

Short Report on SM3608 3D Game Production

Final Project Development

Name & SID:

Wang Long Shek 55722755

WONG Yu Hang 56684547

Part 1: Game Design Document

Basic Information

Name of the game: Pinball FPS

Platform: PC

Genre: Pinball / FPS

Core Game Mechanics

The player needs to control the character to shoot the enemies and control the flippers to let the enemies and the player not fall to the bottom. Destroy all enemies to win.

Components

Controls

A to control the left flipper

D to control the right flipper

left mouse button to shoot

move the mouse to turn the view

shift to slow motion

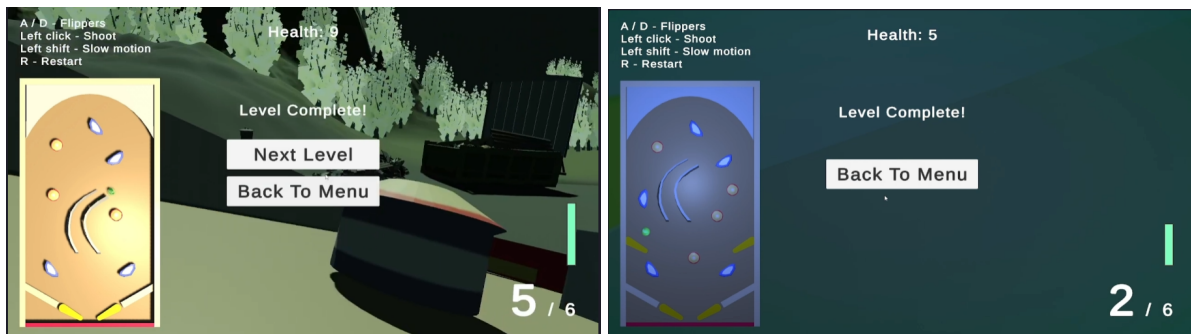
Title scene



Use the mouse to press the corresponding button to go to the corresponding level. Press ESC on the keyboard will quit the game.

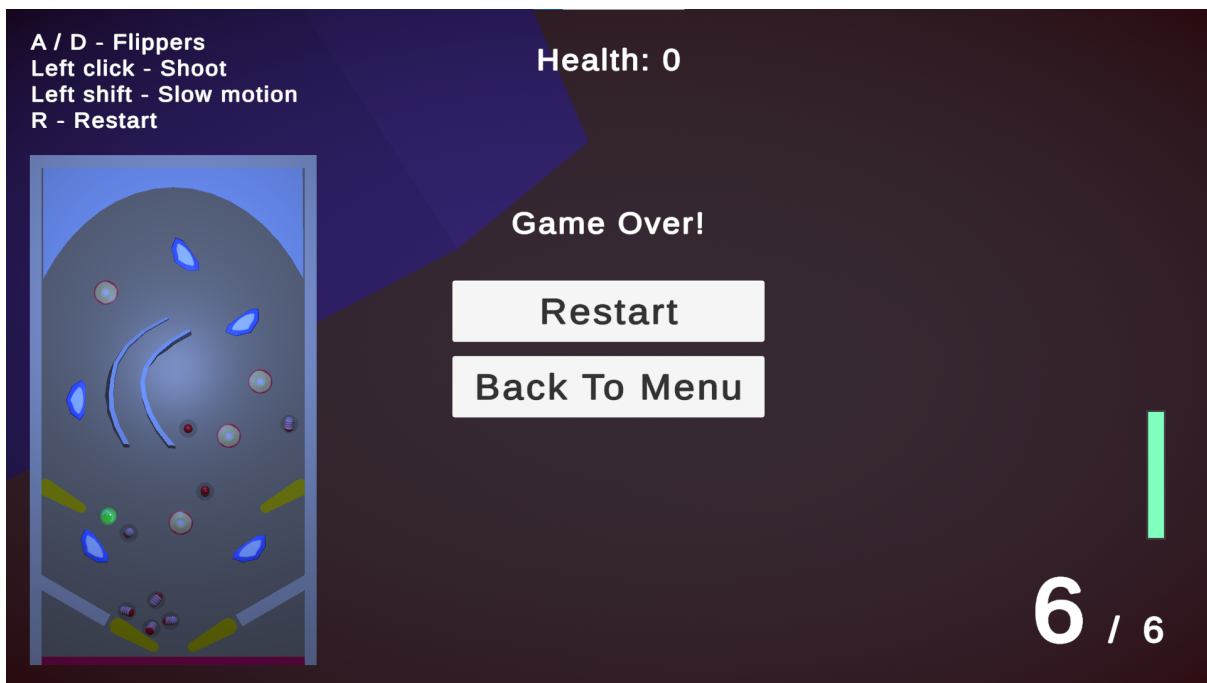
Result Menus

Win



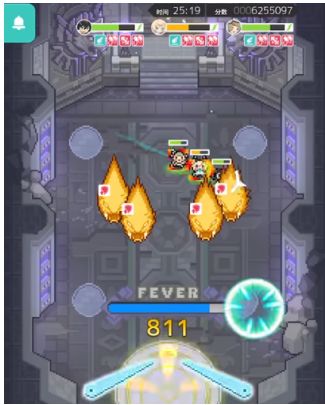
Use the mouse to press the corresponding button to go to the next level or back to the menu.

Loss



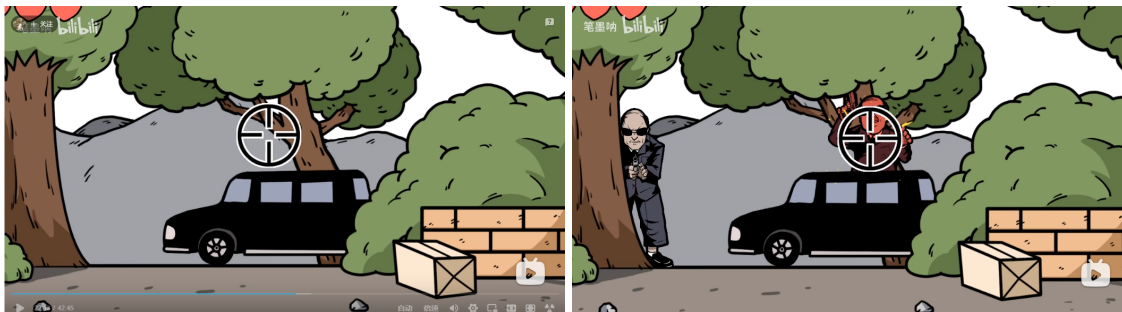
Use the mouse to press the corresponding button to restart or back to the menu.

Inspiration and Sketches



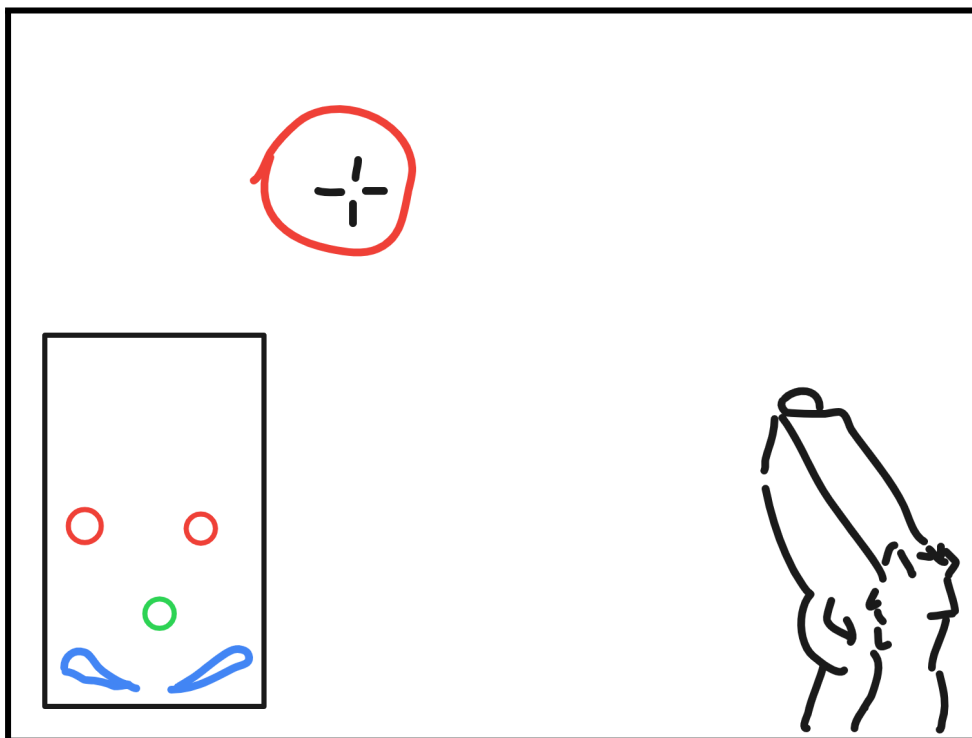
CyGames *World Flipper*

<https://play.google.com/store/apps/details?id=com.kakaogames.wdfrp>



Spacelight Studio *Otaku's Adventure*

https://store.steampowered.com/app/937170/_/?l=tchinese&curator_clanid=28673811



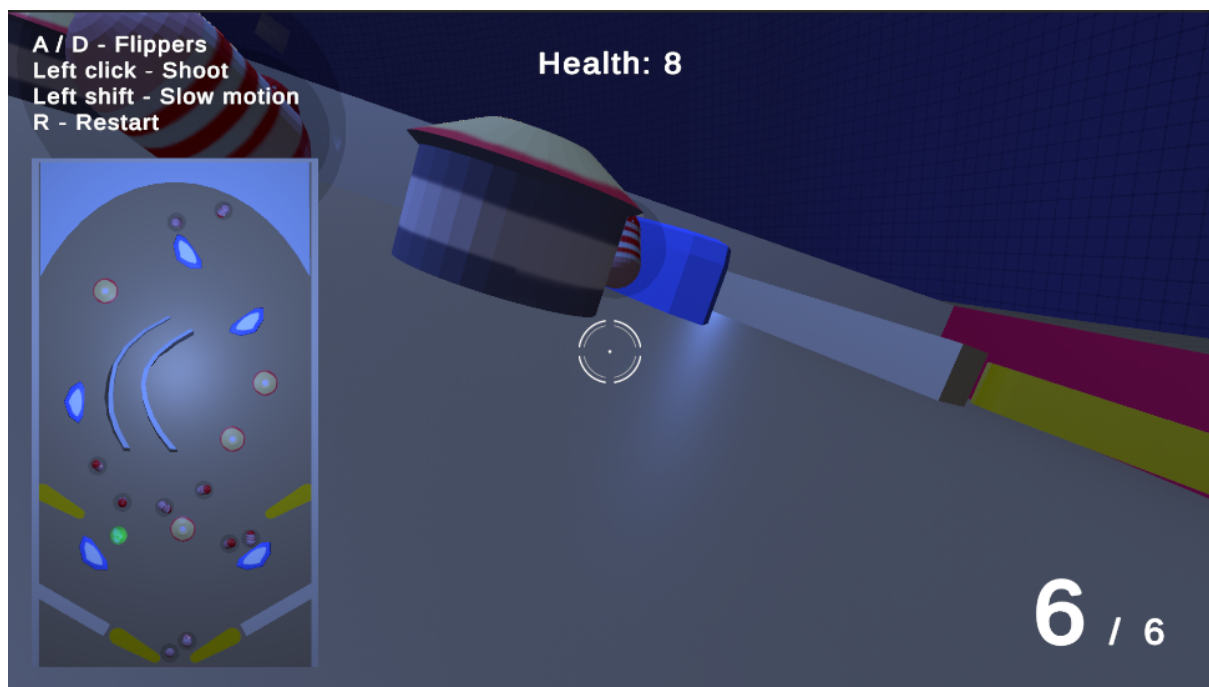
itch.io - First Person Pinball by jahnpm
<https://jahnpm.itch.io/first-person-pinball>

Related gameplay

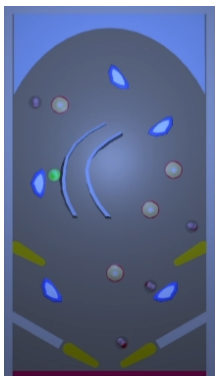
Level Description

- 1: Empty, small scene.
- 2: Expand the scene and add more enemy balls
- 3: A large number of enemies, and obstacles will also block the line of sight

Gameplay Detail Description



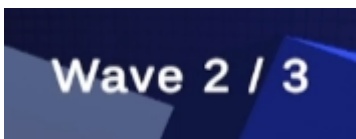
The player starts the game in the first-person view of a pinball, that cannot move or jump. The character is affected by gravity rolling to the bottom. When any ball falls bottom, deduct 1 Health point. When the ball representing the player falls to the bottom, in addition to deducting HP, the game will pause and return to the initial position. When the Health point reduces to 0, loss.



In addition to shooting the ball like an FPS game, the player also needs to observe the window on the left to ensure that the ball will not fall to the bottom.



There are 6 bullets at a time, touch the flipper to refill. There are limits to how slow you can slow down, and continued use will reduce the energy value, which will be restored over time.

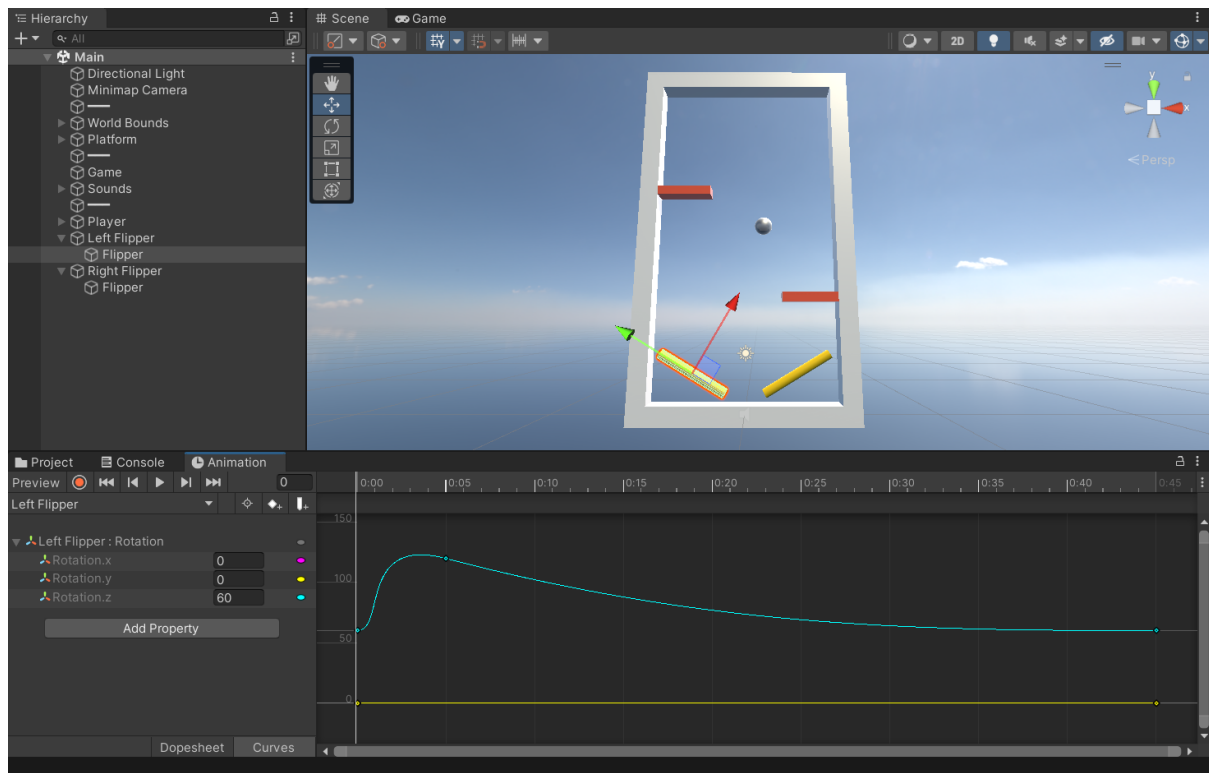


Each level has 3 waves of enemies. There are more and more enemies in each wave. After each wave of enemies is eliminated, the start of the next wave is controlled by the player.

Part 2: Parts that were Difficult to Implement

Wang Long Shek:

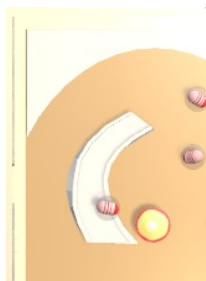
At the early stage of the project, when I'm making the triggering of flippers by "A" and "D" keys, I was trying to use Animation to animate the flipper rotations, and playing the Animations with Animator in script. The animations are able to play smoothly, but the physics are very inaccurate — the ball would fall through the flippers, as a result the flippers could not bounce the ball upwards.



After searching online, I learned from this [forum](#) that the problem was because the flippers have Rigidbody, the way to move/rotate rigidbodies with physics calculations is to use [Rigidbody.MovePosition\(\)](#) and [Rigidbody.MoveRotation\(\)](#) in `FixedUpdate()`. However, after trying to call these functions and even copying the example codes in official documentation, I still couldn't make the rigidbody move. Because previously I was using Animation to animate their transforms, I added Animator component to them. It turned out that it was the Animator that blocked any transform value changes by script, even though the script does not call the Animator to play any animation. After removing the Animator, the flippers can be rotated. It was unexpected that such a seemingly simple part in programming could take such a long time to debug.

Wong Yu Hang:

In the process of continuous testing, I need to constantly adjust the elements in the scene, especially the core gameplay. The model occasionally gets stuck with the ball, so I need to spend a lot of time adjusting the obstacle layout of the model and the scene.



Part 3: Division of Works, Assets Production & References

Division of Works

Wang Long Shek:



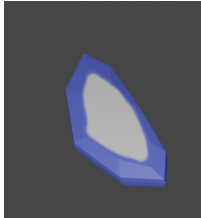
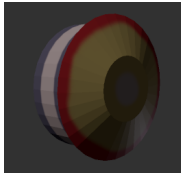
- Game Design
- Game Programming
- Sound Effects
- UI

Wong Yu Hang:

- Game Design
- 3D Assets Production
- Programming (A small amount)

Art Asset Production Sheet

3D models build with Blender:

File name: arched	
File name: arched1	
File name: obstacle	
File name: elasticColumnfbx	

3D models form online:

Synty Store *POLYGON - City Pack*

<https://syntystore.com/collections/frontpage/products/polygon-city-pack>

Other 3D assets were built with ProBuilder and reused the assets from assignment 2.

Sound Asset

Sound Effects:

Sound name in project: Enemy Score Sound file name: Retro Game Enemy Spawn 7 Link: https://www.soundsnap.com/retro_game_enemy_spawn_7_wav
Sound name in project: Flipper Enter Sound file name: Pinball Sharpshooter MiscNoises Fienup 014 Link: https://www.soundsnap.com/pinball_sharpshooter_miscnoises_fienup_014
Sound name in project: Flipper Exit Sound file name: TECHNOLOGY MULTIMEDIA SLOT MACHINE PULL LEVER ICONS SPIN 01 Link: https://www.soundsnap.com/technology_multimedia_slot_machine_pull_lever_icons_spin_01
Sound name in project: Flipper Hit Sound file name: Pinball ball hit by plunger roll up side BLASTWAVEFX 16039 Link: https://www.soundsnap.com/pinball_ball_hit_by_plunger_roll_up_side_blastwavefx_16039
Sound name in project: Lose Health Sound file name: Game, lose, negative tone 2 Link: https://www.zapsplat.com/music/game-lose-negative-tone-2/
Sound name in project: No Ammo Sound file name: Multimedia button click 2 Link: https://www.zapsplat.com/music/multimedia-button-click-2/
Sound name in project: Shoot Sound file name: Sci-fi weapon - assault rifle - shooting - single 4 Link: https://www.soundsnap.com/sci-fi_weapon_assault_rifle_shooting_single_4
Sound name in project: Slow Mo Enter Sound file name: Fast and powerful punchy whoosh into a slow motion style tail 1 Link: https://www.zapsplat.com/music/fast-and-powerful-punchy-whoosh-into-a-slow-motion-style-tail-1/
Sound name in project: Slow Mo Exit Sound file name: Slow motion, impact, thud 1 Link: https://www.zapsplat.com/music/slow-motion-impact-thud-1/
Sound name in project: Win Sound file name: Peaceful Win 2 Link: https://www.soundsnap.com/peaceful_win_2_wav