CS 4470 Image Synthesis (4-0)

Synopsis   Advanced principles and practice in the production of computer generated images. Focus of the course is design projects. We will use VRML & maybe a little OpenGL.

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Office hours are anytime you find me there. I am usually available as indicated by the schedule posted outside my office. Make an appointment if you want to be sure to see me. If necessary you may call me at home (earlier than 2200 please).

Schedule   Monday - Thursday 1300-1350, Root 208. Final exam: none.
Spanagel 263 PC lab, the Graphics Lab and Root 204 Systems Technology Lab are normally available for your use. See Milena Cochran (STL) or Rosalie Johnson (CS) for an account unless you already have one.

Travel plans (no class held on these days):
April 6-9   Mine Countermeasures Symposium, NPS
May 25   Memorial Day
June 11   last class

Textbook   1. Ames, Andrea L., Nadeau, David R. and Moreland, John L., *VRML 2.0 Sourcebook*, second edition, John Wiley and Sons Inc., New York, 1997.

Optional texts   2. *The Annotated VRML 97 Reference Manual* by Rikk Carey and Gavin Bell at *http://www.wasabisoft.com/Book/book.shtml*

3. *Late Night VRML 2.0 with Java* by Bernie Roehl, Justin Couch, Cindy Reed-Ballreich, Tim Rohaly and Geoff Brown at *http://ece.uwaterloo.ca/~broehl/vrml/lnvj*

Some other textbooks may be required for successful completion of this course. There are numerous online references available on the course home page at *http://www.stl.nps.navy.mil/~brutzman/vrml*

Guidelines   1. You must devote time to reading and programming to succeed in this course.

2. Students are encouraged to study together. However every assignment that you hand in must be your own work. Group solutions to homework and project assignments are only acceptable when specified. As in any endeavor your individual integrity is essential. If in doubt, ask.

3. I am designing this course to help significantly in your thesis and other courses. Your comments, questions and suggestions are always welcome.

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Course Objectives

○ Gain a detailed view of specialized 3D computer graphics

○ Learn to properly design and structure VRML 2.0 scenes

○ Extend your programming skills using animation techniques, scripts and routes

○ Support thesis work and projects in other classes

○ Use online tutorials and public domain software

○ Provide tools, techniques and a repeatable methodology that you can use later

Class Policy and Study Recommendations

1. You are learning new ideas and a new language. Thinking and writing in a new language requires fluency. Don't be reluctant to think new thoughts or work hard. Persistence pays.

2. You will get a LOT more out of class by reading assigned material beforehand. Keep ahead of me in your reading. Read each section at least twice. This is a challenging and ambitious course that is well worth your while.

3. Discussion and dialog will make class a lot more immediate.

4. Projects make up all of your grade, just like the real world. Exams are boring.

5. Grading is based on merit and performance. I expect everyone to work hard and get an A.

6. You learn how to program solutions to problems by doing. Thus lots of projects. Each weekly project (or projects, if you prefer) should incorporate and demonstrate the use of VRML nodes we are studying. Your final project should pass the "quantitatively cool" test.

7. Students are expected to hand in projects on time. It is your responsibility to contact me in advance for assistance if you are unable to meet an assignment date. I prefer that you hand in something late which is correct, rather than something on time which is broken. Don't get behind, we are going to follow a fast pace.

8. You must get an electronic mail address so that I can send messages to the entire class. There are a set of home pages for this class. Numerous online references will be provided that you will need to retrieve. I also recommend that you build a home page, since you may be required to build one as part of this course.

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Week	Chapters		Assignment	Date due, comments
1 MAR 30-APR 2		Simulation overview, project design	visit aquarium	
2 APR 6-9		Mine Countermeasures Symposium	attend!	
3 APR 13-16	10, 16, 19, 20, 21, 23	Lighting models, shading, materials, transparency and blending, fog		
4 APR 20-23	17, 18, LN10	Texture mapping	some weekly projects	
5 APR 27-30	all	National Research Council report *Modeling and Simulation - Linking Entertainment and Defense*	read	
6 MAY 4-7		Distributed Interactive Simulation (DIS), dis-java-vrml working group	Final project outline due	
7 MAY 11-14		Authoring tools, JVerge		
8 MAY 18-21	LN15, 15	NURBS, extrusions		
9 MAY 25-28	LN14, 15	Humanoid animation, fractals, L-systems		
10 JUN 1-4		Projects		
11 JUN 8-11	-	Project Demonstrations and Papers		
12 JUN 15-18	-	Finals week - backup dates for demos		

CS 4470 Computer Graphics Class Projects

Your grade will be based on various individual programming projects, contributions to the class project and a final report. We may end up doing individual projects rather than a group effort.

Here are final project and report attributes:

- Group approach, or individually designed & executed. We have several interesting ongoing projects that can benefit from improvements and extensions.

- Best approach is work related to your thesis

- Topic mutually agreed upon

- Project outline and methodology proposal, updates due as scheduled

- Deliverables:

    ○ minimum five pages of text in report (I prefer that you write a draft thesis chapter)

    ○ at least five references from text bibliography included and evaluated

    ○ table of contents, include an abstract

    ○ appendices: software source code, user guide, session log

    ○ provide HTML page and links to source code to remain online

- 15 minute presentation and demonstration to class