CS308 Group W1 Gizmoball Specification

Where L is the basic distance unit, equal to the edge length of a square bumper Gizmoball will:

* Support Building and Running modes and allow the user to switch between them or quit at any time.
* Feature a playing area no smaller than 20L x 20L.
* Feature a Building Mode grid of 1L x 1L squares encompassing the playing area where 1 bumper gizmo per square can be placed.
* Have the animation grid no coarser than 0.05L x 0.05L when in running mode.
* Allow the user to add, 90 degree rotate, move and delete gizmos when in Building Mode.
* Not allow the user to rotate absorber gizmos.
* Allow the user to add a ball with a set position and velocity when in Building Mode.
* The ball must have a diameter of 0.5L.
* The ball’s velocity must range from 0.01L/sec to 200L/sec.
* The ball’s velocity must be able to be 0L/sec ie stationary.
* Not allow any overlap of gizmos or balls when in Building Mode.
* Allow the user to connect/disconnect a single gizmos trigger to a single gizmos action when in Building Mode.
* Allow the user to connect/disconnect a single key press to a single gizmos action when in Building Mode.
* Allow the user to save and load previous designs to or from a named file when in Building Mode.
* Allow the user to press keys that cause action in gizmos when in Running Mode.
* Display visually smooth movement of the ball when in Running Mode.
* Display a realistic change in ball velocity due to gravity and friction when in Running Mode.
* The gravity value of 25L/sec2 must be used to achieve realistic effects on the ball.
* The default friction values are mu = 0.025/sec, mu2 = 0.025/L for the velocity equation: Vnew = Vold \* (1 - mu \* delta\_t - mu2 \* |Vold| \* delta\_t).
* Display realistic interactions between the ball and gizmos when in Running Mode.
* Feature 7 different gizmos including square, circular, and triangular bumpers, left and right flippers, absorbers, and outer walls; each with specific appearance, trigger, action and coefficient of reflection.
* Absorbers must hold the ball in there bottom right and then shoots it upwards at an initial velocity of 50L/sec at default gravity and friction values.
* Flippers must rotate through 90 degrees and back to their initial position when triggered.
* Outer walls can not be edited in any way and contain the ball within the 20Lx20L area.