

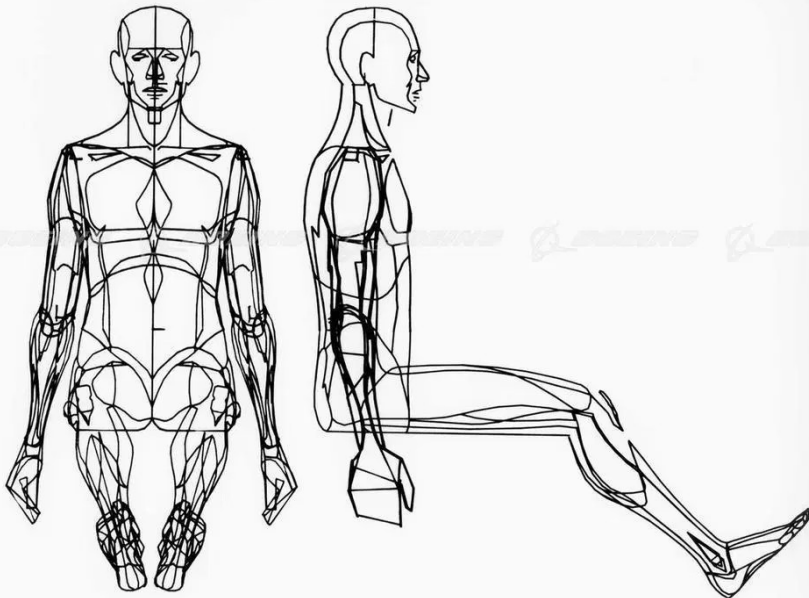
Computer Graphics 1: Introduction

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- Computer Graphics – What's It All About?
- Application Areas
- Course Outline
- Lectures & Labs
- Exams & CTs
- Books
- Questions?

What Is Computer Graphics?

- The term **computer graphics** was coined in 1960 by William Fetter to describe new design methods he was pursuing at Boeing.



- Fetter created a series of widely reproduced images on a pen plotter exploring cockpit design, using a 3D model of a human body

What Is Computer Graphics? (cont...)

*“Perhaps the best way to define computer graphics is to find out **what it is not!***

*It is not a computer,
nor a group of computer programs.*

*It is not the know-how of a graphic designer,
not a programmer, a writer, a motion picture specialist, or a
reproduction specialist.*

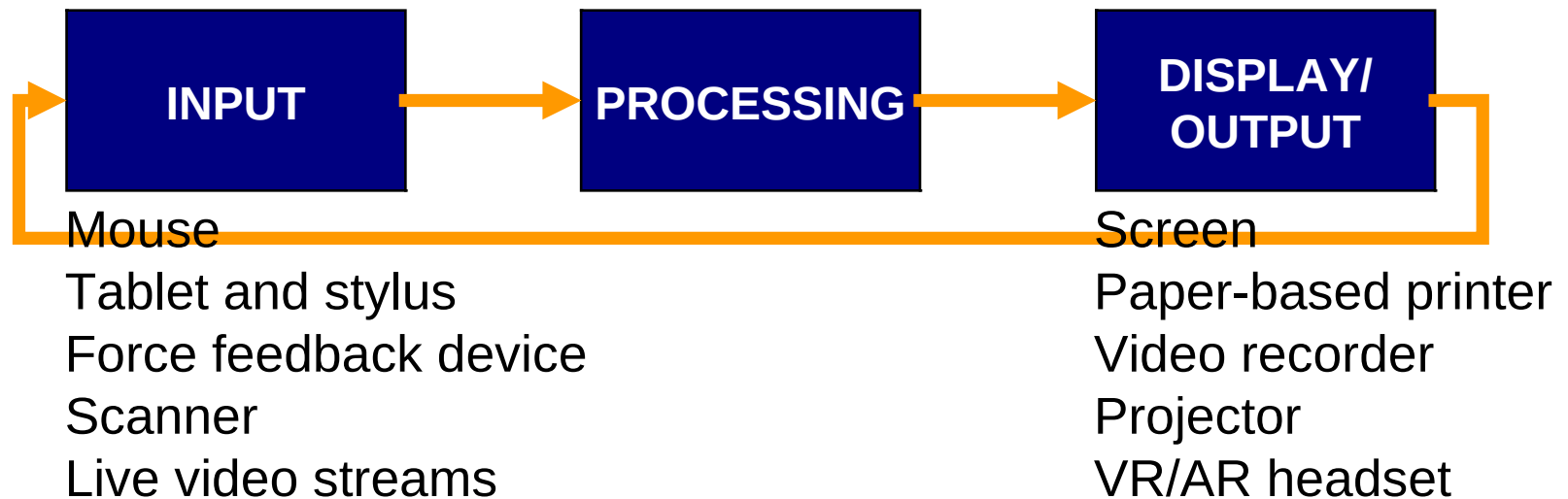
*Computer graphics is all these
– a consciously managed and documented technology
directed toward communicating information accurately and
descriptively.”*

Computer Graphics, by William A. Fetter, 1966

Interactive Computer Graphics

Takes things a step further by allowing users rapid visual feedback from their actions

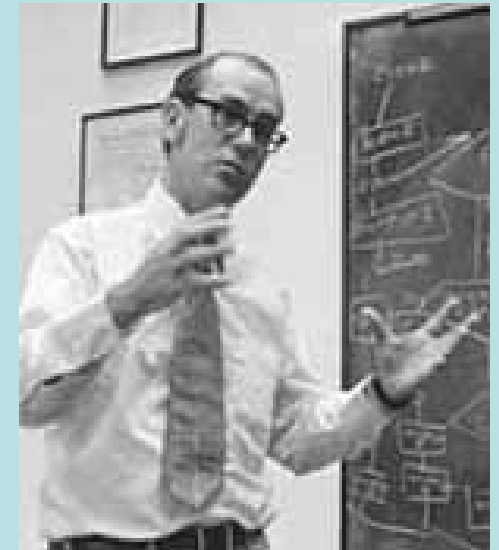
Typically we have the following cycle:



This area is the focus of this course

Interactive Computer Graphics (cont...)

Sketchpad, developed in the 1960s, was the first interactive computer graphics application. Using a light pen, key pad and monitor it allowed users create accurate design drawings.

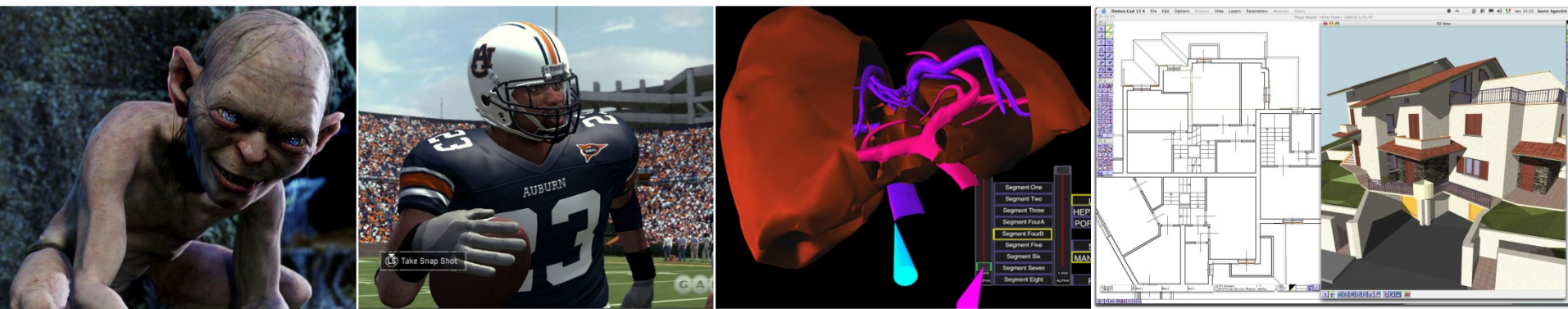


Dr. Ivan E. Sutherland developed Sketchpad as part of his PhD work. He went on to be a hugely influential computer scientist working in areas as diverse as graphics, circuit design, robotics and computer hardware.

If we add interactivity, Fetter's definition pretty much still holds

So, much of modern computing involves some graphical aspect that computer graphics is now ubiquitous

So, let's say *computer graphics encompasses anything achieved visually*

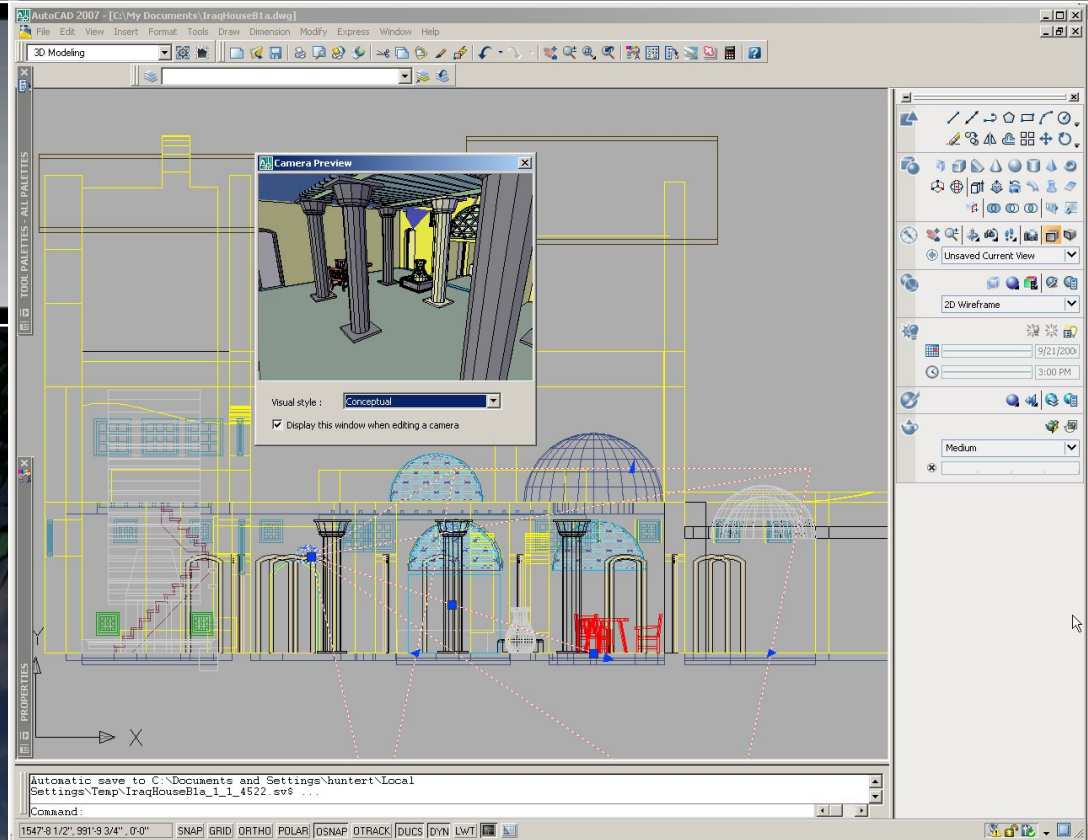


Some of the application areas which make heavy use of computer graphics are:

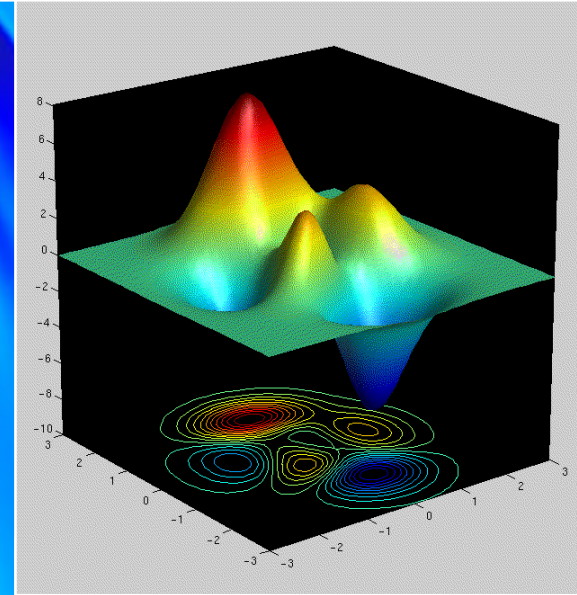
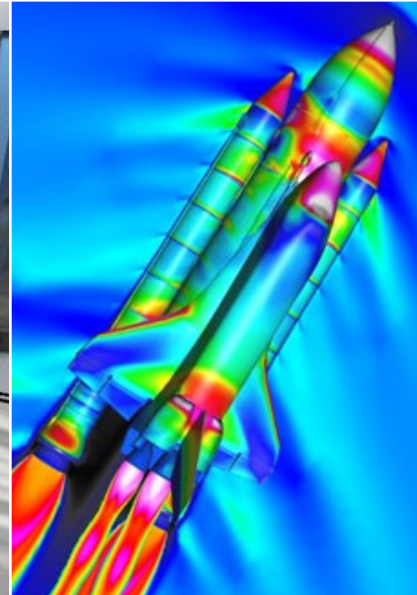
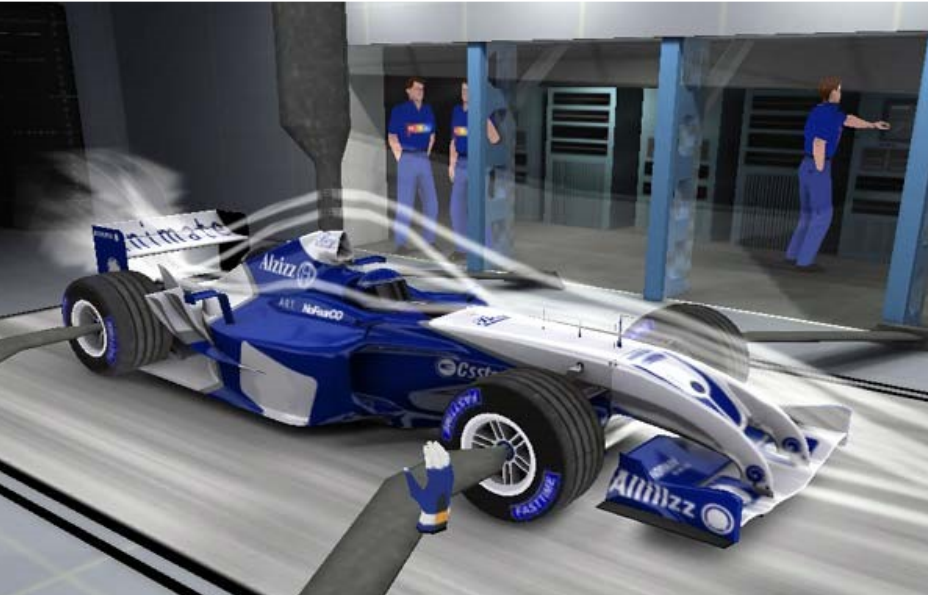
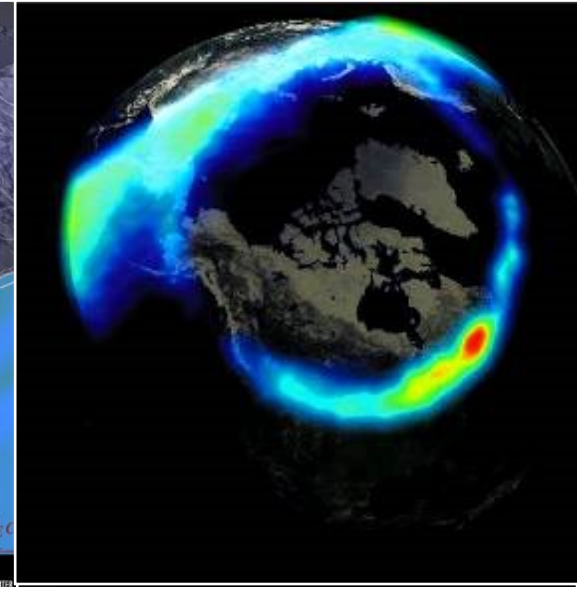
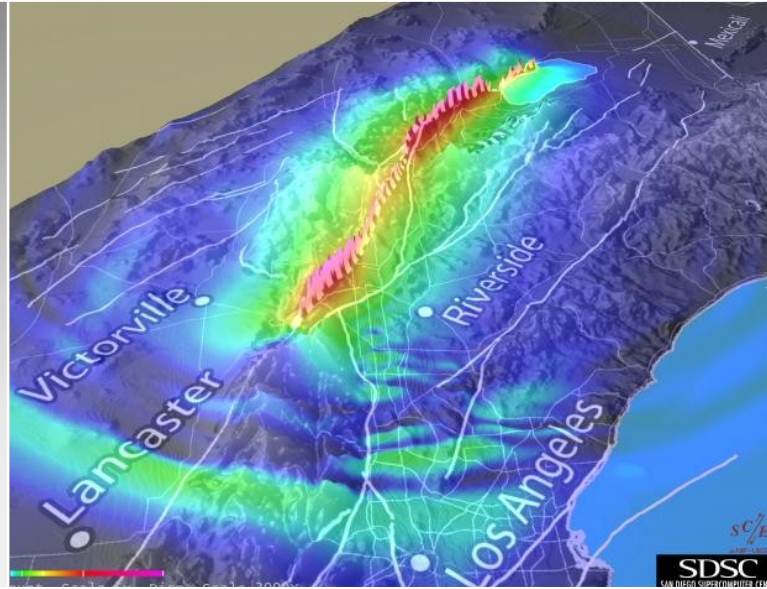
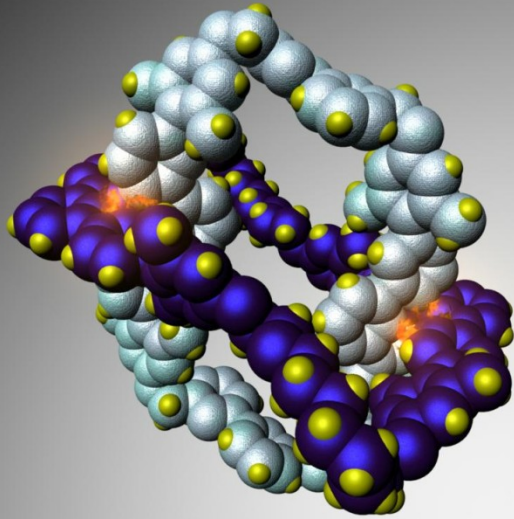
- Computer aided design
- Scientific visualisation
- Films
- Games
- Virtual/Augmented Reality

NOTE: There are lots more and there is huge overlap between these different areas

Computer Aided Design



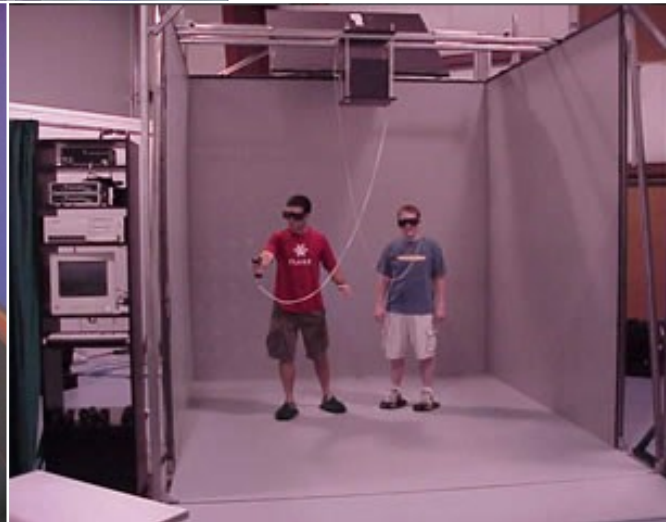
Scientific Visualisation

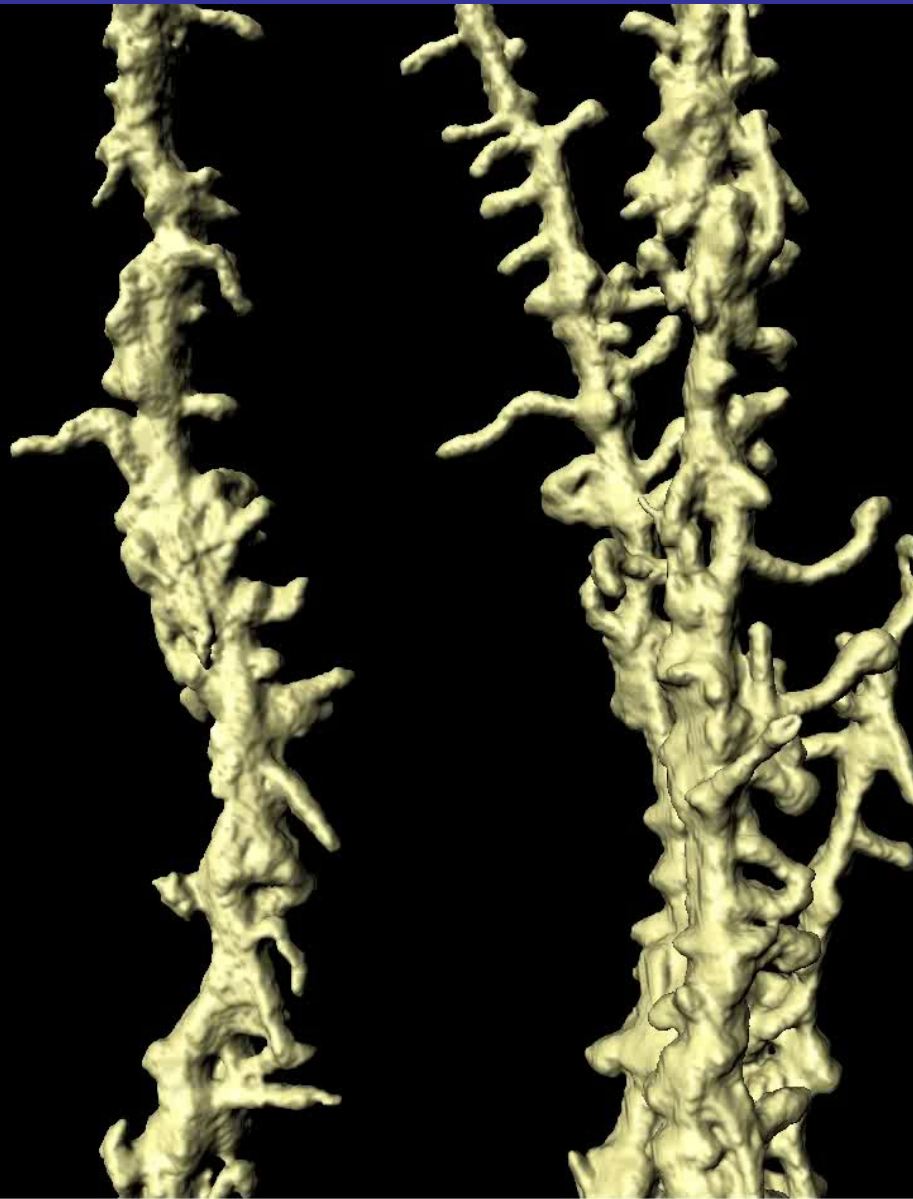






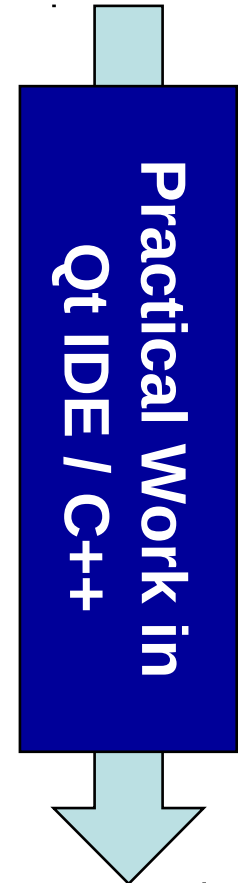
Virtual/Augmented Reality





The course will follow this broad-strokes outline:

- Maths Preliminaries
- Scan Converting Lines
- Line, Circle, Ellipse drawing algorithms
- Polygon Filling algorithms
- 2D Transformations
- Viewing in 2D/3D
- 3D Transformation
- Illumination and Surface Rendering
- Curve Fitting



Lectures:

- Wednesday 14:30 – 16:30 (2 periods)
- Thursday 14:30 – 15:30 (1 period)

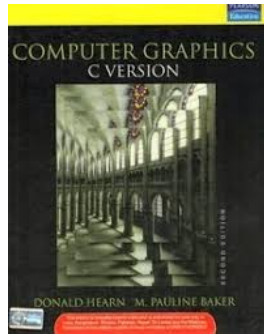
Labs (Arch. Lab):

- Monday 11:00 – 14:00 (A1) – SuB, RS
- Tuesday 11:00 – 14:00 (A3) – SuB
- Tuesday 14.30 – 17.30 (A2) – SuB, JKS

ATTEND THE LABS!!!

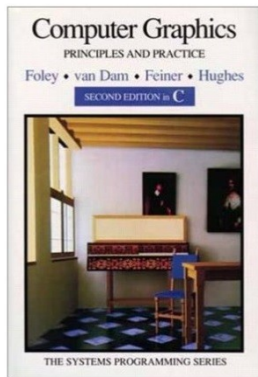
Exams (NBA Guidelines):

- CO1:** Understand the graphical primitives, describe the concept of rasterization and develop line, circle and ellipse drawing algorithms, filling algorithms.
- CO2:** Understand 2D Geometric Transformations, including clipping algorithms.
- CO3:** Understand the concept of 3D graphics, including 3D transformation and projection.
- CO4:** Develop curve fitting algorithms, and describe the concepts of hidden line removal, illumination and shading.



“Computer Graphics – C Version”, D. Hearn & M. P. Baker, Prentice Hall, 2003

Most of the course follows this book



“Computer Graphics: Principles and Practice”, J.D. Foley, A. van Dam, S.K. Feiner & J.F. Hughes, Addison Wesley, 1995

Great for really in-depth theory

Any Questions?

