

## Term project

### COT5520 Computational Geometry: Fall 2002

The term project will consist of two parts:

**Part I:** you will be required to choose one of the chapters (or parts of a chapter) from the text book by de Berg, van Kreveld, Overmars and Schwartzkopf, as listed below, study it thoroughly and make a classroom presentation of the important ideas and algorithms in the chapter. You should try to augment the material with list of recent references cited at the end of the chapter or from other sources that you might find from your own research.

**Deliverables:** A tutorial report on the chapter and a power point lecture presentation. One hour will be allocated for the presentation. You may not be able to present all the material in your report but try to give a summary of ideas of topics that you may not deal in detail during presentation.

**Part II:** Pick one important algorithm from the chapter and find a real-life application where this algorithm is useful and applicable. Implement this algorithm, test it with data obtained from realistic databases (download from web or whatever sources you can identify) and provide a graphics interface to demonstrate the algorithm. You could tie this project with your specific research interest and produce a paper at the end of the semester for conference/workshop presentation.

**Deliverables:** A report (or a technical paper) describing the detailed algorithms, data structures used, complexity analysis and performance data and a power point presentation of the work in the class room. The final report should be written professionally with the following sections: Introduction and motivation, problem statement, a clear description of the algorithm with explanation with examples, important data structures used, implementation, test results and conclusions. One hour will be allocated for this presentation.

#### Topics

Computing Overlay of Subdivisions (Chapter 2)  
Linear Programming (Chapter 4)  
Arrangements and Duality (Chapter 8)  
3-D Convex Hull (Chapter 11)  
Binary Space Partition (Chapter 12)  
Robot Motion Planning (Chapter 13)  
Visibility Graphs (Chapter 15)  
Any other topic of your research interest.

#### Team

You could work in teams of two or by yourself. There will be two special presentations by guest students. The scope of the project (both for Part I and II ) should be discussed with me and approved by me. You should submit a written proposal by September 30.2002. Then you have about a month and a half to complete the project. You should have your everything completed by November 17. A schedule of presentation will be announced later during the period November 18 – through December 6. We may have to meet outside our regular class hours.