**Games Development Pipeline**

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**Unity Rube Goldberg Machine Project Report**

My Rube Goldberg machine is themed on Pokémon by using poke balls as the spheres. The end goal is to capture a charizard by launching a poke ball at it. I chose this theme because I felt it would be the simplest to fit to a machine.

Each device in the machine is explained below

1. The machine starts with a seesaw triggered by the player controlled poke ball falling down onto it. It uses a hinge joint about its centre with a 40 degree limit to act as a seesaw.
2. The second device is a bucket containing a poke ball. This is triggered to tilt over by the seesaw pushing its back upwards and it tips the ball out onto the next device
3. Third is a bar that spins on a hinge joint and is triggered by the previous ball falling on it
4. Next is a ball rolling down a ramp into a pinball machine. It’s triggered by the bar spinning and pushing it forwards
5. The ball landing in the pinball machine triggers the chain to release and the machine launches the ball forwards
6. The ball hits a row of dominoes which each fall in turn.
7. The last domino falling releases a pendulum which was held in place.
8. The pendulum swings into another ball and pushes it forwards down a ramp
9. This ball falls onto a seesaw that was keeping a ball in place and releases it
10. After the ball is released it rolls down a ramp into a cylinder
11. The cylinder is caused the rotate and push another ball forwards.
12. This ball rolls down the ramp and falls on another seesaw.
13. This seesaw launches a ball on the other end upwards
14. The ball bounces off a wall and down a ramp into a pan
15. The pan spins and triggers another to spin, which triggers a third. The third pan pushes a ball forwards
16. This ball falls onto a trampoline which bounces it back up
17. The ball then hits a button which causes a cylinder to rotate.
18. The cylinder pushes a ball forwards by rotating into it.
19. This ball rolls into a hammer and makes it fall.
20. The hammer pushes a ball forwards and down a ramp.
21. The ball lands in a catapult and causes it to launch
22. The catapult launches the ball into a charizard to capture it

The physics in my machine is extremely robust so the machine reaches the end properly every single time. Another strength of my machine is the theming of everything being very coherent, such as the materials textures and sounds.

There are several things with my machine that could be improved. The camera timing can sometimes not follow the action perfectly due to the timing of the elements varying between uses. This can make things slightly difficult to follow sometimes. Also when the machine is started and the begin screen appears all the spheres have to settle which causes a lot of on collision enter events and that triggers the collision sound to be played many times at the start, however once the spheres have settled they don’t cause any more random collision sounds. The machine itself doesn’t look very elegant in its design which is something I would improve if I were to make a new machine.

However despite the design limitations every single device in my machine works flawlessly and performs its action as intended without fail.

The camera’s movement is achieved with a simple script that searches for a game object with the name “position” + the index of which animation it’s doing. It then uses a lerp to move to that point before moving to the next one. With this script it allows me to add more animation points or remove them without having to reopen the script. The camera is scripted to start moving when the player controlled ball reaches a certain point

The player’s start ball that they control is achieved by using the build in axes for unity’s input and a get axis function. This is read into a vector which is used in the add force function to make the ball move.

Bumm One 2013 PokeballBounce [online] Youtube, <https://www.youtube.com/watch?v=NoufAlvp4QA>

Niall Stenson 2019 Pokémon Theme On Guitar [online] Youtube <https://www.youtube.com/watch?v=zxKeIAZT7Mw>