TCSS 491 — Computational Worlds
Winter 2012 — Project 1 (phase 2)

Due Date: Wednesday, Feb. 29

Guidelines

This project should be completed in small groups of two students. The project deliverables (described below) should be submitted to the instructor electronically by the end of the day on the due date.

Project Overview

Your group will design and implement a distributed virtual world incorporating a basic physics engine. The project is divided into three phases:

- Phase 1: Implementation of an interactive virtual world.
- Phase 2: Addition of a physics engine.
- Phase 3: Distribution of the virtual world across multiple application instances.

The current assignment addresses only the second phase, the remaining phase will be completed later.

Phase 2 Design

In this phase, your group will extend your virtual environment from phase 1 to include basic physics. Specifically, your virtual environment should permit all objects from phase 1 to interact under the influence of collisions and environmental forces such as gravity. All objects may be considered rigid bodies that are free to rotate. The major elements necessary to complete this phase include:

- Integrating the physics engine with the existing virtual environment from phase 1.
- Calculation of the moment of inertia for all objects.
- Correcting the collision detection algorithm for triangle-circle collisions to prevent "phantom" collisions.
- Completing the triangle-triangle collision detection algorithm for use with general objects.

Deliverables

All Java source code should be archived together, e.g., placed in a `.zip` file, and submitted to the instructor. Only one group member need submit the group's deliverable. Please make sure that both group members' names appear somewhere within the deliverables.