

# **Introduction to Computer Graphics**

**COMP 360**

## Instructors

### *Professor*

Ron Goldman

DH -- 3116

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T,Th 2:30–3:30 P.M.

### *Labbie*

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TBA

## Web Page

### *Exams*

- Posted the Week of the Exam

### *Labs*

- Posted 2-3 Weeks Before Due Date

## Grading

### *Exams*

- HW + Midterm + Final -- Probably Take Home
- 50% of Final Grade

### *Required Labs*

- 4 Programming Assignments
  - each approximately 2-3 weeks long
- 50% of Final Grade

### *Extra Credit Lab (Optional)*

- At End of Semester
- Worth up to a Full Letter Grade

## Required Labs

- 4 Programming Assignments
  - Length -- each approximately 2–3 weeks long
  - Coding -- 1 hour / per person / per day
- Work in self selected pairs
- Change partners after every assignment
- Graduate students must work on at least two labs with an undergraduate
- Language -- C++ and OpenGL
- Lab -- Symonds II

## Tutorial on C++ and OpenGL

### *Place*

Symonds II Lab

### *Time*

Wednesday 7:00 PM

or

Friday 7:00 PM

### *PC Password for Symonds II Account*

See Instructions -- Comp 360 Web Page

## Symonds II Lab

*Access Restricted*

*Will Obtain Access for All Students*

## Required Labs -- Grading

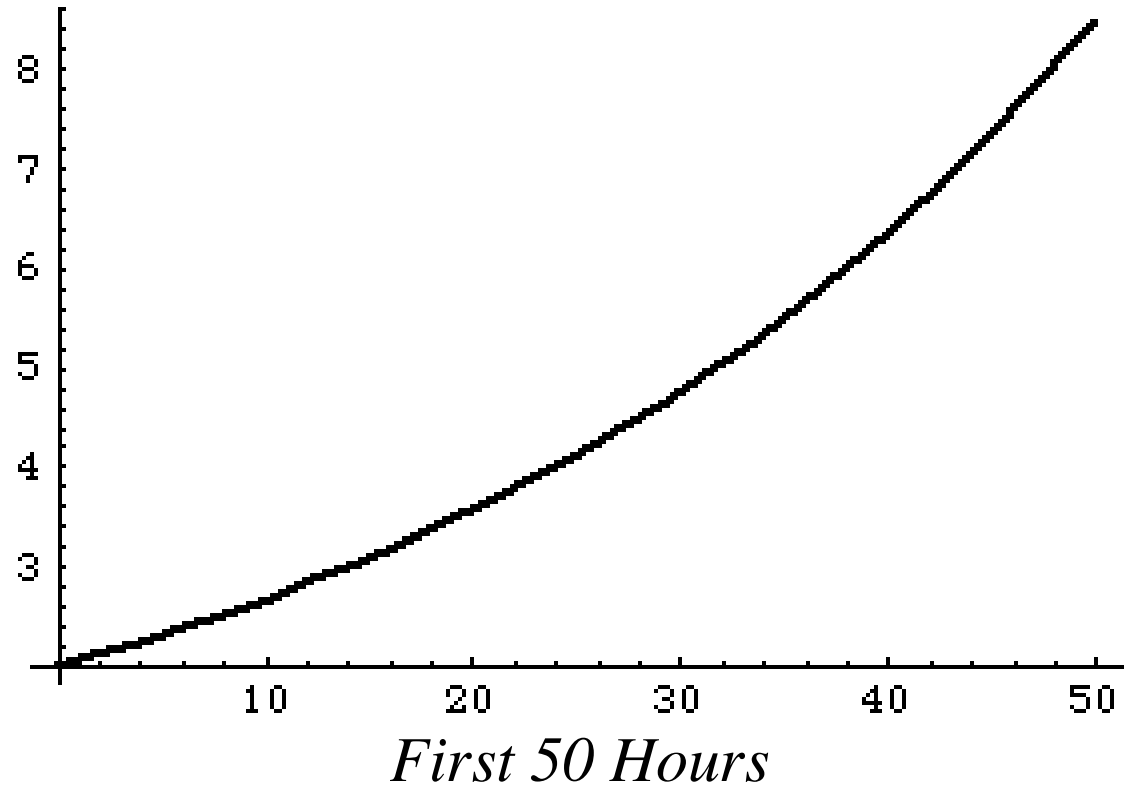
- 50% of Final Grade
- Late Policy:  $G_{Late} = G_{OnTime} - 2 \times 2^{H/24}$ 
  - $G = Grade$
  - $H = Hours Late$
- Consulting -- Permitted
- Copying Code = Cheating

## Late Policy

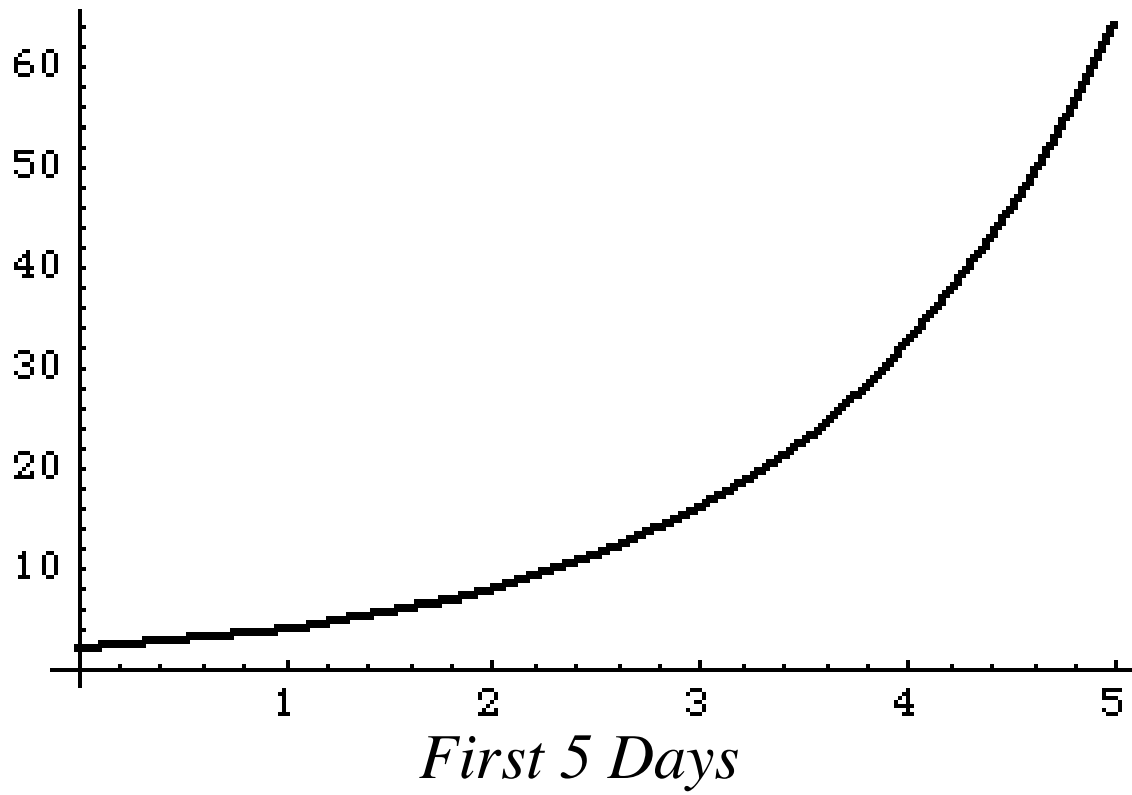
$$G_{Late} = G_{OnTime} - 2 \times 2^{H/24}$$

<u><math>H=Hours\ Late</math></u>	<u><math>Penalty=2 \times 2^{H/24}</math></u>
$0.00000001 = 10^{-8}$	2
12	2.8
$24 = 1\ day$	4
$2 \times 24 = 2\ days$	8
$3 \times 24 = 3\ days$	16
$4 \times 24 = 4\ days$	32
$5 \times 24 = 5\ days$	64

## Penalty Function



## Penalty Function



## Grading (continued)

### *Final Grade*

- $\text{Grade} = 50\%(\text{Exams} + \text{HW}) + 50\%(\text{Labs})$

### *Extra Credit Lab (Optional)*

- at end of the course
- for students who did poorly on some previous assignments
- for A students who wish to be exempt from the final exam
- worth up to a full letter grade
- see programming projects at end of various lectures

## Exams

### *Midterm and Final*

- Probably Take Home
- 50% of Final Grade

### *Exam Questions*

- 95%–100% from Exercises at End of Each Chapter

## Required Text

*An Integrated Introduction to Computer Graphics and  
Geometric Modeling*

-- Ronald Goldman

-- CRC Press

## References

### *General References*

- Computer Graphics: Principles and Practice  
-- Foley, Van Dam, Feiner, Hughes
- Computer Graphics -- Hearn and Baker

### *Fractals*

- Turtle Geometry -- Abelson and DiSessa
- Fractals Everywhere -- Barnsley

(On Reserve in Fondren)

## References (continued)

### *Freeform Curves and Surface -- Bezier and B-Spline*

- Curves and Surfaces for Computer Aided Geometric Design: A Practical Guide -- Farin
- Pyramid Algorithms: A Dynamic Programming Approach to Curves and Surfaces for Geometric Modeling -- Goldman

(On Reserve in Fondren)

## Lectures

### *Class Discussion -- Informal*

- Answer Questions on Contents of Each Chapter
- Solve Problems at End of Each Chapter

### *Preparation -- Crucial*

- Read Text
- Submit Brief Written Summary and Questions
- Each Student Responsible for the Solution to One Exercise

### *Attendance -- Mandatory*

- 1 Point Off Final Grade
  - For Each Class Missed Without Valid Excuse
  - For Each Class Attended Without Sufficient Preparation

## Written Summary

### *Purpose*

- To Prepare for Class Discussion

### *Format*

- One Typed Page
- Grammatically Correct and Coherent English

### *Topic Headings*

- Main Themes of the Chapter -- Not a Summary
- What I Learned from Reading the Text -- Not a Summary
- What I Did Not Understand in the Text
- Errors in the Text
- Questions on the Text and on End of Chapter Problems

# Syllabus

## 2-Dimensional Computer Graphics (Fractals)

- Turtle Graphics 1.5 Weeks
- Affine Graphics 1.5 Weeks

## Mathematical Methods for Computer Graphics

- Coordinate Free Methods 1.5 Weeks
  - Dot and Cross Products
  - Determinants
- Vector and Matrix Techniques 1.5 Weeks
  - Affine and Projective Transformations
  - Quaternions

## Syllabus (continued)

### 3-Dimensional Computer Graphics (Realistic Rendering)

- Recursive Ray Tracing 1 Week
- Surface Modeling 1 Week
- Solid Modeling 1 Week
- Polygonal Modeling 1 Week
  - Hidden Surface Algorithms -- 1 Lecture
  - Shading Algorithms -- 1 Lecture
- Radiosity 1 Week
- Freeform Curves and Surfaces 2 Weeks
- Other Topics As time permits

## Prerequisites

### *Trigonometry*

- Trigonometric Identities
- Law of Sines and Law of Cosines

### *Vector Geometry and Vector Algebra*

- Addition, Subtraction, Scalar Multiplication
- Dot Product, Cross Product, Determinant

### *Matrix Algebra*

- Matrix Multiplication

### *Calculus*

- Differentiation



## Symonds II Lab

*Access Restricted to Labbies*

*Will Deputize Some Students as Labbies*

- Select Times During the Week
- Sign Up with Labbie
- First Come, First Serve
- Students are Responsible to be in Symonds II at their Selected Hours
- Students Paid Going Rate -- \$10/Hour as Labbies