Physics-Based Labyrinth in Unity

Physics Project

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Abstract. I implemented a Physics-Based Labyrinth Game, where the player controls a rolling wooden marble and must pass 9 different rooms to complete the game. The game - implemented in Unity - makes use of many of its ready-made physics components in order to make the labyrinth fun and challenging for the player to solve.

Code: `https://github.com/AndreaMas/Physics-Based-Labyrinth-Game`
Video: `https://youtu.be/u_5miEU_jJY`
Play: `https://aramas.itch.io/physics-labyrinth-game`

1 Game Presentation

The game consists of a Labyrinth made of 9 different rooms. The player - with arrow keys - controls a rolling marble which has the objective of reaching the end of each room (symbolized by a fluctuating yellow cube). The game ends when the final room is reached, where the ball will need to face its mortal enemy (the impenetrable wall) in order to escape.

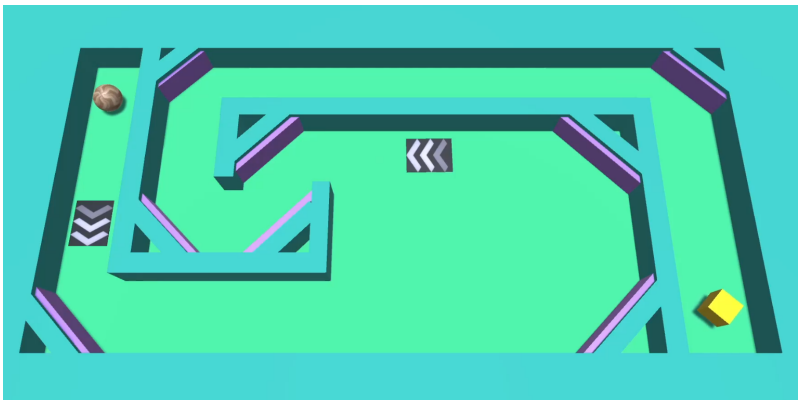

Fig. 1. Example of a simple room. In this instance, bouncy purple walls and an acceleration platform will help the player reach the end of the room with ease.

2 Physics Components Used

In order to create an engaging physics-based gameplay, physics components ready-made by Unity where used, such as:

- Rigidbodies
- Physics Materials
- Hinge Joints
- Spring Joints

The above have proved useful to create rotating doors, floating punching-bags, bouncy walls and slippery floors. However, for creating custom behaviours, custom scripts have been made to implement features such as:

- Extra-bouncy Walls
- Acceleration Platforms
- Impulse Platforms
- Sticky obstacles

Extra-bouncy walls and impulse platforms simply apply a force on the player-controlled ball upon the exact moment of collision, while acceleration platform do so but in a more continuous manner.

Sticky obstacles, on the other hand, upon collision become child of the player, which makes up for interesting gameplay inspired by the Katamari videogame series[Fig. 2].

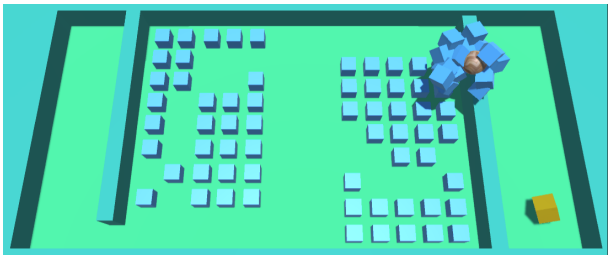

Fig. 2. Player, by picking up enough objects, is able to roll over walls.

Conclusion and future improvements

The game is a great test case for testing physics components in Unity and their versatility. The ease-of-use enabled fast creation of obstacles and fun features. The project is now setup with numerous prefabs making it extremely easy to create novel levels and challenges for the player. The game in itself lacks an original element to it, which could be brought by making the controllable character more interesting.