

CS 8625 Project Description Summer 09, Dr. Ken Hoganson

Simulation/Modeling/Teaching System in High Performance Computing

Concept: Students will create a software system that involves high-performance computing in some way. Students will submit a project description/proposal, will participate in alpha-testing, will participate in beta-testing their system, and will turn in an executable and all source code documented.

This project will count as the final exam: (35% of overall grade).

The project prospectus, alpha and beta testing, and reviewing will count as course assignments/homework.

(Midterm counts 35% of course grade).

Alpha- and Beta- testing will be semi-formal:

- Designer explains and demonstrates system in its unfinished state, to two classmates.
- Each classmate reviewer will fill out and turn-in a one page evaluation/suggestion form (the form will be posted). Copy to designer and professor.
- Recap: each student in the class will review two other projects. Each student's project will be reviewed by two other classmates.
- Two review sessions (dates to be posted): Alpha and Beta testing.
- Demos, discussion, and reviews can be done remotely.
- Designer demos will be recorded using ePop (see Mr. Lebron for assistance), so the professor can view the recorded demo, and so remote reviewers can see the demo asynchronously.
- Completed project turned in for grade by noon on the day scheduled for the course final exam.

Project Prospectus: a formal 1-page document, format to be posted.

Project timeline:

- Project prospectus: Due to professor on July 7. Students will receive feedback.
- Alpha Testing: completed no later than July 16. Designer presentations will be recorded, reviews to the designer and copy to the professor.
- Beta Testing: completed no later than July 23. Designer presentations will be recorded, reviews to the designer and copy to the professor.
- Final project turn-in: executable version, all source-code documented.

Development system options: [regardless of system, you must create a self-contained executable, and all code must be documented and accompany the turn-in.

- Java
- C, C++, C#
- Flash
- Gamemaker 7
- Other development system/tool requires pre-approval.

Some example project ideas (you are not limited to these ideas):

- Continue the computer architecture simulation system to simulate a multiprocessor, multicomputer, grid, cluster, cloud system.
- Develop a teaching tool that shows students (some combination of the following)
 - how speedup calculations are performed, with balance-point calculation
 - how systems are evaluated
 - bandwidth-throughput evaluations
 - performance bottlenecks
 - communication vs computation relationships
- Animated tools to show/teach
 - Parallel process execution
 - Computer cycles of address to cache/to local memory/to remote memory
 - Model a specific computer system or architecture
 - Show multi-threaded programming
 - Show the speedup resulting when hardware resources are allocated across multiple levels in a balanced fashion.
- The above ideas will be approved, but you may brainstorm and suggest other ideas or combinations, which you will submit in your prospectus.