

CE218 – Computer Game Programming

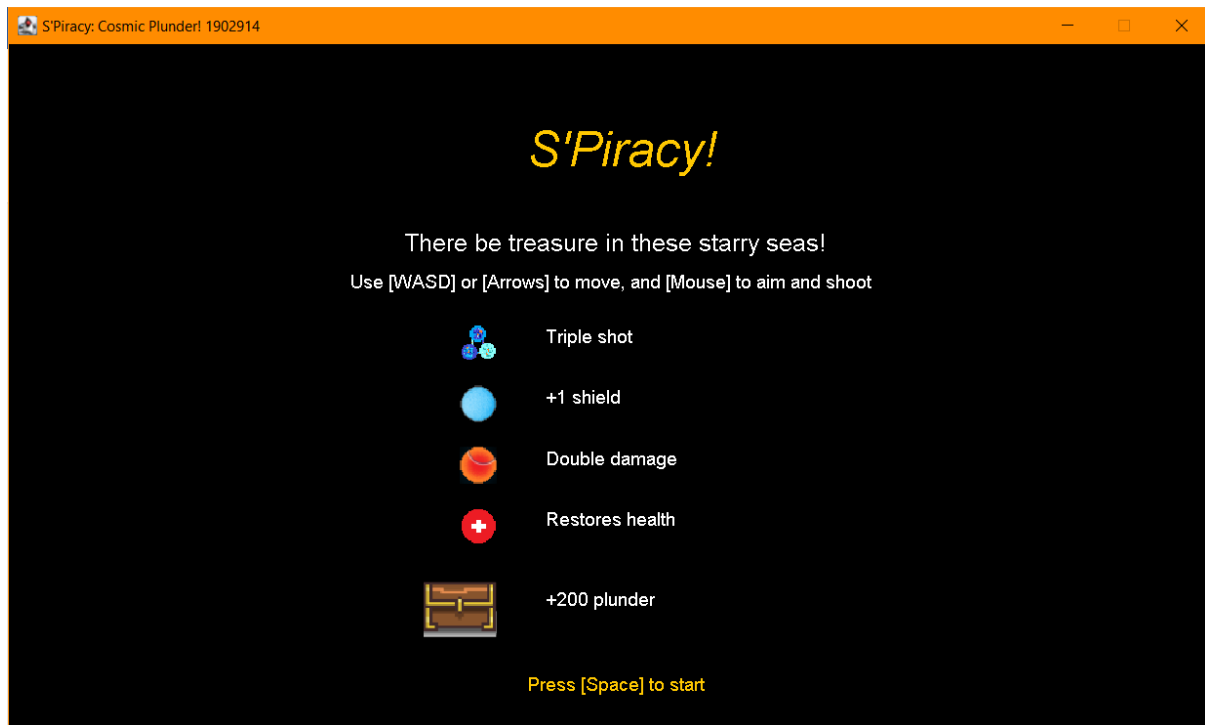
Assignment 1 Report

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Manual



```
public class Houston { //What else would the control center for a space-themed game be called?
```

You are a space-pirate sailing the cosmos in search for plunder – a s’pirate, if you will!

As shown above, the player controls their ship using the [WASD] or [Arrow] keys. [Mouse] is used to aim and shoot. Once the game is started, they will also be prompted to press [Space] to activate shield if they have one, and it is not already active.



As illustrated, there are 5 drops that spawn on enemy death, each spawning from a specific kind of enemy with a random chance.

To collect these power ups, the player must touch them with the ship. Completing a level will collect any missed drops. Each power up collected will give +5 plunder.

Plunder is gained by killing enemies (according to their health) and drops collected. Collecting a [Treasure Chest] gives +200 plunder in addition to the basic drop reward.

There are 6 kinds of enemies, with different shooting patterns for each. But that’s best understood by playing – have a go! [I have left my high score in the file for any aspiring challenger]

The game can be run by running ‘Game.java’ inside the src folder.

Design Choices

Space pirates?

Presented with the task of creating a spaceship-based shooter game, I wanted to make something fresh, so to start with I used a flying rocket-propelled pirate ship as my ship.

Animation

I also wanted to make it at least somewhat animated, so all enemies have 2 frames of general animation along with hit-frames for when they take damage. The ship has animated rocket-flames, a hit-frame, and a shield frame for when shield is activated.

Levels

I wanted it to be a multi-level game, with dedicated music, backgrounds, and enemy spawn patterns. In the final version, there are 3 levels, with unique music and backgrounds. The type of enemies, number of waves spawned, and number of larger boss enemies spawned depends on the level.

Sounds

These are sounds for most interactions between sprites, such as shooting, hitting, getting hit, getting hit while shielded, and collecting drops. There is also start-screen music, a level-up sound, level music, and win/lose game-over sounds.

Enemies and Drops

There are 5 types of basic enemy and 1 boss enemy.



Basic Alien – Shoots straight forward.
Can drop **Triple-shot**. Fire three shots in a spread. (3s)



Tracker – tracks and shoots towards enemy ship.
Can drop **Shield**. Activate to block all damage. (10s)



Rotor – Shoots in a constantly rotating pattern.
Can drop **Flame Shot**. Shots deal double damage. (5s)



Shotgun – Shoots in a spread of 3 shots.
Can drop **Health**. Adds 25% health.



Tank – Shoots straight forward, but has high health
Can drop **Triple-shot**.



Boss – Shoots 4 shots in a rotating pattern and can move towards ship.
Can drop **Treasure Chest**. Adds 200 plunder.



Tuning and Balance

```
public static final Double VLIM = 3.0; //spaceship speed limit
public static final Double VEL = 10.0; //ship and enemy cannon speed
public static final long ENEMYDELAY = 1500; //Frequency of enemy shots

public static final int MAXSHIELDS = 3; //Max shields at a time

public static final long SHIELDURATION = 10000;
public static final long FLAMEDURATION = 5000;
public static final long TRIPLEDURATION = 3000;

public static final int SHIPHEALTH = 10; //Max ship health

public static final int ENEMYHEALTH = 4;
public static final int ENEMY2HEALTH = 8;
public static final int ENEMY3HEALTH = 7;
public static final int ENEMY4HEALTH = 2;
public static final int ENEMY5HEALTH = 15;
public static final int BOSSHEALTH = 25;

public static final int HIT = 3; //Score penalty for getting hit
public static final int DIFFICULTY = 3; //Controls difficulty of spawn patterns
```

Above are all the parameters used in this game for adjusting balance and difficulty. Some notable adjustments were:

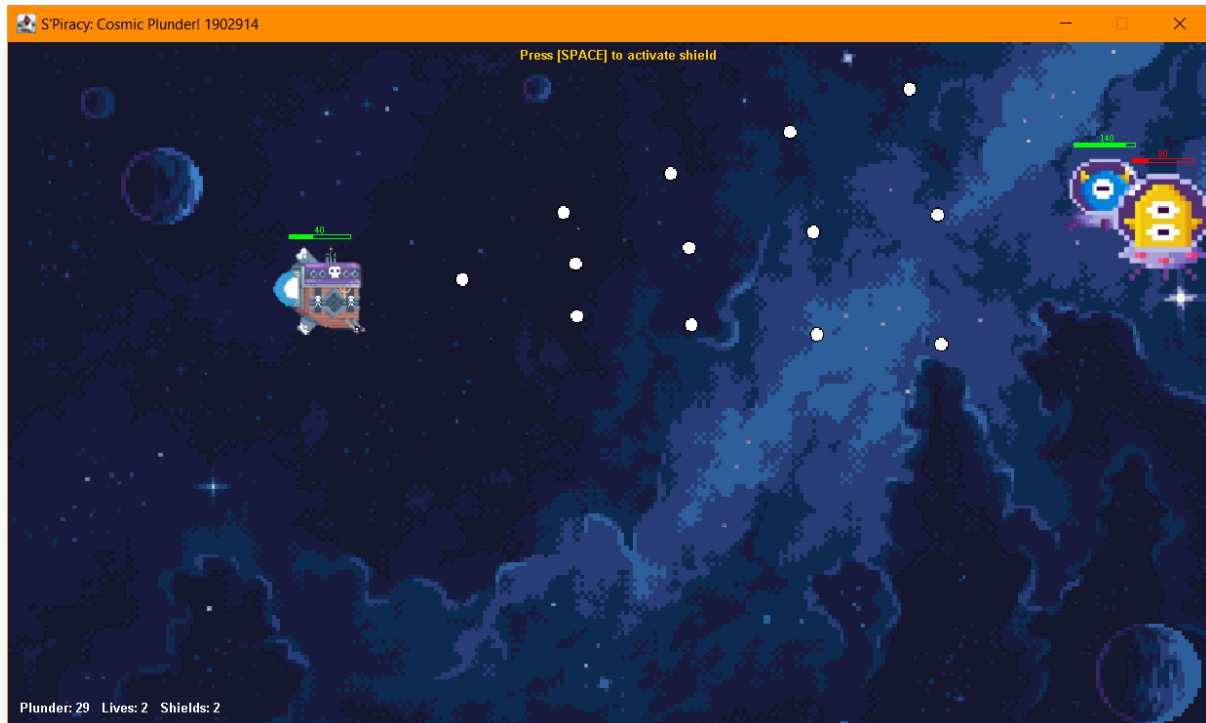
- Enemies were shooting too fast, so a delay of 1.5 secs was added
- Triple-shot was too powerful, especially when combined with flame shot, so its duration was brought down to 3 secs. Flame shot was also reduced to 5 secs.
- Too many shields would have made it too easy
- Ship health reduced to 5 to keep it just challenging enough.
- Difficulty 3 is a reasonable level. 4 onwards spawns too many enemies at a time, and 2 is too easy.

Notable Achievements

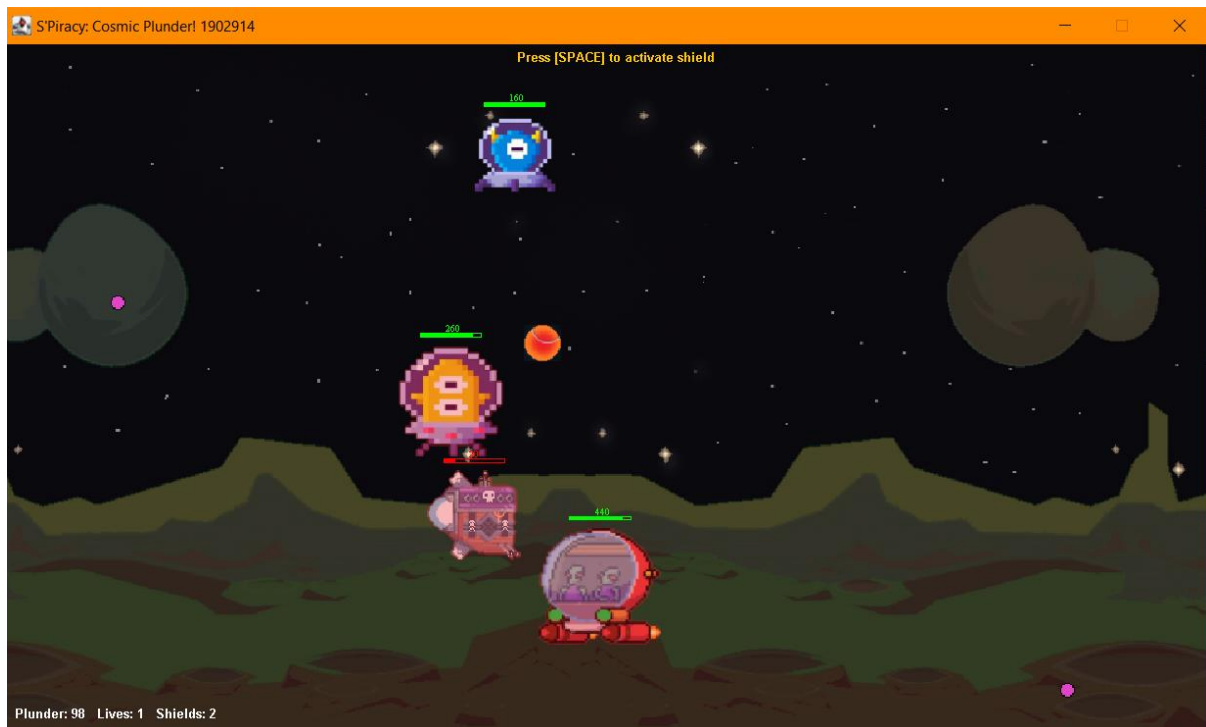
- Edited my own sprite images and created animations
- Added hit-image and hit-sound for when ship or enemies are hit
- Shooting is controlled by mouse click and movement
- Multiple enemies, including boss and position-tracking enemies
- Multiple power-ups with randomized drop-chances
- 3 levels with unique backgrounds, music, and enemy spawn patterns. Can reset on game-over by pressing space.
- Health-bars on ship and enemies (changes color when low)
- High scores stored and retrieved from file

Stills from the Game

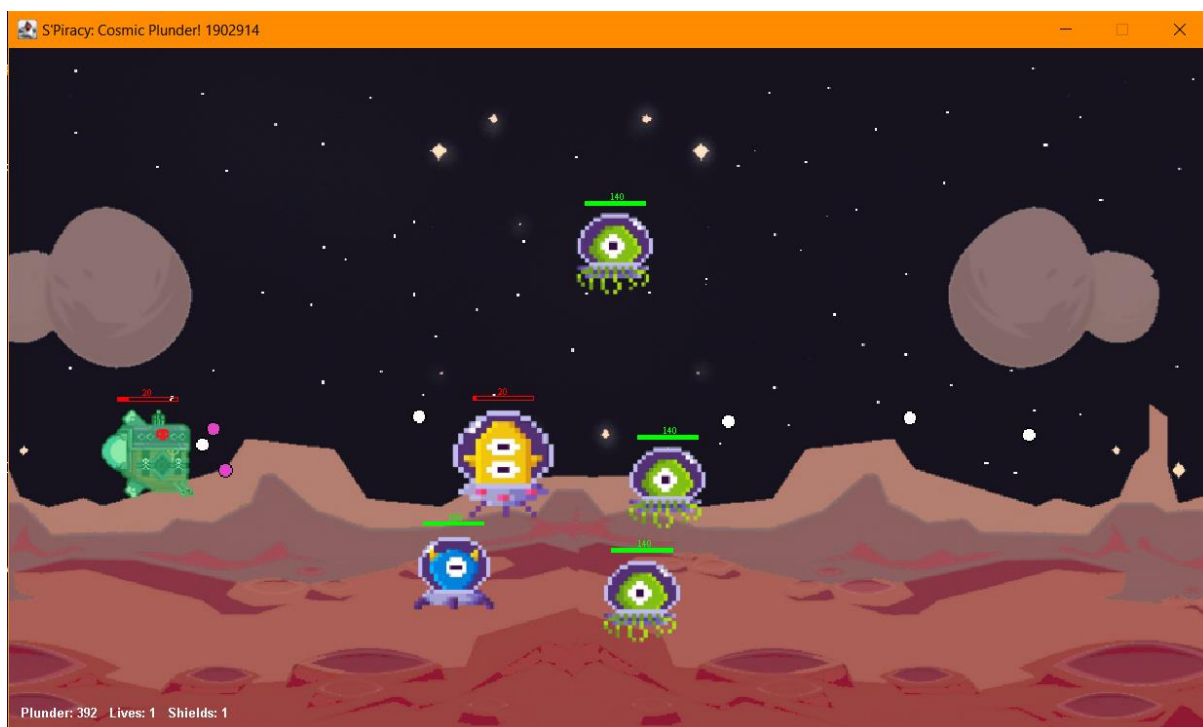
Level 1:



Level 2:



Level 3:



Game Over (Lose):

