

2019 Fall Introduction to Computer Science – Final Project Documentation

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The purpose of the project is to produce the game “ROLL!!!!,” a new version of the game “NS-SHAFT,” which is a computer game originally produced in the late 1990s by a Japanese software company. In the game “ROLL!!!,” the player was cast a spell on, turned into a ball, and placed at the top of a nine-story tower. The only way he can escape and turn back to human is to jump from one platform to another in the tower, get to the first floor of the tower, and find the only exit out while avoiding spikes and falling out of the game window, which is constantly moving downwards.

Components used to build the code include:

1. The class Platform, which has subclasses:
 - i. Ordinary, representing ordinary platforms to safely land on,
 - ii. Fake, representing platforms that appear to be the same as ordinary ones but actually vanish if the player lands on them,
 - iii. Spiky, representing platforms that deduct the player’s life by 5 once the player lands on them,
 - iv. Jelly, representing platforms which the player passes through at a slower speed upon landing on them,
 - v. Conveyor, representing platforms that send the player towards a certain direction (left or right), and
 - vi. Spring, representing platforms that cause the player to bounce;
2. The class Aid, representing health supplement for the player to get which replenish the player’s life, displayed as a red cross;
3. The classes TopSpike and BottomSpike, representing spikes located at the top of the frame and the very bottom of the game respectively, which kill the player upon encounter;
4. The class Tube, representing the two tubes at the very bottom of them: one tube sends the player back to the starting point while the other is the exit for the player to win the game;
5. The class HealthBar, representing the life of the player (between 0 to 12),

displayed at the right side of the window;

6. The class Player, which represent the player in the game:
 - i. The right, left and up key control the movement of the player.
 - ii. The player is displayed as a circle with opacity reflecting its life.
 - iii. If its life is not 12 and it lands on a non-spiky platform, health is increased by 1; if its life is not 12 and it gets a health supplement, its life gets replenished.
 - iv. When it lands on a platform, gets a health supplement, win the game or lose the game, sound effects follow.
 - v. If its life is less than or equal to 0 after deduction, if it falls out of the window, or if it touches the top/bottom spike, the player loses.
 - vi. If the player successfully gets to the bottom of the tower and jumps into the correct tube, the player wins.
7. The class Game, which represents the game:
 - i. The left part of the window displays the tower, while the right part displays the name of the game, the life of the player, the current level at which the player is (i.e., the score), and the “START” button to click on for restarting the game.
 - ii. The downward movement of the scope gets faster as the game progresses.
 - iii. It deletes the objects in the game which have already passed the scope in order to improve the execution efficiency.
 - iv. When the game is over, the prompt for restarting the game is printed.

To play the game, one should open the file, follow the prompts, click on the “START” button with the mouse to start the game, control the movement of the ball with right/left/up keys on the keyboard.