Report - Assignment 5
Ryan Wu
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Map - Ocean

The map is 32 by 32, which gives a total of 1024 tiles. A wall of coral surrounds the outer edges. There are several methods to reduce low framerate and computational load, such as only drawing and checking for collisions when the tile is in the window. There are three tiles: Coral tiles, which are impassable to both enemies and the player, Bubble tiles which allow enemies but not the player without a key, and open water, which has several random background types. The coral and background tiles are often randomly rotated. If the player uses a key, all bubbles are popped for a short amount of time which is reflected on screen and will return after with some random variation. Impassable tiles will bounce the player back depending on their angle and velocity. All tile types are held in the Tile class and the block variable determines whether the player will bounce off or not.

Player - Fish

The player is centered on the screen at all times and can accelerate through the water with the keyboard, however, changing directions, stopping quickly, or recovering speed after bumping into coral will take time due to inertia. The player also slowly drifts down to the bottom of the ocean. This makes movement a lot trickier. The player can collect tokens throughout the map by eating them. If the player takes damage from an enemy, it will bounce off, turn slightly transparent and become unable to take damage for a very short amount of time. When all lives are gone, the game is over. Bubbles will spray out to indicate damage taken. The player is animated with a loop of slightly different frames to give an animated cartoon effect. Bubbles will also spawn as a trail. The faster the player moves, the more bubbles are created.

Invisibility - If the player presses the spacebar, they will become invisible for some time denoted by the blue transparency effect and cannot take damage, granting the opportunity to escape. Enemies will also fail to track an invisible player. However, the invisibility ability will cost one life on use. This is a replacement for the running functionality, as increased speed will instead limit movement and agility in this environment.

Popping bubbles - If the player presses “k” and has keys (hooks) in their inventory, one will be consumed and all bubbles on the map will be popped for a short amount of time.

Enemies - Pufferfish

Enemies will randomly move around the map, and can pass through bubbles. They will bounce off coral, similar to the player. If the player is close enough, enemies will switch to tracking mode where they slow down and pursue the player’s location. This tracking is not too sophisticated and the enemy will chase the player regardless of blocks in the way, allowing the player to move farther away. However, it is difficult for the player to escape when several enemies are chasing from different directions. If the player moves out of range, the enemy will default back to random movement around the map. When randomly moving, the enemies move faster than the player but slow down when chasing in order to allow the player a chance to escape. The more pearls are collected by the player, the faster the enemies move and chase.

Special Tokens - Pearl, starfish, clam, and hook

There are several token types, each with different rules, effects, spawn rates, and lifespans. Tokens only generate on passable tiles, not on coral, bubbles, or popped bubbles. All tokens are animated in different ways, such as sparkles, which differentiates them from the environment. The HUD displays the amount of health and hooks in inventory on the top left, and the score on the top right.

Coin token (the shiny pearls)
- Increase score and enemy speed and are the most common
- Have a large chance of generating when there are less than 8 on the map
- Despawn after quite some time

Health tokens (starfish)
- Heals one life and is fairly common
- Have a chance to generate when there are less than 6 on the map
- Despawn quickly

Super health tokens (clams)
- Heals 3 life and is rare
- Have a low chance to generate when there are less than 3 on the map
- Despawn after a little while

Key tokens (hooks)

- Will pop all bubbles for a short amount of time and is uncommon
- Have a low chance to generate when there are less than 4 on the map
- Take a very long time to despawn

Classes

The Bubbles class is for drawing, fading, and removing bubble effects. The main sketch holds an arraylist of bubbles.

The Character class is the player class. It mostly contains the positions and velocity of the player. The drawMe method draws the player and various effects. The update method cycles through frames and also changes movement. Other classes will often reference the position to translate accordingly and create the effect of movement.

The Enemy class is the enemy class. The inWindow method ensures only the enemies in the window are drawn. The update method facilitates the movement of enemies, and switches between random movement and tracking depending on the distance from the player. The hitCharacter and bump methods check if the player is close enough and changes the direction of movement for both the enemy and player.

The Scores class holds the health of the player, the number of keys collected and the score, reflected by the amount of coins collected. The draw method cycles through the different elements of the HUD and draws them according to the scores. This class also ends the game when the player reaches zero health.

The Tile class determines whether a tile is passable and what type it is. It rotates everything but the bubbles randomly. The popbubble method allows the player to pass through popped bubbles and remembers its old image path. The collision and checkcollision methods check the player and enemies for collisions, and adjust their velocities accordingly. The inWindow method is used to ensure collisions and drawing only happen in the window.

The Token class is used for the general methods that all the different tokens share. It checks whether a token is in the window and also cycles through animations and draws tokens. The various token classes are a subclass of this one, and add scores depending on the type of token.

Main Sketch

The main sketch first initializes all the variables. Minim is imported and the sound is initialized here. Each type of token, the tiles, enemies, and bubbles has its own ArrayList. The map size is also initialized here. The main sketch also checks key input for player direction and ability usage. In the setup, the map is created and stored by assigning each tile its location and information. The scores, enemies, and players are also added. The player and enemies can only be placed on passable tiles. The tokenadd method is called by the token checks and randomly generates tokens across the map depending on rarity. Iterations such as movement and drawing for the player, tiles, and enemies are performed in the draw method, along with token functions.