

# APCS Final Project - Nova Subrift

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## Introduction:

This project was created as a sub-replica of the game, Nova Drift, a 2D space shooter developed by Chimera Entertainment. As for how accurate this attempt at a replica is, probably not at all, considering how none of us have played the game in question.

Take the disparities as unique features, applications of creative license, etc.

## Gameplay

Control a spaceship and shoot down waves of enemies that scale progressively over time.

Experiment with different combinations of weapons, ship types, and shields. Upgrade your ship with modifiers that allow you to scale with the enemies.

How far can you go?

## Instructions

Move the mouse around to aim your spaceship. Right click to move, left click to shoot.

That's it!

## Features

### Baseline

#### Fully Functional UI

This entails screens, buttons, images, and etc., each which function accordingly. A list of such includes:

- The menu screen, containing a “play game” button, which would take you to the gameplay screen
- The gameplay screen, which would render enemies, bullets, and ships, and register user inputs to make the game playable
- The upgrade screen, containing a small selection of modifiers to choose from/types of shields, weapons, and hulls to change to
- The game over screen, which would contain buttons to go back to the main menu, and also display a message along the lines of “game over”

#### Operational Gameplay

With things including:

- Bullet physics, with bullets dealing damage to enemy ships in it's hitbox

- Ship physics, with ships that collide with each other, dealing ram damage
- The player ship, moving and shooting based on user input
- Enemies, which attack the player, each having health and damage scaling with waves
- Enemy waves, spawning new enemies when all the all the ones on screen are defeated
- Ship modifiers, with some that increase attack speed, bullet damage, ram damage, etc. when chosen and applied in the upgrade screen
- A leveling system, in which players get xp from defeating enemies, allowing the player to level up and get upgrades from the upgrade screen
- World boundaries, which warp the player around the edges, but despawn enemies and bullets. In other words, the edges of the screen

## Goal

### Multiple Enemies

Each wave would spawn different types, providing variety to the gameplay. Some types of enemies may include:

- Sniping enemies, which kite and shoot the player
- Ramming enemies, which rely on ramming and knockback to damage the player
- Teleporting enemies, which dodge bullets and damage the player with bullets
- Above are just basic ideas for enemies, and are yet to be fully fleshed out.

### Multiple Weapons/Shields/Hulls/Modifiers (Maybe stretch goals?)

In other words, parts of the player that affect how the player receives damage, shoots, moves, and plays the game in general. A list includes:

- Weapons, which the player can equip (one at a time) to change the shooting style and bullets the player creates. Examples include: - A thruster weapon that propels the player forward (ram damage) and also drops mines that collide with enemies, dealing damage - A minigun weapon that spams low damage bullets at enemies - A railgun weapon that shoots large, damaging, piercing bullets - A laser weapon that creates an instant laser, piercing enemies - A drone weapon which creates mini-ships to damage enemies
- Shields, which the player can equip (one at a time) to change what happens when the ship takes damage. Examples include: - A warping shield that teleports the player whenever it gets hit - A radial shield that burns enemies around it - A reflecting shield which reflects bullets around it whenever it gets hit - A orbiting shield which creates orbiting orbs around it, which block bullets and deal damage - A cloaking shield which hides the player when it is not moving
- Hulls, which the player can equip (one at a time), each containing different base stats, such as speed, reload, and damage. Examples include: - A basic hull with no special stats - A shotgun hull with faster acceleration/speed, more projectiles but also less projectile speed and reload speed - A tank hull with more health, more overall damage, but also slower speed - A sniping hull with higher overall damage and projectile speed, but also slower reload and less health - A ramming

hull with more health, ram damage, and speed, but less bullet damage and reload speed

- Modifiers, which the player can collect, each modifying ship stats in a different way. Some can be taken more than once, and some are rarer than others. Examples include: - Overdrive, a common modifier that gives +10% reload speed but -5% projectile damage - Piercing Hull, an uncommon modifier that gives +50% ram damage, but -10% projectile damage - Compressed Munitions, an uncommon modifier that gives +20% splash damage radius and +5% splash damage, but -15% projectile speed - Tailgate Unloading, a rare modifier that makes the ship shoot backwards, but gives +40% overall damage and +10% projectile speed

### Bosses

These would appear on certain waves (25, 50, 100?) instead of the normally spawned enemies, with special attack patterns and weapons, and a larger xp reward as well. Don't forget – they would also be of a bigger size than normal enemies.

### Nice Assets/Graphics

Something that isn't just the squares we have right now in processing. Decent sprites and shaders would be nice, but those are definitely stretch goals. Enough said.

### Background Events

Since Nova Drift is a game that takes place in space, you should see spacelike objects that interact with the player. Give them something to think about other than enemies, that's all.

- Asteroids, which float around the screen and deal damage in collisions. Destroyable, whether by ramming, shooting, or etc.
- Shooting stars, which would quickly move across the screen, damaging anything in their path. Maybe a warning before they appear, so the player can dodge.
- Black holes, which suck everything in around them. Instakills anything inside.
- Planets. Dunno about this one. Is it just a bigger asteroid with gravity?

## Stretch

### Multiplayer (Jerry???)

Allow the player to play with others across the web. Yeah, I don't see this one happening.

### "Special" Modifiers

Special super-rare modifiers that completely overhaul some parts of the player. Think: turn the player into a chain of multiple ships, or make its bullets 10x bigger and suck in enemies.

### Music/SFX

I have never played with java and sound before.

### LeGeNdArY GrApHiCs

See "Nice Assets/Graphics" in the Goals section

# Class List

- Content:
  - Bullets: Stores bullet types
  - Enemies: Stores enemy types
  - Gear: Stores weapon/shield/hull types
  - Modifiers: Stores modifier types
- Core:
  - Canvas: Extends PApplet. This is the drawing surface
  - Content: Loads everything in the content folder
  - Events: Processes and stores events, which, when called, update a part of the game
  - Input: Processes and stores key and mouse inputs. Also stores the keybinds.
  - Rules: Contains overall multipliers for each team, after the player modifiers are processed.
  - Sounds: Stores a “global” JayLayer to play songs and sound effects.
  - UI: Stores all the UI components
  - World: Stores entity lists, the player, and initializes the game
- Game
  - Entities: A list of entities. Provides helper methods to managing them
  - Experience: Represents an XP orb that is dropped when enemies are destroyed.
  - Player: Extends Ship. Updates, draws, and stores player data. Also processes inputs
  - Team: Stores the different types of teams
  - Waves: Stores and simulates waves
- Graphics:
  - Effects: Contains everything required to create, process, and draw effects in the game
  - Pal: A palette, containing different colors
  - Sprite: Represents the sprite assets.
- UI:
  - Bars
    - ProgressBar: Extends Table. Represents a progress bar
    - SegmentedBar: Extends ProgressBar. Represents a bar that is made up of multiple segments
    - SmoothBar: Extends ProgressBar. Represents a bar that smoothly grows.
  - Drawables
    - Drawable: Extends Table. Anything that is drawable.
    - Text: Represents a line of text
  - Interactables
    - Button: Represents a button
    - Slider: Represents a slider
    - Tooltip: Represents a tooltip
  - Screens:

- GameScreen: Updates and draws the game screen
  - MenuScreen: Updates and draws the menu screen
  - PauseScreen: Updates and draws the pause screen
  - Screen: Represents any screen. All other screens extend Screen.
  - UpgradeScreen: Updates and draws the upgrade screen
- Table: Represents a piece of UI. Has an x, y, width, height, and color
- List: Extends Table. Represents a list of items
- World:
  - Bullets:
    - Bullet: Extends Type. Contains data for a bullet type
    - LaserBullet: Extends Bullet. Represents a laser with a line that slowly fades out, dealing damage to enemies in its path.
    - MineBullet: Represents a mine that deals damage when an enemy passes over
    - RailgunBullet: Contains stats for a railgun bullet
    - VolleyBullet: Represents a volley of bullets.
  - Enemies
    - DroneOrbitEnemy: Stores stats for an enemy with drones orbiting around it
    - Enemy: Extends Type. Contains data for an enemy type
    - EnemyPart: Stores stats for a part of an enemy.
    - EnemyVersions: Represents the level or difficulty of an enemy (common, elite, champion)
    - MultiEnemy: Stores stats for an enemy with multiple parts
    - SprayerEnemy: Stores stats for an enemy that sprays bullets.
  - Modifiers:
    - Modifier: Extends Type. Contains data for a modifier
  - Ship:
    - Weapons:
      - ThrusterWeapon: Stores stats for a weapon which propels the player forward and drops mines behind it
      - VolleyWeapon: A weapon that shoots a volley of bullets.
      - Weapon: Extends Type. Contains data for a weapon type
    - Hull: Extends Type. Contains data for a hull type
    - Shield: Extends Type. Contains data for a shield type
    - Ship: Extends Entity. Simulates a basic ship
    - Thruster: A thruster that propels a ship
  - Entity: Contains a Type, which changes how the entity interacts with the world
  - Instance: Represents an instance of a content type
  - Type: Represents a type of entity. Contains stats and behavior

## Credits

Alan Ma: Content, Bullets, Enemies, Sprites

Jerry Yang: Buttons, Bars, Screens, UML, Sound  
Leon Wang: Physics, Sprites, Entities, Core