Revised Spec

Gizmoball should contain 2 modes:

Build Mode

User in build mode can:

* Add any of the following gizmos to the playing field (gizmos should not be placed if either it overlaps a currently existing gizmo or is out of the boundary of the playing field):
* Square bumper
* Circular bumper
* Triangular bumper
* Left flipper
* Right flipper
* Absorber
* Outer walls
* Reposition any gizmos (given that it does not overlap a currently existing gizmo or is out of the boundary of the playing field)
* Rotate any gizmo in a 90 degree clockwise rotation
* Assign a trigger to a gizmo which when struck with a ball or when an associated key is pressed, will carry out at most one action (chain reactions should not occur).
* Delete any gizmo from the playing field
* Add a ball to the playing field with specified position and velocity (ball should not be placed if either it overlaps a currently existing gizmo or is out of the boundary of the playing field. A stationary ball can however be placed inside an absorber).
* Save to a file in the standard format or an alternate special format with the file name being specified by the user. The save file must contain all the data of the gizmos, all triggers and their associated actions as well as the current ball position and ball speed.
* Switch to running mode
* Quit Gizmoball

Run Mode

User in run mode can:

* Trigger the actions tied to the gizmos through the bounded key presses
* Switch to building mode (should allow gizmos in a transitional state to finish before switching over)
* Quit Gizmoball

Additionally, Gizmoball should:

* Generate smooth animation of the motion of the ball (20fps)
* Ball must have default diameter of 0.5L
* Ball speed must range from 0.01L/sec to 200L/sec with 0L/sec being stationary
* Ensure the ball bounces in the direction and speed after a collision the way you would expect it too.
* Continuously change the ball speed to account for gravity
* Standard gravity value = 25 L/sec^2
* Continuously change the ball speed to account for friction

Playing Field

* The basic distance unit should be defined by L
* One L should be equivalent to the edge of a square bumper
* Playing field must be at least 20L by 20L (should fit 400 square bumpers)
* Origin is in the upper left corner (0,0) with coordinates increasing to the right and down
* Each Gizmo should be bounded to its own box(s) including the flippers during its rotation
* The origin of each of the standard gizmos is the upper left hand corner of its bounded box
* The origin of a ball is its centre

Bumpers (Square, Circular, Triangular)

* Square bumper has Edge length 1L
* Circular bumper has diameter 1L
* Triangular bumper has sides of length 1L and hypotenuse of length Sqrt(2)L
* All bumper’s trigger is generated whenever the ball hits it
* All bumpers are not required to carry out an action
* All bumper’s coefficient of reflection is 1.0

Flipper

* Each flipper has a generally rectangular rotating shape with bounding box of size 2Lx2L
* Each flipper’s trigger is generated whenever the ball hits it
* When a left flipper gets triggered, it sweeps 90 degrees counter clockwise and if it gets triggered again will sweep back 90 degrees to its original position
* When a right flipper gets triggered, it sweeps 90 degrees clockwise and if it gets triggered again will sweep back 90 degrees to its original position

Absorber

* Should be a rectangle with integral-length sides
* An absorber should stop any ball that encounters it and hold it in the bottom right hand corner
* The action of the absorber when triggered is to shoot the ball in holding straight upwards with a speed of 50L/sec
* An absorber takes no action when it is not holding any balls or when a previously fired ball has yet to leave the absorber.
* Absorbers cannot be rotated

Outer Walls

* Outer walls should be an impermeable and lie just outside the playing area which the user cannot move, delete or rotate
* Trigger is generated when the ball strikes the wall but no action is required
* The coefficient of reflection is 1.0