

# INTERCEPTORS

## DESIGN DOCUMENT

March 30, 2021 | 2.0

**CSCI437 GROUP 5**

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## SUMMARY

Progress through levels defeating scores of varying enemies while avoiding attacks.

Enemies have different attacks and attack patterns. Kill them to raise your score.

Work through them all until you get to the boss, which you must defeat to win the level.

# OVERVIEW

## About Interceptors

Interceptors is a top down, 2D aerial combat game in the spirit of Ace Combat. It will involve the player piloting the titular interceptor and battling continuous waves of Alien invaders on a vertically scrolling screen. The player will be able to receive power ups and take on various classes of enemies in a variety of worlds. The player will also be able to utilize their personal “time stop” ability, to freeze the rest of the enemies on the screen and wriggle out of difficult situations. After defeating the boss of each level, the player will continuously progress until the Alien menace has been defeated. Stake your claim as the greatest pilot to fly!

**“Stake your claim as the greatest pilot to fly”**

## Profile

Genre	Top-Down Arcade Shooter
Platform	PC
Market	Youth and young adult, age 8-28, shoot 'em up fans, aviation fans
Setting	2144, Earth. The Near Future
Plays like	Ace Combat meets Space Invaders / Galaga

# RELATED GAMES

## Ace Combat

Publisher	Namco, Access Games
Genre	Combat flight simulator
Platform	PC, console
Year	1995



Ace Combat is a combat flight simulator game with a plot of stopping a terrorist organization. Basic aerodynamics are provided. Players complete missions to earn money for new equipment.

Interceptors is like Ace Combat in that it is also an aircraft shooting game. Unlike Ace Combat, Interceptors does not focus on realistic flight simulation. It is a top-down game, easier for players of all skill levels to get started with and have fun!

## Galaga

Publisher	Namco
Genre	Fixed shooter
Platform	Arcade
Year	1981



In Galaga, the player controls a lone starfighter to defeat all invading enemy spaceships. Enemy spaceships have different abilities, including capturing other jets.

Interceptors is like Galaga in that it is also a shooter game with aircrafts. Unlike Galaga, Interceptors gives you more control over the aircraft. Player may move up and down as well as left and right in Galaga. With a setting on Earth instead of the deep space, Interceptors gives players more colorful backgrounds.



## Ikaruga

Publisher	Treasure
Genre	Shoot 'em up
Platform	Arcade
Year	2001



In Ikaruga, the player controls a mechanical air gunship  
With the goal of defeating enemies and scoring points  
in premade challenge screens

Interceptors is like Galaga in that it also incorporates a lot of bullets  
onscreen, and the goal is to win with the highest score. Unlike Ikaruga, the enemies in Interceptors  
fly on set trajectories, but their every movement is not precomputed

# PLAYER COMPOSITION

## Player Persona

### Will's Player Persona



"I'm just looking for a quick game to relax in my free time"

**Age:** 22

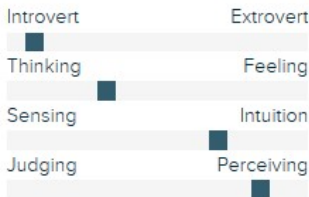
**Work:** Scribe at a local hospital

**Family:** A pet named Bubs

**Location:** 1347 Richmond Rd,  
Williamsburg, VA 23185

**Character:** Reliable, quiet

#### Personality



Dedicated Deliberate Busy Kind

#### Needs and Goals

- Often overloaded with work, needs a simple game to relax
- Wants to graduate and attend medical school
- Also wants to run a successful supplements business

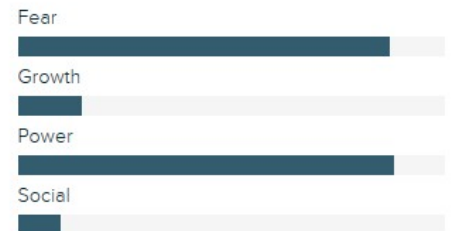
#### Frustrations

- Wants an easy to understand game with quick levels to unwind in his limited free time
- Many modern games require a large time investment to become fun

#### Bio

Will is a hardworking college student pursuing an advanced CAMS degree while pulling long shifts at the local hospital. He is very passionate about health, and is striving to grow his fledgling business selling Amino-Acid supplements. He is a dedicated and deliberate individual, who spends quality time every day caring for his pet Bubs. Between all of these responsibilities, Will has very little time to relax. He loved strategic, fast paced games growing up, but has difficulty playing many modern games due to the large time investment required. Will is looking for a simple to understand game that he can enjoy in his limited free time, that is still entertaining enough that he gets the chance to fully unwind.

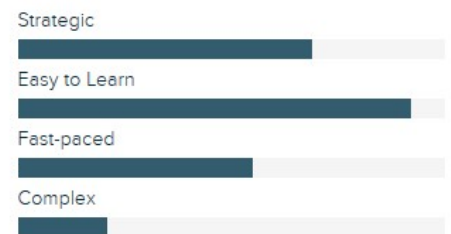
#### Motivations



#### Brands & Influences



#### Preferred Games



## Design Decision Guides

This persona helps us demonstrate that our game should have very intuitive controls – so much so that an extremely minimal tutorial will be enough for our users to pick up the game.

It also shows that our target users will want the game to be fast paced and strategic, which allows the game to have a lot of depth without overwhelming the player with complexity.



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# WORLD



The year is 2144. Humanity has begun to spread throughout the solar system, and claim its place as a spacefaring civilization. However, aliens from beyond the Sun have seen the green glint of Earth from their own system, and have spent the last several million years flying their battle fleet to our home. They have finally arrived, and have caught humanity completely by surprise.

During their initial attack on the planet, whole population centers were massacred by their advanced laser beam weapons. You, a skilled fighter pilot, are the only known human to have survived one of these laser strikes. The resulting radiation gave you the ability to control your perception of time at will, letting you stop time and maneuver out of the clutches of alien weaponry.

You, with your time stop ability, are the only person capable of beating back the alien menace. All the world has left at its disposal is a measly outdated interceptor, which you must now fly into the heart of the alien fleet to save Earth once and for all!

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# CHARACTERS

## The Pilot:

Nameless and faceless, this is the player character represented by the interceptor sprite. Having taken a dose of alien radiation, the Pilot is able to stop time at will, and is the only hope Earth has of countering the alien fleet.

Armed with an old fighter jet, the pilot will maneuver around the screen, launching a hail of bullets at all the enemies in front of their plane, receiving power-ups from airdrops, and stopping time with a recharging ability.



## Screamers:

Named for the loud noise that their high-powered engines produce, screamers are the alien strike craft. Fast and maneuverable, these planes will sail across the screen at breakneck speed, but will shatter after receiving only minor damage.

## Bogeys:

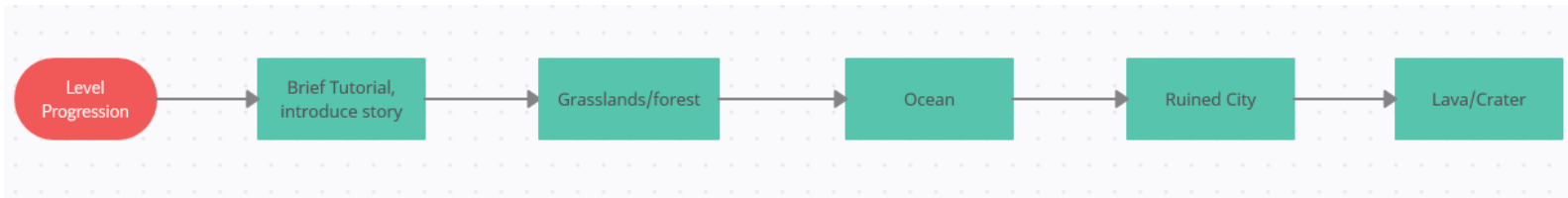
The all-around alien fighter craft. Bogeys combine speed, firepower, and durability into a terrifying package. These are the main alien enemies that the player will encounter.

## Flagships:

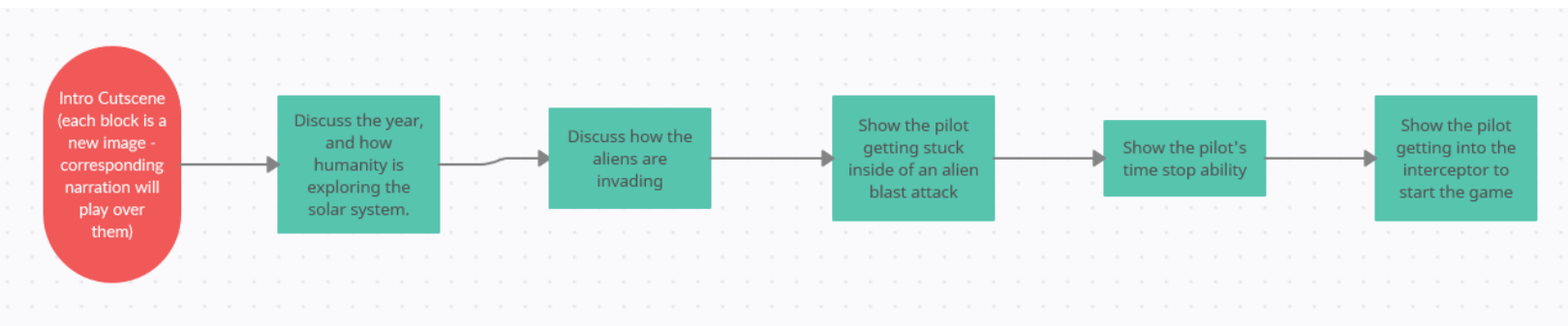
Huge, incredibly tough, and packing more firepower than a modern battleship, these ships launch fighters and coordinate the Alien assault. These are the main targets of the player's mission, and once they defeat a flagship the level will be over.

# PROGRESSION GRAPHS

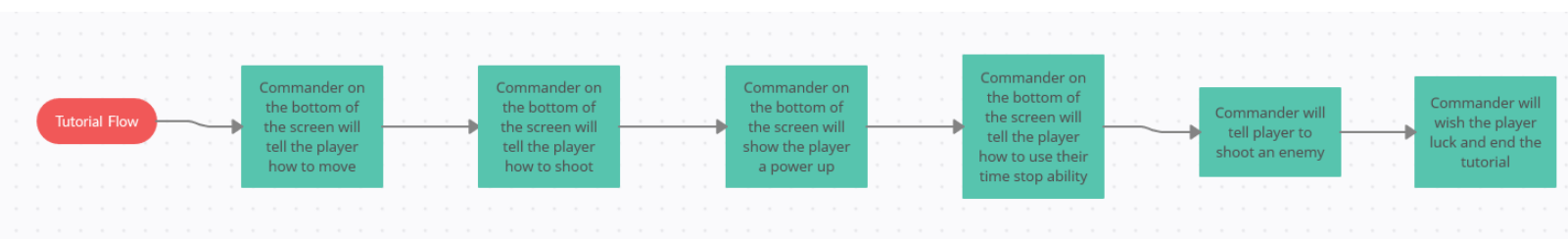
## Level Progression



## Intro Cutscene Storyboard



## Tutorial Flow





# ART DIRECTION

All sprite work will be drawn by the team for this game. That includes enemies, the player's plane, and bullets. The art style will be simple, reminiscent of 16 bit graphics. Several images are already completed, such as the player's aircraft and the power up boxes sprite.

The backgrounds may or may not be drawn by the team - we are currently planning a standard (forest), city, water, ice, desert, and lava worlds. We may or may not paint these backgrounds ourselves, depending on our timeline.

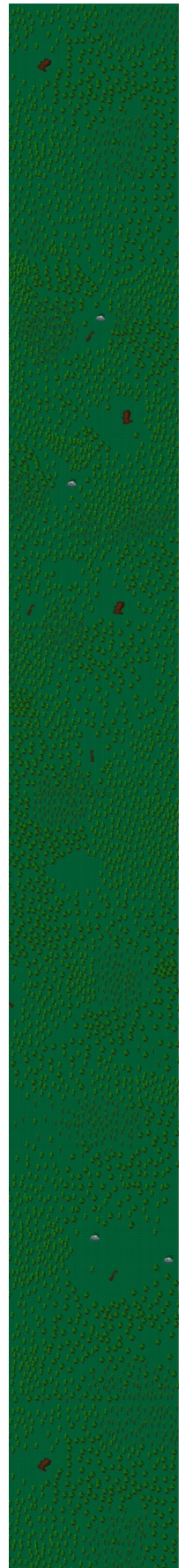
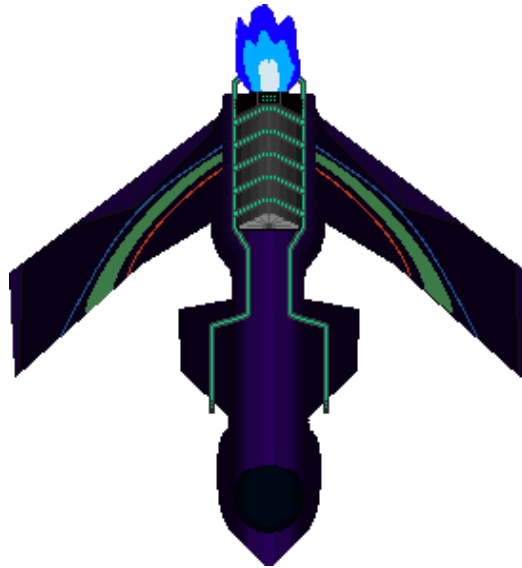
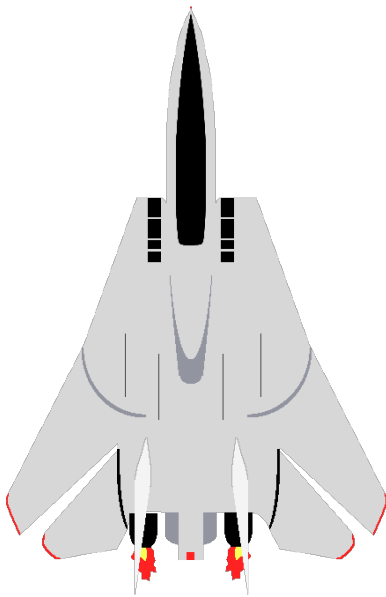
The images on this page are reference images that detail the general style of the game.



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# CURRENT ARTWORK

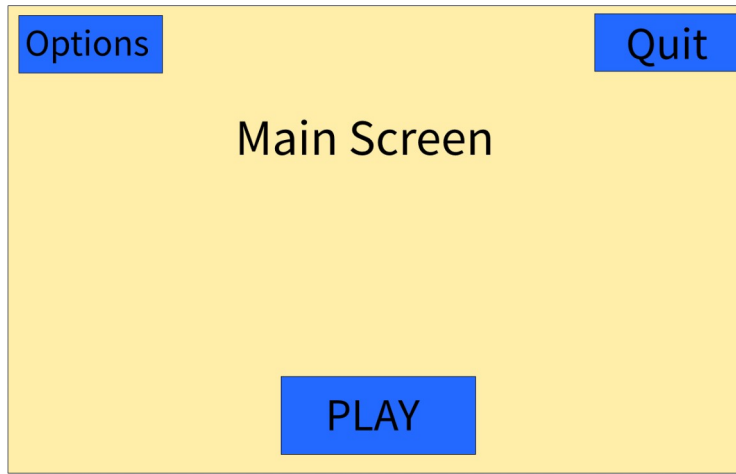
The images on this page represent the current artwork that is currently implemented in the game



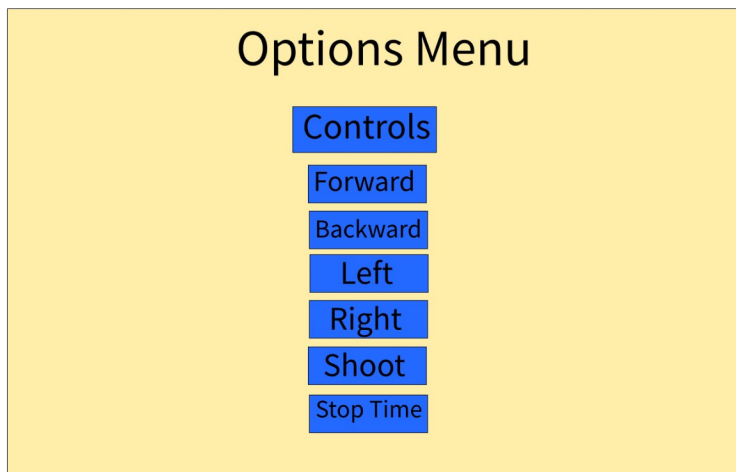


# UI STORY BOARDS

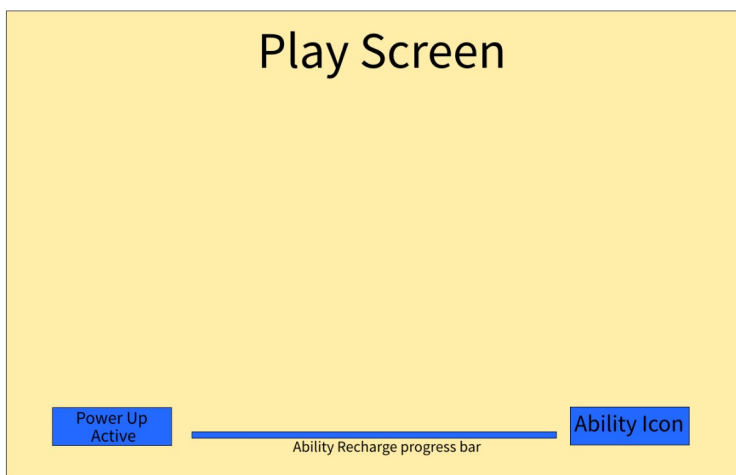
Title Screen:



Menu:



HUD:



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## TAGS AND DIALOG

TUTORIAL1: “Welcome pilot. You’ve had a bit of a rough past few days – its good to see you back behind the sticks.”

TUTORIAL2: “This bird’s a little older than the jets you’re used to flying. Let me give you some tips to help you get into the swing of things.”

TUTORIAL3: “Press the INSERT MOVEMENT KEYS HERE to move in the direction you want to go”

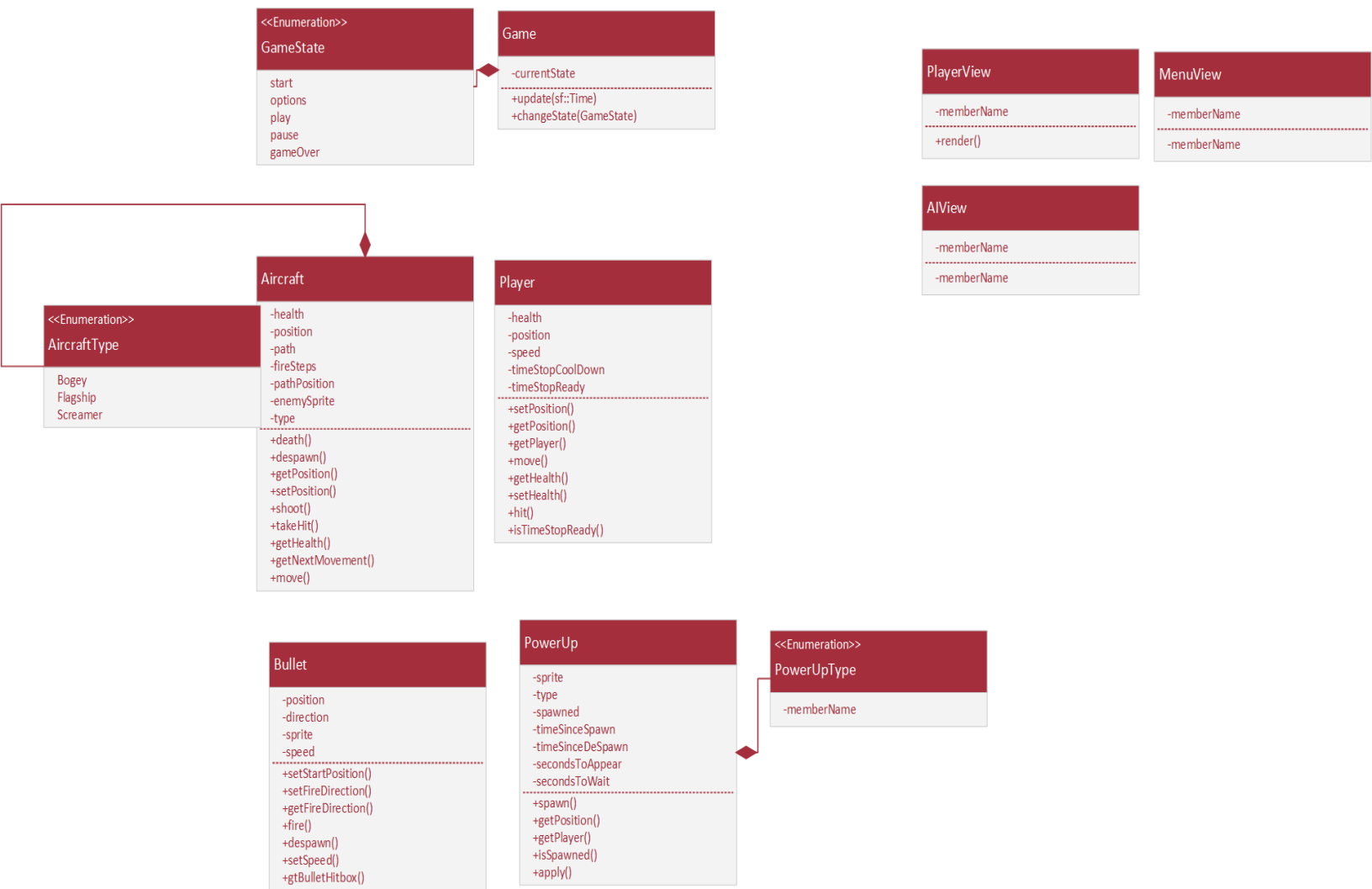
TUTORIAL3: “Press INSERT FIRE KEY HERE to shoot your weapon”

TUTORIAL4: “We’ll do our best to drop you some supply crates periodically. Break them to get special power ups.”

TUTORIAL5: “There’s an enemy fighter! Take him down!”

TUTORIAL4: “Well done. Best of luck pilot, and fly safe!”

# SOFTWARE ARCHITECTURE



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# CONTROLS



## Defaults

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SHOOT	—	‘spacebar’
MOVEUP	—	‘w’
MOVEDOWN	—	‘s’
MOVELEFT	—	‘a’
MOVERIGHT	—	‘d’
STOPTIME	—	‘enter’

## Customizability

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All controls will be fully remappable according to player preferences, and will persist between game sessions inside of an options file

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# LEVEL DESIGN



As an aerial game, our main level design will be very simple. There will be no environmental hazards in the level, just open sky.

Power ups will float down in parachute every 2.5 minutes in a random location on the screen. There will additionally be a scripted powerup launch during the tutorial section.

Enemies will be “launched” by the AI viewer based on a set script. By launch, we mean that the AI will pick a point on the screen for them to spawn and move them along their set path. These launches will occur in several different phases.

Level 1 structure:

- The tutorial phase, during which just one standard enemy, a “bogey,” will be launched
- The first wave will launch a small number of enemies, almost entirely bogeys, designed to get the player adjusted to the combat system
- The second wave will begin mixing bogeys and screamers to create a significant challenge for the player
- The third wave will flood the player with enemies, creating a “sea of bullets” atmosphere that the player has to dodge through
- The fourth wave will only include the flagship. This flagship will have a maximum healthbar and fire a multitude of different bullets at the player from several cannons located across its sprite. The player will have to defeat this flagship to progress to the next level.
- The enemies will move along their set paths to create a challenging environment for the player, with the exception of the flagship, which will sit at the top of the screen and will not move.



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# MECHANICS

## Space

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- The game will be two dimensional, and portrayed in a top-down view
- The screen will be autoscrolling, forcing the player to continue slowly forward
- Player:
  - The player will be able to move forward, backward, left and right with their keys. These keys will be customizable
  - The player's acceleration will be instantaneous - no windup to get to full speed
  - The player's weapon will have infinite ammunition, and will fire if the player taps the fire key, or fire continuously if the player holds it down.
  - The weapon can be modified by power ups, which will change its bullet power/speed
  - Player will have a health bar, that will reduce if hit by an enemy bullet, or when running into an enemy

## Power Ups

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### Spread Shot:

- Transforms the player's main weapon into a shotgun for a few seconds, which fires bullets in a wide spread in front of the player

### Overcharge:

- Speeds up the rate of fire on the player's weapon dramatically, making it fire a stream of bullets

## Time/Game Speed:

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- Game will run in real time
- Player will have the option to stop time every few seconds of real time, with a recharging time stop ability
- The variables below are used to keep track of the amount of time left on the player's time stop before it recharges, and whether the ability is ready to use or not

```
int timeStopCooldown;  
bool timeStopReady;
```

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# MECHANICS

## Enemies

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### Screamers:

- Very fast
- Extremely low health: 1 shot to kill
- Weapon fires only occasionally
- Worth moderate points if killed
- Will move quickly behind the player's position (their position when the screamer enters the screen), slow down to fire behind them, then fly off.

### Bogeys:

- Average speed
- Average health: 3-5 shots to kill
- Weapons fires relatively often
- Worth few points if killed
- Will have several different paths, but all will be simple single curves

### Flagships:

- Very slow (maybe even static on the top of the screen)
- Tons of health, >100 shots to kill
- Weapons are firing almost constantly
- Equipped with a laser beam weapon that takes up a large portion of the screen
- Worth tons of points if killed
- Cannot be evaded

All enemies, with the exception of the flagship, will eventually leave the screen/ fly past the player if they are not killed. The player will get no points for evading enemies

All enemy movements are defined in their path arrays, which are lists of vectors that detail changes to be applied to their starting point. The array will allow the AI view to simply get the next enemy movement vector and apply it to the enemy's current position. The vectors are stored as such:

```
sf::Vector2f path[50] = [v1, v2, v3 ... ];  
int pathPosition;
```

This way, by retrieving the enemy's current position and the next step in its path, the AI view can easily update the enemy's position and decide whether to fire at the player

# SCHEDULE

## Roadmap

	Rui Hou	Harrison Keen	Kathy Ngo	Joey Lindsay
<b>Sprint 1</b> (starting 3/25)	Update game skeleton code to include views and create new UML diagram	Complete enemy source files and conduct design presentation	Complete power up and player source files	Update/revise design document and help with design presentation
<b>Sprint 2</b> (starting 4/1)	Begin constructing the menu view	Complete options source file and set up the options XML file	Construct the bullet source file	Begin constructing the player view
<b>Sprint 3</b> (starting 4/8)	Finish constructing the menu view and conduct design presentation	Finish constructing the options screen	Begin constructing the AI view	Complete sprite assets construct player view, implement player and bullet movement
<b>Sprint 4</b> (starting 4/15)	Implement the time stop ability	Construct title and end screens	Finish constructing the AI view	Construct the level one source file
<b>Sprint 5</b> (starting 4/22)	Debug and wrapup	Debug and wrapup	Debug and wrapup	Implement game sounds and debug
<b>Sprint 6</b> (starting 4/29)	Debug and final report	Debug and final report	Debug and final report	Debug and final presentation

## Issue Tracking

Bugs and features are tracked on GitHub (<https://github.com/joeylindsay/gameDesignGroup5/issues>).

# CHANGELOG

Version	Date	Change
0.1	Mar 16, 2021	First draft document on Google Doc
0.2	Mar 24	1. Document format change 2. Related games with pictures 3. Detailed software architecture with UML diagrams
0.3	Mar 30	1. Updated Design Document 2. Redid UML structure with proper separation from view 3. Completed source files for the enemy and player classes
0.4	Apr 8	1. Pushed updated skeleton code and preliminary player view 2. Pushed completed power up source file and options xml file
0.45	Apr 9	1. Debug push for the options screen
0.5	Apr 11	1. Pushed finalized bullet movement 2. Pushed screen scroll 3. Pushed automatic view resizing
0.55	Apr 12	1. Pushed completed bullet movement and tracking
0.57	Apr 15	1. Updated design document 2. Debugged screen resizing 3. Added completed background, bogey and screamer artwork