CS6.301: Design and Analysis of software systems **Spring 2021**

Assignment-3

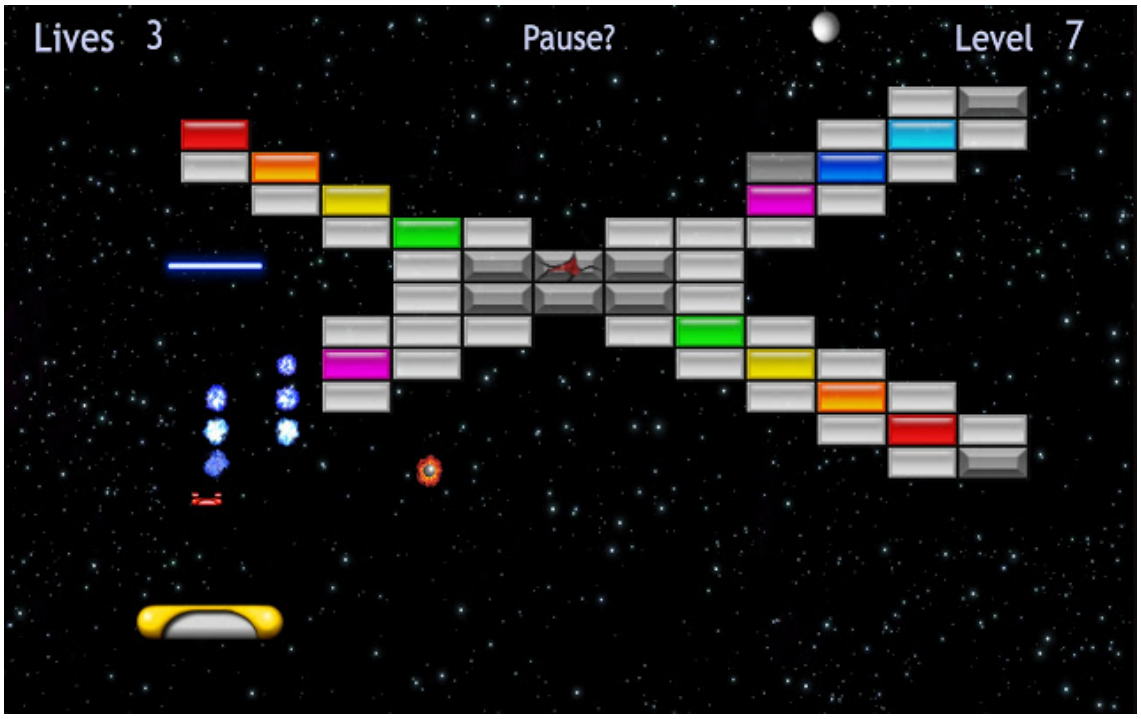
Released: 8th Mar, 2021 *Deadline: 15th Mar, 2021*

Instructions

- This assignment is designed to extend your previous code from assignment-2.
- **Hope your code is modular and extensible to new features! :P**
- Submit all your code files and README.md as a zip file, named as <Rollnumber>.zip
- The README.md file should describe the game, various rules and all the functionalities. Also include a quick game guide.
- Ensure that the submitted assignment is your original work. Please do not copy any part from any source including your friends, seniors, and/or the internet. Any such cases would lead to a **straight 0** in the assignment.
- **Use Moodle only for all your queries.**

Introduction

For this assignment, you need to extend your arcade game from assignment-2. Hope you had fun making the game in assignment-2, now you shall be adding new features to the game to make it more fun! The objective of this assignment is to test how extensible you have written the previous assignment.



Levels

In previous assignment we had only 1 level, but this assignment you need to make at-least 3 levels of which one of them is the boss level (explained later). Keep the following points in mind while making the levels:

- Each level **must** be having different layouts.
- The scores and lives of each level will be carried forward to the next one. i.e, it will not be reset after each level but will remain the same from the previous one.
- All the power-ups will be lost at the start of the new level(including expand and shrink of the paddle).
- The startup of each level will be same as the startup of the previous assignment adding the above constraints to it.

Falling bricks

This feature makes the game similar to a time attack(time limit for each level) type of game. Further description is in the following:

- After a certain number of seconds in each level this feature is triggered.
- Upon reaching the fixed time, every time the ball hits the paddle the brick layout shifts itself downward by 1 unit(towards the paddle).
- Once the lowest brick in the current brick layout reaches the paddle level, the game is over(not just losing a life).

Rainbow bricks

This is a new type of brick which keeps changing colours (also hardness) till it is first made in contact with.

- Make sure you use the same colours for the hardness that you have used in assignment-2.
- The colour change for the brick will happen in each frame.

Power-up 2.0

- Here we try to upgrade the already existing set of power-ups.
- Instead of a linearly dropping power-up from the brick, every power-up must be projected along the direction in which the ball hits the brick. In simple terms, The power-up must attain the ball's velocity after it spawns. Use this link for reference.
- Power-up collisions with wall must be handled just like ball collisions with the wall. Power-ups will be unaffected by bricks.
- After being projected with the ball's velocity, the power-ups must have a gravity effect.

Shooting paddle

- This power-up will enable the paddle to shoot bullets in order to break the bricks. The strength of each of these bullets is same as the ball.
- Taking the power-up will enable the paddle to shoot lasers continuously until time for the power-up runs out. Have a small delay between subsequent laser shoots.
- This power-up is only supposed to be active for a limited time. Display the remaining time of usage of the power up.
- There should be a visual difference in the paddle once this power-up is collected, You could have small cannons on both ends of the paddle from which the bullets will be shot. Note that taking this power-up should not affect the paddle size.

Boss Enemy

- The final level of the game will have the boss enemy along with a few unbreakable bricks.
- The boss enemy is a UFO which flies at the top of the screen and follows the paddle (moves along with it).
- Use your creativity and imagination for this one, this should be the most difficult obstacle to clear. The UFO need not look like an exact UFO :P But do look up ASCII arts online, some of them are beautiful :)
- The UFO drops bombs in regular intervals onto the paddle (which travel linearly downwards), on being hit by these bombs the paddle loses one life.
- The UFO has a health which reduces on hitting it directly will a ball (show health bar as well). The collisions with the UFO are similar to the other collisions that you have implemented before.
- The UFO will be able to spawn defensive bricks around it(not unbreakable ones) after it's health falls below a certain range. The defensive strategy would be an entire layer below the UFO and it can use this twice. These bricks will form a layer under the UFO and breaking of these bricks would not yield a power-up.

Bonus

- **Fireball Power-up** - This would be similar to the exploding bricks in the previous assignment except the same effect is caused by the ball on hitting the bricks.
- **Sound** - Have sound effects for different events of the game like ball hitting the paddle, brick or wall; exploding bricks; shooting lasers; boss enemy music etc.

Library Usage

- Your code **must** be in **Python3**. Python2 is not allowed.
- **No curses libraries (like pygame) are allowed**. **Only libraries allowed are colorama and numpy**. In case of any doubts about whether a particular library is allowed, please post it on the Moodle thread and get it clarified from one of the TAs.

Deliverable

Submit a single <RollNumber>.zip file containing the README.md file and your code files. Ensure your code is modular with multiple python files. Here is a sample of what the .zip file looks like when extracted: