1/31/2018

CS308 Gizmo-Ball

Physics Loop & Triggering System

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**PHYSICS LOOP:**

The physics loop is based on a timer running in 0.5 second intervals. Each tick the minTimeUntilCollision method is called on every other gizmo in order to determine if a collision is going to occur during this tick. If the minimum time until collision is less than the timer’s tick time, then a collision is going to occur. In case of no collision the ball moves freely for tick time. If we know that there is going to be a collision the ball moves for minTimeUntilCollision and is now adjacent to the object it’s going to collide with. Because of the collision all the gizmos that the colliding gizmo is connected to are triggered. After the collision has occurred the appropriate reflect method is called to calculate the ball’s new velocity. At last gravity and friction are applied to the ball using a mathematical formula.

A Pseudo Algorithm:

1. Call minTimeUntilCollision() method on every other object
2. IF minTimeUntilCollision is more than tick time:
   1. Move ball for time(no Collision meaning the ball moves freely)
3. IF minTimeUntilCollision is less than tick time:
   1. Update Ball’s position to be adjacent to colliding object
   2. Trigger any connected Gizmos
   3. Call Reflect() method to get new velocity after collision
4. Apply Gravity and Friction

**Triggering System:**

The triggering system is the system that is going to be responsible for how gizmos or keyboard events can be connected onto other gizmos in build mode and how these connections are going to be handled in play mode. A Gizmo can be triggered either by pressing a key event that is connected to it or by the ball colliding with a Gizmo connected to it. Different gizmos implement different functionality when triggered for example a left flipper when triggered rotates 90 degrees counter clockwise whereas a right flipper rotates clockwise. This could be achieved using the Triggerable interface witch all the gizmos will implement. In Build mode the user can either connect gizmos to trigger other gizmos or connect a keyboard event to trigger a gizmo. Whenever the user adds a key event to be connected to a gizmo that key event is added to the list of keyboard events the system is going to be listening to and whenever a gizmo to gizmo connection is added a reference of the gizmo to be triggered is stored in the gizmo that is triggering it. The relation of the connections between gizmos is nontransitive meaning that triggering a gizmo does not trigger a chain reaction with any of the gizmos that it is connected with. For example, keyboard event A is connected to Gizmo B and Gizmo B is connected to Gizmo C. If the user inputs A from his keyboard, then gizmo B is going to get triggered but not Gizmo C.