**COSC363 Assignment 1 Report**

**Description**

The scene contains two moving features; a hollow hourglass shaped object as a pendulum, and a ball bouncing such that at the peak of its movement, it travels through the pendulum.

|  |  |
| --- | --- |
| **A picture containing grass, sky, outdoor, wooden  Description automatically generated** |  |
| *Figure 1: Close up of pendulum* | *Figure 2: View of ball path* |

**Controls**

|  |  |  |
| --- | --- | --- |
| Move Forward | Up Arrow, | W |
| Move Backward | Down Arrow, | S |
| Move Left |  | A |
| Move Right |  | D |
| Look Up |  | 8 |
| Look Down |  | 5 |
| Look Left | Left Arrow, | 4 |
| Look Right | Right Arrow, | 6 |
| Reset Scene |  | r |

**Build Instructions**

* Download and install Microsoft Visual Studio (if not already done)
* Extract the project ZIP and open OpenGLProject.sln in Microsoft Visual Studio
* Workspaces?
* Run by clicking “Local Windows Debugger” near the top left of the screen

**Extra Features**

**Skybox**

The scene contains a skybox. The images was obtained from [https://opengameart.org/content/sky-box-sunny-dayon 7/04/2021](https://opengameart.org/content/sky-box-sunny-day%20on%207/04/2021).

**Physics Based Animation**

The objects in the scene conform to the mechanics of those on earth. The movement equations are defined in References.

**References**

**Pendulum Movement Equations**

Let be the initial angle of the pendulum

Let g be the gravitational constant

Let r be the length of the pendulum

Let t be the time since the program was started

Let be the static point of the pendulum

**Ball Movement Equations**

Let T be the period of the pendulum

Let t be the remainder of the time since the program was started divided by T

Let be the peak of the ball path (turning point of parabola)

Let be any other point on the path (use bounce position)

If

Otherwise

and are set such that the ball accelerates downwards at g m/s