Physics Integration
Summary and Woes

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Product Summary

We integrated the Open Dynamics Engine into the hardware graphics engine that we have been building in class for the past few weeks. The most important bits are in the Body and Geom members in the meshGLMesh structures. These hold the information necessary to implement collision detection and other reaction to various forces.

In our demo, a set number of bouncing objects are generated and spawned above the ground where there is a stack of boxes that resemble a huge bale of hay. All of these objects are affected by gravity, and some of the bouncy objects will collide with the bale, which will cause it to break apart into its sub-nodes.

Note: in case the compile code does not work, we included a video of our demo demoFinal.mov

Changes in the Project Over Time

Initially, we had planned on creating triangle-based meshes within the physics engines to use in collision detections. Due to the lack of documentation online and the fickle nature of the various functions, we decided to abandon it, and implemented the physics simulations for only boxes, spheres, and capsules. It is technically possible to create complex compound objects using these but the ODE manual advises against it.

Additionally, we planned for our demo to be a trebuchet that would launch another object into a wall made of small boxes. This was abandoned due to both time and complexity constraints. It would have been possible to create a custom mesh for the trebuchet, but arranging the different triangles in just the right way would have been very time consuming, and the triangle meshes in ODE was not working either so we decided against it.

Then we tried to build the trebuchet by using about two dozen separate nodes connected by a joint, but this too proved to be very time consuming as we needed to place and rotate these nodes just right before we can 'glue' them onto each other.

Other Challenges

Because of the various libraries used in our graphics engine, we were largely unable to work outside of the lab, and especially in the beginning of the project, we spent a lot of time trying to configure these correctly so that we can even compile.