

Introduction to Computer Graphics



CS380
Spring 2016



Computer Graphics?

□ “This is CG.”

CS380

- This course provides a broad introduction to the field of 3D computer graphics.
- The goal of this course is to learn **how to form images by computer.**
 - We will study the basic methods used to define shapes, materials and lighting when creating computer-generated images for use in film, games and other applications.
 - Covered topics include affine and projective transformations, viewing, shading, lighting, texture mapping, modeling, animation and 3D interactive applications.
- Through a series of OpenGL programming assignments, students will become familiar with interactive 2D and 3D graphical display concepts.

Prerequisites

- Linear Algebra
- Basic programming skill
 - C / C++ / Java
 - Python (okay, but will need to study C++ for yourself)
- Some understanding of algorithm, data structures (Level you've learned in Discrete Mathematics course)
- Some understanding of computer architecture and system

- Please reconcile to take this course next year, if you are not ready yet.

Instructor

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TA

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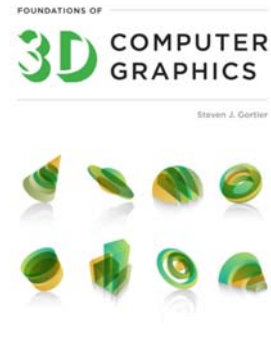
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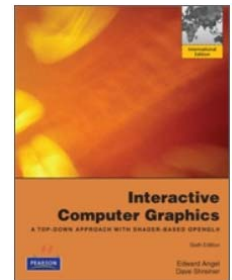


Textbook

- Steven J. Gortler (2012)
 - Foundations of 3D Computer Graphics
 - MIT Press
 - <http://www.3dgraphicsfoundations.com/>
 - <http://www.3dgraphicsfoundations.com/code.html>



- Reference book
 - Edward Angel and Dave Shreiner
 - Interactive Computer Graphics: A Top-Down Approach with Shader-based
- available from the KAIST library



Schedule

- Lectures
 - Tues / Thurs 4 ~ 5:15 PM
 - N1 Room #102
- Lab Session
 - Wed 7 ~ 10 PM
 - E11 Room #307 & 306
 - TA Help hours

Mon	Tue	Wed	Thur	Fri
4 PM				
	Lecture		Lecture	
5:30				
		Lab	7 PM	
		TA's help Hour		
			10	

Lecture Schedule (tentative)

Tue/Thur			
Date	Topic	Readings	Assignment
Mar 8, 10	Introduction and HelloWorld 2D	Chap 1, Apx A	HW #0
Mar 15, 17	Linear and Affine Transformation	Chap 2, 3, Apx B	HW #1
Mar 22, 24	Frames in Graphics	Chap 4, 5	
Mar 29, 31	HelloWorld 3D, Projection	Chap 6, 10	HW #2
Apr 5, 7	Depth	Chap 11	<transformation w/ simple anim>
Apr 12, 14	From Vertex to Pixels	Chap 12	
Apr 19	Geometric Modeling,	Chap 22	
Apr 20~26	Midterm Exam		
Apr 28, May 3	Color and Shading	Chap 9, 14	
May 10, 12	Raytracing	Chap 20	HW #3
May 17, 19	Lighting	Chap 21	Shading/Lighting
May 24, 26	Texture Mapping	Chap 15	
May 31, Jun 2	Sampling	Chap 16, 17	HW #4
Jun 7, 9	Resampling	Chap 18	Texture mapping
Jun 14	Animation	Chap 22	
Jun 15~21	Final Exam		

Lecture & Lab

Tue/Thur			Wednesday		
Date	Topic	Assignment	TA (LAB)		
Mar 8, 10	Introduction and HelloWorld 2D	HW #0	9	OpenGL Intro 1 (Simple 2D)	
Mar 15, 17	Linear and Affine Transformation	HW #1	14	open lab	
Mar 22, 24	Frames in Graphics		23	OpenGL Intro 2 (3D & viewing)	
Mar 29, 31	HelloWorld 3D, Projection	HW #2	30	open lab	
Apr 5, 7	Depth	<transformation w/ simple anim>	6	open lab	
Apr 12, 14	From Vertex to Pixels		13	<Election day>	
Apr 19	Geometric Modeling,		20	open lab	
Apr 20~26	Midterm Exam				
Apr 28, May 3	Color and Shading		4	Lighting setup exercise	
May 10, 12	Raytracing	HW #3	11	open lab	
May 17, 19	Lighting	Shading/Lighting	18	open lab	
May 24, 26	Texture Mapping		25	Texture mapping exercise	
May 31, Jun 2	Sampling	HW #4	1	open lab	
Jun 7, 9	Resampling	Texture mapping	8	open lab	
Jun 14	Animation				
Jun 15~21	Final Exam				

Lab (E11: 307)

- ❑ Must come sessions
 - OpenGL Introduction 1 (3/9)
 - OpenGL Introduction 2 (3/23)
 - Shading/Lighting Session (5/4 tentative)
 - Texture mapping Session (5/25 tentative)
- ❑ Other Wednesdays 7~10 PM
 - Open lab
 - TA Help Hour
 - You may come and work on your homework and ask questions to TA

Homework Assignments

- ❑ 4 main programming assignments +
- ❑ **Homework #0: Due next Tuesday (3/8)**
 - Not graded, but essential for you to do in time to assess yourself and to continue on.
- ❑ Homework #1~4: Programming using OpenGL
- ❑ You may also get *some written problem solving homework* throughout the course.
- ❑ Read the chapter!!

What you should expect from the lecture

- Learn basic concepts and topics selected from the textbook (mostly)
- Get motivated to read the textbook
- **Pop-quiz** to check how the class is following the lecture materials

and what I expect from you

- Skim through the chapter **before** coming to class
- Read the chapter carefully **after** the lecture
- Participate!
- Practice & play with OpenGL library and resources to understand concepts.

Grading

- Attendance and Participation 10%
 - Including mandatory lab sessions
- Homework Assignments 40%
 - Including any written ones
- Midterm Exam 25%
- Final Exam 25%

On the back page of your survey....

- Write down your observation about the animation.
 - What was interesting?
 - What kind of technical aspects you see related to computer graphics?
 - ...

Cubic Tragedy

- Ming-Yuan Chuan from the National Taiwan University of Science and Technology, Taiwan
 - People's Choice Awards at SIGGRAPH 2005 Computer Animation Festival

"Check out this short film done using polygon animation. It features a girl who is trying to figure out how to use her CG makeup to redraw her polygons. I think it's awesome that her makeup kit comes with an "undo" button."

<http://humaninbox.blogspot.kr/2005/09/cubic-tragedy.html>

