Physics Engine Documentation

Assessment Task 2

References and Research Material

- AIE Tutorials and Slides provided in the physics for games modules. I followed the “Creating a Physics Engine” tutorials. On top of these tutorials, I added player movement, respawn system and a game loop to keep playing.

- Googled various C++ questions when I needed coding help. These sites(below) have lots of information with good explanations and examples of most things involved in basic C++.

https://www.geeksforgeeks.org/c-plus-plus/?ref=shm
https://cplusplus.com/doc/tutorial/
https://stackoverflow.com/questions/tagged/c%2B%2B

- I researched simple physics-based games online to get ideas for my demonstration.

https://www.youtube.com/watch?v=fQoJZuBwrkU (Flappy Bird)
https://www.youtube.com/watch?v=OspvMh3UWPU (Falling Blocks)

Simulation Description

The simulation is a small and simple game that drops boxes from randomly generated spots at the top of the screen and they fall to the bottom using gravity to manipulate their position and rotation. These boxes drop at an increasing frequency as the game continues to add difficulty. The boxes can collide with each other or the player on the way down.

The player is a circle that can be controlled with WASD. Each direction adds force to the player object so it can be moved around the screen to avoid falling boxes. The player is also manipulated by gravity, this causes them to fall constantly like “Flappy Bird.” The player must see how long they can avoid the falling boxes for, and they are only allowed 3 collisions before the game is over.

The “Game Over” function spawns a plane at the bottom of the screen, freezes player by setting it to kinematic, and drops soft bodies from the top of the screen to demonstrate their collisions working and indicate the game is over.

Third-party non-physics libraries

- GLM
- Bootstrap

Improvements

- Code could be slightly better optimised regarding my box spawning system. Probably a few other areas I could tidy up if I wanted dive deep into optimisation. Would require more time and research on my part.
- Boxes jitter when they are meant to be lying flat on a plane. It would require much more research to deal with this issue and it is beyond the scope of the course. May investigate in the future.
- I would like to port this to Raylib as I feel it would be easier to make a more creative simulation to demonstrate the physics systems.

Class Diagram