

University of California, Irvine  
ICS 187  
**“Biohazard”**

*Project Professor:* **Professor Dan Frost**

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**Design Document**  
Final Iteration

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# Table of Contents

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Overview.....	3
Game Specifications.....	6
Rules and Mechanics.....	6
Music and Sound.....	11
Background Story.....	11
Characters.....	12
Levels.....	15
Cut Scenes.....	21
Artificial Intelligence.....	22
Additional Concept Art.....	23
Technical Specifications.....	28
Programming Languages.....	28
Code/Engines.....	28
Target Hardware and Operating Systems.....	28
Classes.....	28
Algorithms.....	28
Version Control.....	29
Schedule.....	30

## Overview

The 2-D side scrolling game is something most people considered outdated and tired. Many games of the late 1980s and early 1990s used this method of implementation and were quite popular. However, after a while, there were so many out in the market and most were just like the next. We, at Neutrinos Games, understand that this is a classic genre of computer gaming and we wanted to take advantage of this by creating a 2-D side scroller, however, adding story elements into the game that would make it stand out from the rest. In order to inspire a entertaining and extraordinary feeling to games, many developers of 2-D side scrollers tend to set the environment in another time period or fantasy world in order to create an escapist reality. This can be seen in popular classic side scrollers such as the original Contra and Metroid series, which took place in the distant future, or the Castlevania series, which transported players to the past. Instead, we decided that instead of looking far out for game ideas, we should look “inward” for something that players can directly relate to, yet imaginative enough so that players can transcend mundane reality. Thus, we looked inside ourselves for our game setting and came up with “Biohazard”.

“Biohazard” is an action/adventure game set as a 2-D side scroller. You, the player, will be “the White Blood Cell” (WBC) and the main character of the game charged with the mission to eradicate a young boy’s body of the destructive J-Virus. The game begins with Jason, an average, healthy, 15-year-old boy on his way to buy a new computer game. He is walking behind a man that is noticeably ill. He is coughing and sneezing uncontrollably and Jason decides to walk past him rather than in his wake.

Unfortunately, this was a deadly mistake because as he walks past the man, he unintentionally breathes in the J-Virus, which later leads to the infection.

Meanwhile, in Jason's mouth, a new WBC has just been assigned by Central Command to guard against oral infection. The player will begin his/her adventure here. They will play the WBC on its first day of work and although they don't know it yet, it will lead to a huge adventure that will take them to the furthest reaches of "inner space."

The game play for "Biohazard" will have the player enter the mouth and thus, starts the first level of the game. For each level, the player must complete a mission in order to move on to the next level. As the player moves up in the levels, the missions will get relatively harder. Various germs and enemies will be featured in each level for the player to fight off. Occasional power-ups will be strategically placed to help the player along in the missions. Each of the missions takes place in the various parts of the body such as stomach, nose, and throat, which have been affected by the virus, and thus needs the help of the player to protect the body from further infections.

In order to kill the germs, the player is given weapons to shoot with and fight them off. Depending on the germ, the player will need to shoot at the enemy a certain number of times by clicking a key to fire the weapon. By using arrow keys on the keyboard the player will maneuver through the levels from left to right, eradicating enemies until facing a boss at the end of the stage. Defeating the stage boss will signal the end of the

level. After completing all the missions, the last mission will be for the player to defeat the virus itself with a special type of ammunition given to the player in the previous level.

“Biohazard” will play like most other 2-D side scrollers, however it will be supported with a strong and interesting story that many people have not seen in any gaming genre. We at, Neutrino Games, expect our audience to enjoy our product and not only find it fun to play but also an engaging story to follow. Another interesting aspect of our game is the fact that we are not necessarily creating this game for the male gamer. This game will appeal to the rare female gamer as well because its tone is non-gender specific. Thus, we are aiming for an audience of both genders probably of the teen age group and up.

# **Game Specifications**

## **I. Rules and Mechanics**

### *Player*

The player will be able to move forward and back with the arrow keys on the keyboard, and jump with the spacebar. Pressing a direction will also set the orientation the player is facing. The player will have 2 types of weapons, a primary weapon and secondary weapon. Primary weapons will fire linearly, and is ideal for taking out enemies in lines. Primary weapons will fire upon the input of the “X” key. Secondary weapons will inflict damage in a nonlinear fashion, and is ideal for taking out enemies in a small area. Secondary weapons will fire upon the input of the “Z” key. Generally, weapons will fire in the direction the player is orientated.

### *Health and Lives*

The player’s Health Bar and Lives will be displayed in the upper left hand corner of the screen. The player will begin with a full Health Bars and 3 Lives. The Health Bar will deplete when the player takes damage from enemies. When the player’s Health Bar is depleted, the player will lose a Life and return to the game, starting once again with default equipment and a full Health Bar. When all of the player’s Lives have been used, then the game is over.

Another health meter showing the health of Jason will be displayed below the player’s health meter. At the start of the game, it will be quite low because it is the height of Jason’s infection. During each mission the meter will decrease slowly as the infection

takes affect on Jason's health. It will act as a timer for the player so that they complete their objectives in a timely matter. If this meter is completely depleted the player loses and the game is over. However, as each mission is completed, Jason's health meter is increased an eighth of the bar, thus, the threat of not finishing the objective in time is only in the beginning of the game.

### ***Weapons***

The player will begin with the default "Plasma Pistol" (primary weapon) and "RBC Grenades" (secondary weapon). When a player picks up a new primary weapon, the weapon will automatically switch to the new weapon. If the player uses up all their ammunition for their new weapon, they will fall back to the Plasma Pistol. If the player picks up another new primary weapon, the player will drop the current primary weapon. If a player picks up a new secondary weapon, the player will drop the current secondary weapon, and utilize the new one. Once ammunition for the secondary weapon is empty, the player will no longer have a secondary weapon until more ammo is found or a new secondary weapon is picked up.

### ***Primary Weapons***

*Plasma Pistol:* the default weapon for the player, it fires with a medium range doling out an average amount of damage. Thus, the player must shoot an enemy an average amount using this gun. (Note: the number of times a player must shoot an enemy with this weapon is the average amount of shots it takes to terminate an

enemy (i.e. other weapons will take more or less shots to destroy an enemy according to its power level).

*Enzyme Blaster*: a faster weapon that fires more shots in a given amount of time than any other gun, however with a lower hit damage. The advantage to this gun is that it can eliminate enemies faster but requires more ammunition to be effective.

*Anti-Body Cannon*: a very powerful weapon that can take out many enemies with a minimum number of shots but with a longer re-fire rate. This gun is very effective against stronger enemies but weaker against a large number of them.

### ***Secondary Weapons***

*Spit Ball*: an effective antibacterial weapon that eliminates a small grouping of enemies. Has a shorter throwing range and only eliminates a few lower order enemies but helps in large fights.

*Acid Burst*: a high acidic bubble appears that when generated, eliminates all enemies within a close range of the player. This secondary weapon helps when the player is surrounded or overwhelmed by enemies.

*Peroxide Bomb*: a powerful secondary attack that creates a stream of H<sub>2</sub>O<sub>2</sub> that will eliminate any enemies on the player's path. A very strong weapon that should only be used sparingly because it is a rare find.

### ***Power-ups***



The player may encounter various power-ups throughout the game. The power-ups will be temporary and should assist players in achieving their objectives. The most common temporary power-up will be the health regenerator. Each health power-up will increase the player's health meter by a fourth. Another common pick-up item will be ammunition. All the primary weapons are powered by the same ammunition, thus, there is only one type of ammunition the player must pick up for their weapon. There is also another type of ammunition pick-up for secondary weapons and like the primary weapons, the same type of ammunition powers all secondary weapons. There will be two additional temporary power-ups available to the player. One will be a shield, which will make the player invulnerable to any attacks. It will only last for 45 seconds but should aid the player in advancing heavily guarded areas. The second power-up will be a damage amplifier that doubles the damage of the player's weapon. This power-up will only last for 30 seconds but will allow the player to reduce the amount of enemies they face.

### ***Game Ending***

There are really only a few ways for the player to end the game. The player can deplete all their energy and die which will end the game without the ultimate goal achieved. Another way the player can end the game is if he/she takes too long to complete their mission. The health meter displaying Jason's health will decrease slowly during each mission. However, this will proceed very slowly; the only real risk of the player ending the game this way is highest in the beginning missions of the game. Or the player can proceed successfully through all the missions and face the final infection at the end and defeat it, in which case, the player will have won and the game will end. Full

development would allow the player to save his/her progress during the game but we do not anticipate implementing that feature of the game during this software cycle.

### ***Game play***

The player is a WBC set inside the body of a 15-year-old boy, named Jason. He will start the game a healthy teenager but very quickly he will be overtaken by a serious infection that the player must defeat. The player will fight the infection in various parts of Jason's body, the mouth, nose, nasal passages, throat, tonsils esophagus, and lungs. This environment should have a biological "look" and the atmosphere should be hazy. The objective of the player is to destroy bacteria by moving through the stage from left to right. The player will have to shoot the attackers and depending on the character, they will require a different amount of hits to effectively kill the attacker. When an enemy is destroyed, it will flicker and fade away. At various points during their missions, there will be voiceover briefings updating the player on new objectives. This will be accompanied by text in case the player does not have sound available to them. The physics we're using for this game will be the same as standard physics where there will be normal gravity and liquid splatter.

## **II. Music and Sound**

### ***Music***

The music we will be using for this game will be taken from the soundtrack of *Kingdom Hearts*. *Kingdom Hearts* is a game developed by SquareSoft.

## ***Sound***

The sound will either be recorded by our group or, if possible, found online and used in the game. Sounds will mainly be of an atmospheric nature and will include, but not be restricted to: weapon shot, power-up pick up, a damage shot, jumps, jump landings, turning valves, etc.

## **III. Background Story**

Jason is a healthy 15-year-old living in Irvine, California. Like many other teenage boys, he enjoys playing video games, specifically, computer games. He has spent many hours buying and updating his system so he can play his games with the latest in computer gaming technology. On one of his usual trips to Fry's, a computer electronics store, he walks behind a man that seems to have a cold. But this is no mere cold; Jason doesn't know it yet, but he's breathing in the airborne J-Virus, a malicious organism that eats away at internal tissue.

Meanwhile, inside of Jason's mouth, a WBC has just been assigned to his first task as frontline defense against oral infection by Central Command. The J-Virus infection will block Central's ability to create more antibodies to help in the fight. The WBC will have to fight off the deadly infection facing germs of all forms before ultimately destroying the dreaded J-Virus...alone.

## **IV. Characters**

### ***The White Blood Cell***

This is the main character of the game that must fight off the infection that has invaded Jason's body.

### ***Jason***

This is the environment the WBC will be fighting in. Jason is an average 15 year old boy who gets infected with the J-Virus which the WBC must eliminate before he succumbs to the disease.



Concept Art of J-Virus

***J-Virus***

Two headed female organism that infects Jason's lungs. She mutates rapidly and kills tissue without a second thought. She attacks cells by biting through the cell membrane and extracting the nucleus while the cell is still alive. She sets up an infection by creating

an egg sac that continually generates germs to defend her territory. These germs spread the infection throughout the body and mainly along the respiratory system. The only way of defeating the J-Virus is with penicillin ammunition.

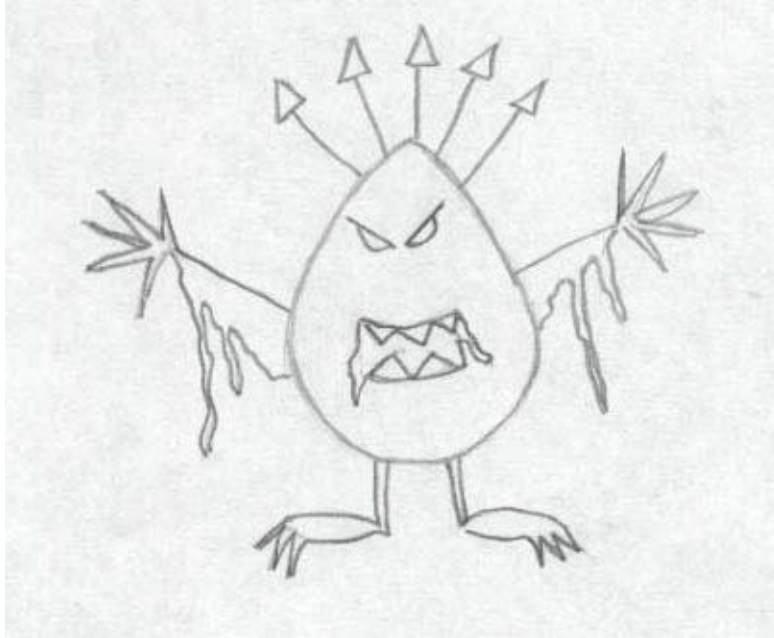


Concept Art of Grunt

### ***Enemy Germs***

Divided into three tiers, these are the J-Virus' warriors that the WBC must defeat before it can reach their leader.

*Grunt Germ*: the weakest of all the germs, this warrior is only capable of hand-to-hand combat. Although they are weak individually, they are overwhelming in numbers.



Concept Art of Major Grunt

*Major Germ*: a mid-level germ, this warrior has a firing attack that is considerably stronger than the Grunt's. This germ is a substantial threat to the WBC however not undefeatable.

*Germinator*: the highest order germ, this warrior has a strong cellular membrane and a long range firing attack that is quite capable of killing the WBC. The slow pace of the Germinator is the only advantage the WBC has in gaining the upper hand.

## **V. Levels**

A brief note on the missions: these missions are the main missions we would like to implement if we had the time to do so. But by our estimates we will only be able to develop a portion of these missions for our project. Thus, the missions we plan on completing will be marked by an asterisk (\*).

*Mission 1: Infection \**

*Setting:* Jason's mouth, along the surface of the tongue.

*Objective:* You are a new WBC assigned to defend Jason from infectious diseases by Central Command.

*Description:* The WBC will start the mission out while Jason is still healthy. As the mission proceeds, there will be a few Grunt Germs advancing on the WBC that he will be able to defeat quite easily. Then all of sudden, a huge wave of the Grunts will invade which will overwhelm the WBC. He will survive the attack but he will have failed his objective because Jason will be infected after this mission. The J-Virus will block Central Command from producing any more WBCs to help fight the infection, which means he will have to fight off the infection alone. Central Command will still be able to communicate his objectives to him throughout his fight.

*Mission 2: Fever*

*Setting:* Jason's brain, around the base of the brain, near the Hypothalamus.

*Objective:* Jason's hypothalamus is under the control of the Grunts causing blood to rush to his head and giving him a fever. The WBC must eliminate all Grunts around the Hypothalamus and reset it to bring Jason's fever down.

*Description:* The WBC will start the mission near the Hypothalamus and advance on the area while eliminating Grunts on the way. Once the area is secure, it must push the reset button located on the Hypothalamus. This will allow the brain to readjust Jason's body temperature so that his fever subsides. The WBC will be given a secondary objective,



which will be to assist in bringing down the fever faster. It will need to find three veins in the area and open their valves, releasing the blood from the brain. However, these will be guarded by additional Grunts.

*Mission 3: Stuffy Nose*

*Setting:* Jason's nostrils, within the nose but close to the nostril.

*Objective:* The mucus in Jason's nasal passages have been infested with Grunts, so much so, that Central Command feels Jason should just blow out all the infected mucus. The WBC must find the emergency release lever and break the membrane holding the mucus in the nose.

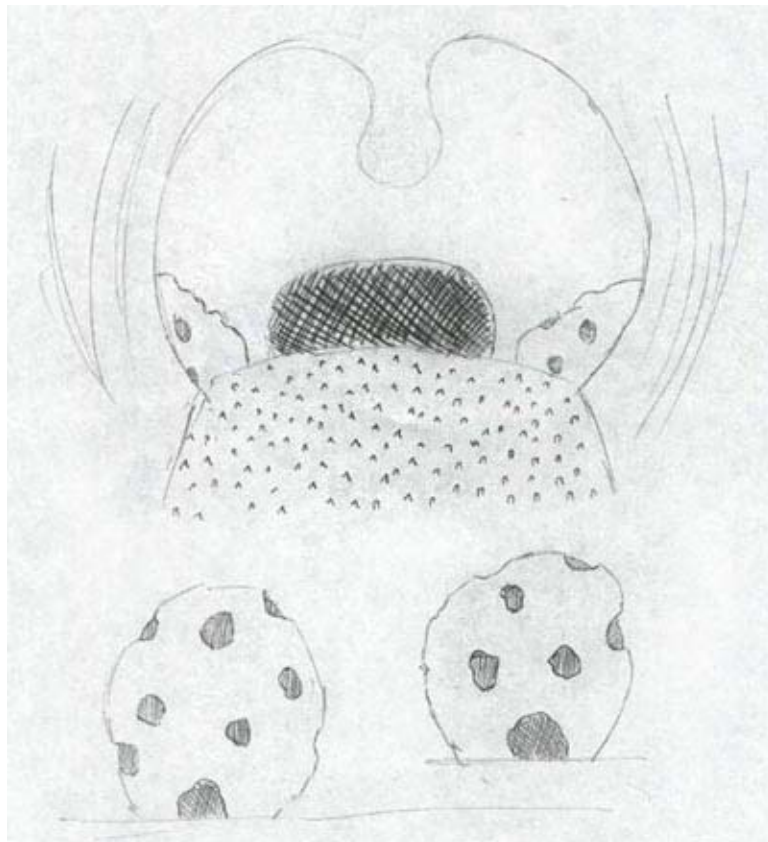
*Description:* The WBC must wade through the mucus to find the emergency lever all the while being pursued by the numerous Grunts contained in the mucus. The WBC can avoid the Grunts if it moves fast enough because the mucus prevents the Grunts from advancing very quickly. Once the valve has been released, the WBC must escape the mucus membrane before it breaks. It will be given 90 seconds to escape to the back of the nose before everything gets blown out.

*Mission 4: Stomachache \**

*Setting:* Along the esophagus, proceeding down towards the stomach.

*Objective:* The Major Germs have setup a Yack Apparatus at the base of Jason's esophagus. This machine is shooting food back up to Jason's mouth causing him to vomit. The WBC must shoot down these flying pieces of food traveling up Jason's throat and eventually destroy the machine.

*Description:* The WBC will start halfway down the esophagus and must start shooting down the flying pieces of food. It doesn't need to shoot down every piece but the more it misses the more Jason gets sick. Once the WBC reaches the Yak Apparatus, it must eliminate the Majors before destroying the machine. After getting rid of the machine, the WBC will notice a medicinal capsule located behind it. It will not know what to do with it yet, but it'll pick it up for analysis by Central Command.



Concept Art of Tonsils and Mouth

*Mission 5: Sore Throat*

*Setting:* Jason's tonsils

*Objective:* The Grunts and Majors have commandeered the tonsils and are wreaking havoc with Jason's sore throat. The WBC must cleanse the tonsils of these infections.

*Description:* The WBC will start the mission somewhere in between the tonsils, he can begin at either one but he must clear out both of them to complete the objective. The Germinator will be introduced during this mission as the leader of the germs who've taken over the tonsils. There will be a Germinator in each tonsil that the WBC must deal with. Both tonsils will be heavily fortified and the WBC will face many enemies before completing this mission.

*Mission 6: Rash and Sores*

*Setting:* Just below Jason's epidermal layer along the length of his arm

*Objective:* The infection is trying to get worse and is attempting to create sores and rashes under Jason's skin. The WBC must stop this before it gets any worse.

*Description:* To eliminate this threat, the WBC will travel down one of Jason's arms in a self-guided vehicle and destroy as many budding sores as possible. While it is doing this, Majors will be stationed along its route to try to deter it from the objective at hand.

*Mission 7: Sneezing \**

*Setting:* Jason's nasal passages

*Objective:* Several groups of Majors and Grunts are causing Jason to sneeze uncontrollably. The WBC must stop this before it is too late.

*Description:* There is an urban legend that says if a person cannot stop sneezing they will die because their heart will stop beating. Jason cannot stop because of the germs and he only has 7 sneezes before his heart will stop pumping. Although his sneezing is blasting a few of the germs out of his nose, most are still there. The WBC must get to four groups of germs and destroy them before Jason sneezes 7 times. Central Command is helping out by redirecting the sneeze blasts out through Jason's mouth so that the WBC won't be blown out with the rest of the germs. But there is a problem and the blasts are returned through the nose. The WBC must complete the objective while trying to stay inside Jason's nose.

*Mission 8: The Remedy \**

*Setting:* Jason's lungs, at the main infection site

*Objective:* The WBC has finally fought off all the symptoms of the J-Virus; it must now go and eradicate the J-Virus itself.

*Description:* It will be revealed that after analyzing the capsule found behind the Yack Apparatus actually contains the antibiotics needed to destroy the J-Virus. Central Command will update the WBC's weapon to harness these antibiotics and have a stronger attack. The WBC will start the mission near to the infection site, but it must fight its way in. Since the J-Virus is aware of its imminent demise, it has hurriedly produced minions to stop the WBC. There will be Grunts, Majors and Germinators to deal with before the WBC gets to fight the deadly virus. She will have two attacks: a pathogen gun that inflicts heavy damage when hit, but the shot travels slowly; and a

Grunt generator that creates several Grunts at a time to attack the WBC. Once the WBC has destroyed the J-Virus, Jason will return to a healthy teenager and the game will end.

## **VI. Cut Scenes**

### ***Introduction to the game***

The game opens with an introduction to Jason; he is walking through the store behind a coughing and sneezing man. The player (an WBC) is then shown inside Jason's mouth and is being given a briefing of his responsibilities for his first day on the job. A cut back to Jason shows him passing up the sick man. Another cut goes back to the WBC milling about, somewhat bored with his job. The player starts to see some Grunts coming down towards him and is told to defend from infection. This goes directly into the first level.

### ***After the first level (which the player fails automatically)***

The germs are shown taking over the mouth, and destroying all the other antibodies on duty. They are then seen spreading throughout the body cutting off Central Command from any action. The WBC is briefed on the status of the situation and is given his objectives. While the WBC is being briefed, Jason is shown with a fever and the WBC then travels to the brain to fight the infection.

### ***Each following level***

Roughly, each mission will start will proceed about the same way. It will start with the WBC getting briefed on the current status of Jason, and what the next objective is. While the WBC is being briefed, there will be a cut to Jason's progress, this will usually show

the current symptom he's suffering from (i.e. sore throat, sneezing, vomiting). Then the WBC will travel to fight the symptom off.

### ***The end of the game***

After the virus is defeated by the player the virus will begin to dissolve and the WBC is victorious. Jason will be shown as a healthy, happy teenager again.

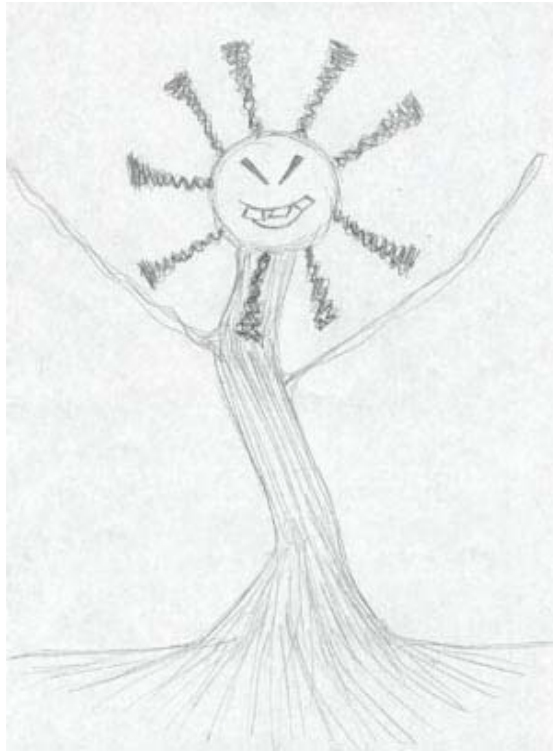
## **VII. Artificial Intelligence**

### ***Enemy***

The grunt germ will attack the player by moving towards them with the intent to kill.

The more advanced germ will have weapons that allow them to shoot the player. The final J-Virus will have special attacks on the player, which include infection bombs and germ generating guns.

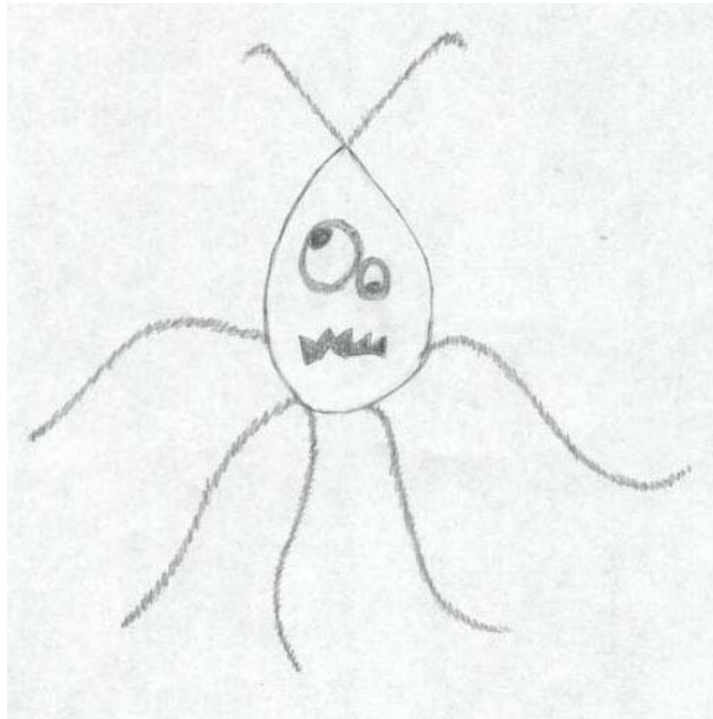
## VIII. Additional Concept Art



Concept Art of Brain Minion



Concept Art of Nasal Passages

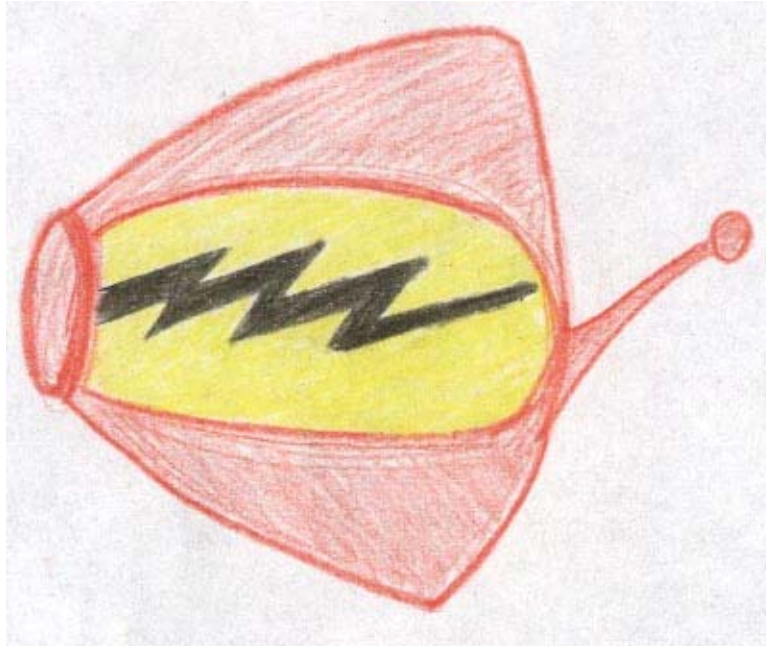


Concept Art of Grunt

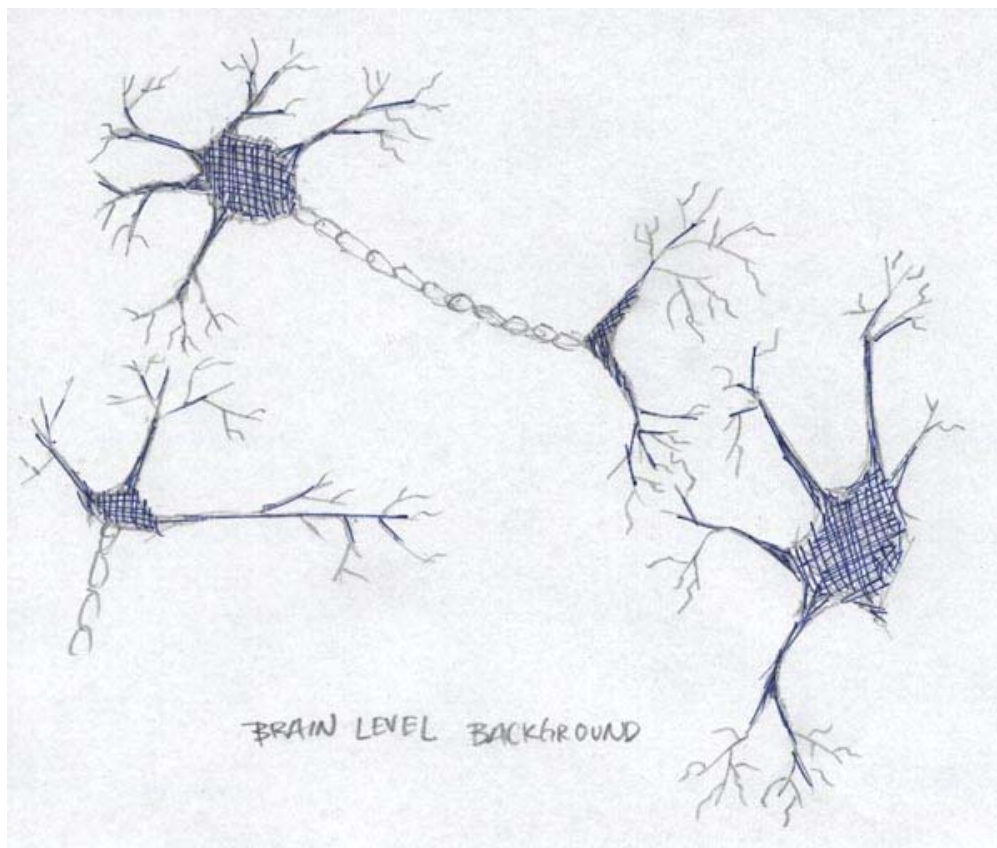


Concept Art of Grunt (Colored)





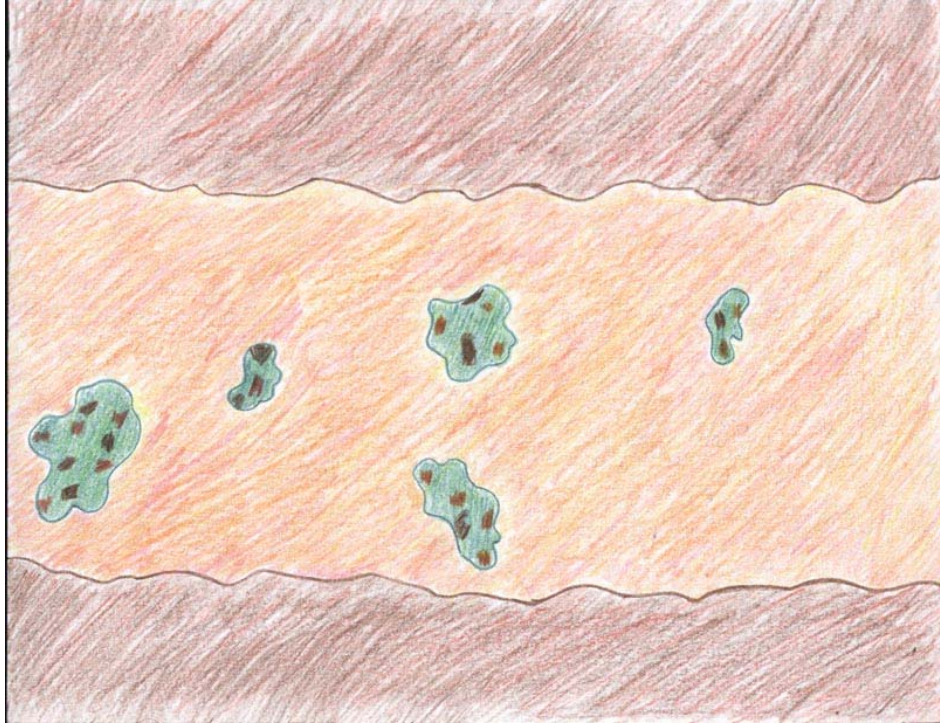
Concept Art of Yack Cannon



Concept Art of Brain Level



Concept Art of Jason



Concept Art of Stomach Level (Colored)

## **Technical Specifications**

### ***Programming Languages***

The program we will be using is Macromedia Flash MX. We will also be coding in ActionScript. We wanted our game to look and feel more cartoon-like and fun since we thought that that would work best for our intended audience, kids ten and up. With Flash, we will be able to achieve the look we want which is not so much detailed 3-D and technical but more interactive and animated.

### ***Target Hardware and Operating System***

#### ***Minimum Requirements***

- Windows 95 or higher
- 100 MHz CPU or higher
- 16 MB RAM
- Soundcard
- Video – minimum requirement: VESA card

### ***Algorithms***

Enemies will be located at fixed locations on the current level. They will lay dormant until triggered by an event initialized by the player or if the player gets within a specified range of the enemy. Once an enemy is in attack mode, it will remain so until destroyed or if the player manages to move past a certain range from the enemy. We will use a shortest path algorithm to determine how the enemy approaches the player. Once the player is within attacking range, the enemy will attack.

### *Version Control*

We will use WinCVS 1.20 for version control in our project, which we downloaded at

[www.wincvs.org](http://www.wincvs.org).

## Schedule and Personnel

There will be three main components to the development of our game: Models, Cut scenes/Animation, and Game coding. Our schedule will be formed around these three parts. After completing the modeling phase of our game, we will divide up into two separate teams, one to complete the animation and cut scenes the other to handle the coding of the game. This division of responsibilities helps in keeping people on track and avoids letting people “slip” by without participating too much. Everyone will be depended upon for a certain part of the game. The responsibilities and our milestones are listed below:

<b>Week</b>	<b>Member</b>	<b>Responsibility</b>
1	n/a	Group formation
2	Mark Lee	Email professor about group formation and members.
3	All	Come up with game ideas, and research techniques for creating games.
4	Mark Lee	Put first design document together for rough draft, write overview, story, and character portions.
	Janessa Wong	Create concept sketches for game characters and environments.
	Derek Young	Research 3-D techniques and game engines, write the cut scenes portion of the design document
	Lloyd Vu	Research 3-D techniques and game engines, write the technical specifications of the design document
5	Mark Lee	Revise and complete final version of design document, add schedule to document

	Jennifer Suwanagorn	Revise and update technical specifications for final version of design document.
	All	Begin character modeling to be completed by 6 <sup>th</sup> week.
6	Mark Lee	Character modeling (Grunt Germ, Major Germ, and Germinator)
	Jennifer Suwanagorn	Character modeling (Jason, WBC, and the J-Virus)
	Janessa Wong	Background modeling (Mouth and Lungs)
	Derek Young	Background modeling (Stomach and Brain)
	Lloyd Vu	Item modeling (power-ups weapons)
7	Mark Lee, Jennifer Suwanagorn, Derek Young	Begin work on game development.
	Janessa Wong, Lloyd Vu	Begin work on animation and cut scene development.
8	Mark Lee, Jennifer Suwanagorn, Derek Young	Have half of the levels completed by this week.
	Janessa Wong, Lloyd Vu	Have half of the cut scenes completed by this week.
9	Mark Lee, Jennifer Suwanagorn, Derek Young	Complete game levels by this week or late this week.
	Janessa Wong, Lloyd Vu	Complete cut scenes and animation by the end of this week.
10	All	Integrate music, sound, and voice into game. Testing in the latter part of the week.