subterranean layer. Hook has several sub-roots along its length, and Slash is smooth but has several sub-roots at its end, resembling a lash. Hook and Slash share the same health.

Attack: When a target gets in range, Slash attacks by whipping the target periodically, inflicting heavy damage. When Slash's target escapes Slash's range, Hook quickly reaches toward Slash's target to wrap around and grasp it. If the target cannot avoid Hook, it is hauled by Hook back into the edge of Slash's range and then released but takes no damage from it.

Whenever not re-acquiring Slash's target, Hook stays dormant near the wall from which it emerges. Hook has a longer range than Slash but is not provoked by a target before has Slash attacked it since it last entered Slash's range.

4.3.1.4. Attack Ranges

All vanguard sentinels have a pair of ranges: provocation and escape. The two ranges are always concentric spheres, the provocation range being smaller than the escape range.

Sentinels begin to attack an enemy when it enters the provocation range. After beginning to attack it, the sentinel can continue attacking it even if it exits the provocation range but not past the escape range. Taraxarat and Kudamon each have both of these ranges, but in the case of Hook and Slash, Slash exclusively has a provocation range, and Hook exclusively has an escape range.

4.3.1.5. Target Prioritization

All vanguard sentinels attack enemies in order of priority, which is as follows:

1. The first *enemy insectoid* to attack a nearby *ally insectoid*.
2. The nearest *enemy worker* (if no insectoid is currently the target).
3. The nearest *enemy insectoid*.

4.3.2. The Guardian Sentinel

There is one type of guardian sentinel. It lives at the colony base, rooted between the nest and the entrance of the base. The guardian sentinel is the final line of defense for a colony nest. It is theoretically possible to destroy the nest without killing the guardian sentinel, but attempting is not recommended. Its damage output and health are the greatest of any creature on Insecterra. Therefore, it must be approached with great caution. It is highly recommended that insectoids reach their maximum power, mobilize several waves of workers to the enemy base, and subdue the majority of enemy insectoids before attempting to confront the guardian sentinel together. Appearance: The guardian sentinel is a three-headed carnivorous plant, resembling a Venus fly trap. Between the three heads are several large, thorny vines and spiky leaves.

Attack: Unlike the vanguard sentinels, the guardian sentinel does not target individual enemies but inflicts area of effect damage to all nearby enemies simultaneously. The guardian sentinel attacks with sharp vines that spring from the ground at the location of each enemy and impale them. The attack is technically AoE but visually appears to target individuals.

The guardian sentinel deals massive damage in each of his attacks, but the damage is split equally among multiple targets. For example, if there are four enemies being attacked, they each take a quarter of the sentinel's base attack damage.

5. Gameplay

5.1. Overview

There is a universal set of fighting controls that all insectoids have in common. This includes, but is not limited, to a punch, jump, shield, and dodge.

Swarm shares gameplay elements that are characteristic of the RTS. Players will control waves of fighting NPC's remotely. Unlike the standard RTS, players will also have a character with local coordinates in the arena.

Each Swarm game has two teams of 3, making a total of six players. These two teams compete, and cooperation among teammates is essential for success.

Players will have a selection of multiple characters and must choose exactly one to play as for each game. Each of these players have a unique set of adaptations and statistics determining the damage output of their attacks and adaptations, damage resistance, movement speed, etc.

Currency that enables itemization of players and allied units to modify their statistics and grant them access to new adaptations.

In addition to innate statistics that vary among characters, itemization can enhance their stats.

Players have the opportunity to gather currency throughout the entire game by accomplishing tasks on the field, such as last hitting enemy workers. They can spend their earnings on their itemization, making a pivotal component to the strategy of the game.

5.2. Game Loop

5.2.1. Pregame: Insectoid selection

Before the game begins, all players must select the insectoid they will play for the entire game.

They may choose an insectoid among the insectoids that are available to their user account. They must also specify which role they will take. No two players on the same colony can select the same insectoid.

5.2.2. Core Game Structure

The flow of the game can be described in three phases: the early game, the mid game, and the late game.

5.2.2.1. Early Game

The early game is when the players on each team assume the role they bid for during the pre-game selection phase by occupying the corresponding part of the arena (i.e. their layer).

5.2.2.2. Mid Game

The mid game usually begins when one or more of the players have destroyed a sentinel, essentially “winning” the layer. Since at least one lane has gained the advantage, the player who won the layer has some freedom to roam to other layers to help his team. The layer winner will also need to outsource in order to continue gaining currency, for the opposing worker waves will reach equilibrium farther away from the ally base. Even though a sentinel is destroyed, the colony will not yet be able to access the nest, due to the presence of the much more powerful guardian sentinel. The insectoids and workers need to become stronger, which can be accomplished by itemizing the insectoids and workers.

5.2.2.3. Late Game

The late game begins approximately when every insectoid has reached maximum level and is almost fully itemized. Colonies will frequently fight in teams, competing for the final advantage they need in order to finally destroy the enemy nest. The entire game should take approximately 30 minutes.

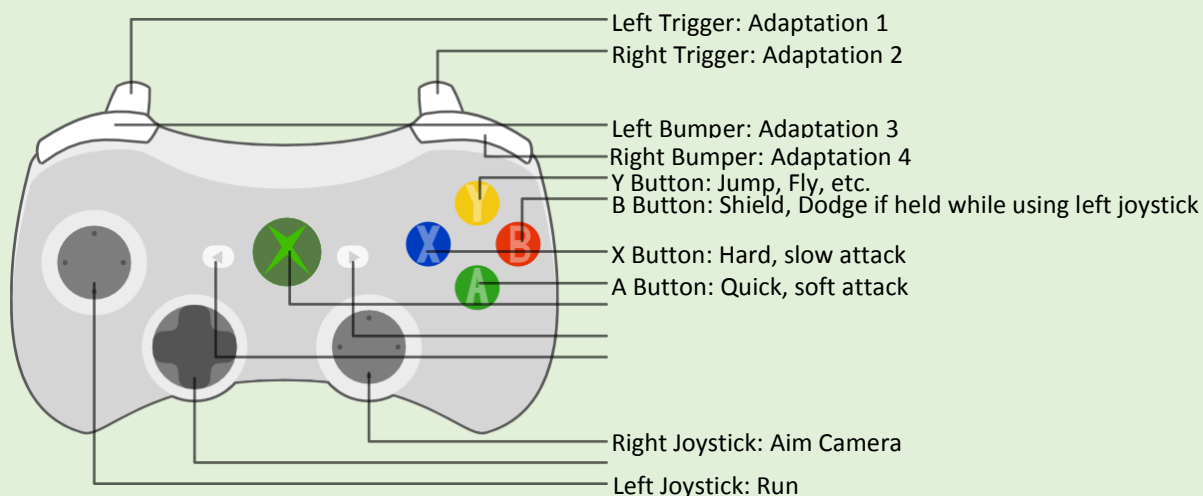
5.2.2.4. Win/Lose Condition

The colony that destroys the enemy colony’s nest wins the game, and the other colony loses. The game ends when a nest is destroyed, so it is not possible for both colonies to destroy a nest. In the astronomically rare case that both colonies destroy each other’s nests at the same time, however, the colony with the most kills wins.

6. User Interface

6.1. Controls

In a game of Swarm, each player directly controls one insectoid, and each insectoid is directly controlled by one player. Using the Xbox 360 controller as a template, below are the controls that are common among all players and insectoids.



6.2. HUD

The Swarm HUD is designed to provide immediate information that the player needs without obscuring any important areas of vision.

Using a third person camera centered slightly above the player, it is essential that the player has as much vision as possible in the top half of the screen, especially near the center. The player character's actions are very forward-focused. The player should have a clear view of the horizon if the camera is at a neutral vertical angle. Therefore, there should be minimal HUD on the top, and it should be limited to corners.

The top right corner displays the player's number of kills, deaths, and assists (KDA) and each team's total kills to its right.

The sides of the screen are also important for the player to see at all times. Danger approaching from the sides should be detectable. It is also necessary for a general sense of what is going on around the player. While the player's focus is primarily at the center of the screen, peripheral vision is useful to detect sudden movement. Therefore, there should be minimal or no HUD on the sides. On the other hand, the view right behind the feet of the player character is not essential for vision. The player character can do very little, if anything, between itself and the camera. Therefore, most of the space can be used at the center-bottom of the screen. However, there should be enough space so that the player character is not cramped by the HUD.

The most frequently needed HUD is placed at this location because it is nearest to the player's area of focus (the player character) and is therefore the most quickly accessible. The health, stamina, and adaptation statuses are the most frequently needed information, so they are placed at this location. The adaptations are placed according to their button locations on the controller (displayed as A1-A4 below). The exception is the passive adaptation (PA), which centered above the health bar.

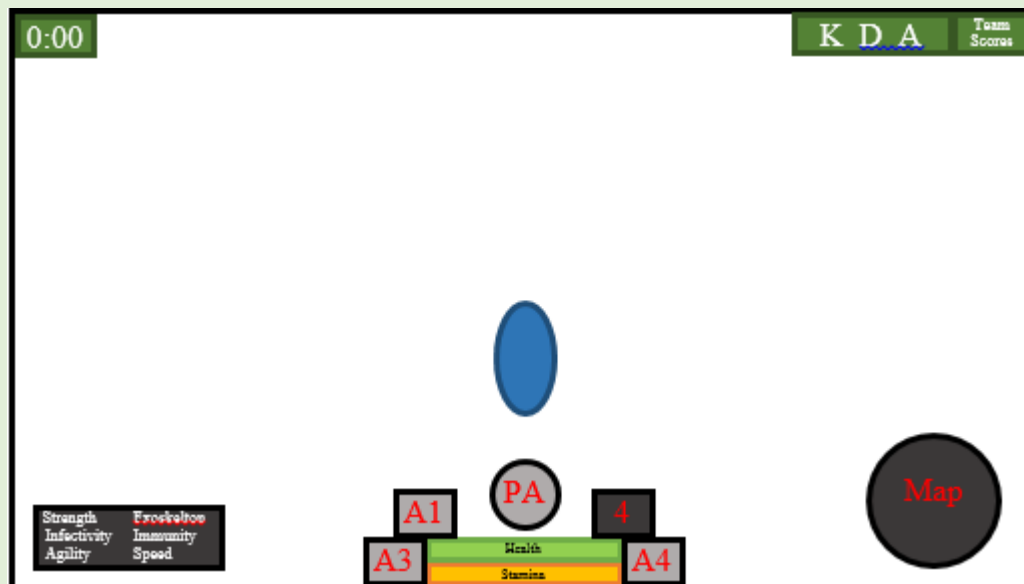
The bottom corners can tolerate some HUD because they are not as essential as the top and sides, but movement should still be perceivable in those areas. The HUD elements in the corners have margins so that if anything approaches from a corner, the player can see it throughout the short duration between the moment it enters the screen and the moment it becomes obscured by the HUD. Consequently, the player can react as early as something enters the screen from a bottom corner.

The bottom right corner contains a circular minimap, and the bottom left contains a box that displays the primary statistics that are the most dynamic throughout the game (e.g. strength).

6.2.1. Adaptation Cooldowns

When an adaptation is on cooldown, the box for the corresponding adaptation darkens and displays the remaining duration of the cooldown in seconds. When the remaining duration drops below 1 second, the duration is displayed in tenths of a second. As an example, adaptation 2 is on cooldown below with 4 seconds remaining.

6.3. HUD



7. Out-of-game Client

Swarm uses an out-of-game client to launch the primary game. The client enables users to create a player profile and log into it through the client. Players start their matches through the client and are returned to the client after the conclusion of the match.

7.1. Player Profile

The player profile stores information such as the player's username, basic profile information, and information about previous matches.

7.2. Starting a Game

A player can start playing a game of Swarm by invoking the client to start a game. The player can create or join a custom game or enter a matchmaking queue to be matched with a sufficient number of players to play a game.

7.3. Matchmaking

Swarm uses a matchmaking algorithm that uses player statistics to match players with other players of roughly the same skill level. As soon as the player chooses to be matched, the matchmaking system places the player into the back of a queue. Matchmaking can take a duration depending on how long it takes for the player to reach the front of the queue. Instead of using a single, large queue, multiple queues are processed concurrently. Whichever queue the player joins is determined by the matchmaking formula.

7.4.Character Selection

Swarm uses a matchmaking algorithm that uses player statistics to match players with other players of roughly the same skill level. As soon as the player chooses to be matched, the matchmaking system places the player into the back of a queue. Matchmaking can take a duration depending on how long it takes for the player to reach the front of the queue. Instead of using a single, large queue, multiple queues are processed concurrently. Whichever queue the player joins is determined by the matchmaking formula.

7.5.Post-game Statistics

Swarm uses a matchmaking algorithm that uses player statistics to match players with other players of roughly the same skill level. As soon as the player chooses to be matched, the matchmaking system places the player into the back of a queue. Matchmaking can take a duration depending on how long it takes for the player to reach the front of the queue. Instead of using a single, large queue, multiple queues are processed concurrently. Whichever queue the player joins is determined by the matchmaking formula.

7.6.Social Networking

Users are able to add other users as friends in the client. The client displays a friends list. Through the friends list, users can chat with each other and invite each other to match-made or custom games.

8. Audience, Platform, and Marketing

8.1.Target Audience

Swarm is primarily geared towards experienced gamers who possess both peak mental acuity and dexterity for strategy and action. Nevertheless, there is certainly room for novice and intermediate gamers. In some cases, players may be much more adept to fighting games than MOBA's, or vice versa. Swarm is targeted to both of these types of players, as it fuses the experience of both demographics. Swarm may not be optimally suited for casual gamers, but a system that matches players by their skill, exemplified in previous matches, can enable casual players to be matched only with players at a similar skill level.

8.2.Platform

PC Game with Xbox Controller or PS4 Controller As a fighter game, Swarm is incredibly fastpaced and actionpacked. Thus, the control input must be synchronized with the player's reaction time and allow multiple forms of input, simultaneously.

9. Technical Specs

- Game Engine – Unreal
- Game Platform – PC
- Hardware Requirements- XBOX 360 controller
- Operating System - Windows 7 and above.
- Recommended Internet Speed - 1 Mbps