



Overview Lecture 1

- Survey of Computer Graphics
 - Computer Visualization
 - CAD
 - Virtual Reality
 - Entertainment
- Short History of Computer Graphics
 - 1200 - 2000
- OpenGL



Computer Visualization

- Scientific visualization
 - Color coding
 - Contour curves
 - Graphs
- GIS
- Computer art



CAD

- Computer-Aided Design
 - Designing building constructions, cars, aircraft, watercraft, spacecraft, textiles, computers, etc.
- Interactive adjustments
 - Wireframe outline
 - Realistic display
- CAM – Computer-aided manufacturing



Virtual Reality

- Interactive 3D scene
 - Gloves
 - Headsets
- Use animations and simulations for
 - Training
 - Walks in architectural designs
 - Education



Entertainment

- Television, Motion pictures
 - Computer-generated actors, backgrounds, cartoons etc.
 - Morphing
- Computer games



History < 1960

1200	Chinese Abacus
1450	Gutenberg
1826	Photography (Niepce)
1842	FAX (Alexander Bain)
1885	CRT
1888	Record Motion pic. on wax cylinder (Edison, Dickson)
1926	First television (J.L. Baird)
1946	ENIAC Computer
1954	Fortran
1958	Integrated circuit (IC, or Chip)



History 1960-1979

1961	Spacewars, 1 st Videogame
1963	DEC-1 – First comersia CAD system
1963-1969	Hidden line, Warnock, Watkins alg., lineclippng
1969	UNIX developed
1969	GUI developed by Xerox (Alan Kay)
1972	Atari founded
1973,1975	z-buffer, phong shading
1975	Microsoft founded
1976	Apple founded
1977	Death Star simulation for Star Wars



History 1980-1989

1980	Donkey Kong introduced by Nintendo
1980	Hanna-Barbera, comp. automation of anim. process
1982	Silicon Graphics Inc, Sun microsystems, Adobe
1984	Macintosh
1985	Pixar Image Computer goes to market
1986-1987	TIFF, GIF
1987	VGA
1988	Willow (Lucasfilm) morphing, Who Framed Roger Rabbit
1989	PhotoShop



History 1990-1999

1991	World Wide Web (CERN)
1991	Terminator 2
1991	JPEG/MPEG
1992	OpenGL
1993	Doom, Myst
1994	Linux 1.0
1995	Toy Story
1995	Java
1996	Quake
1998	MPEG-4



OpenGL

- A software interface to graphics hardware
- Widely used in industry
- Vendor-neutral open standard
 - OpenGL architecture review board
- Stable but evolving
 - Additions are well controlled with extensions
 - Backward compatibility required



OpenGL

- Portable
 - Consistent visual display regardless of hardware, OS and windowing system
 - Callable from Ada, C, C++, Fortran, Python, Perl and Java
 - Runs on all major OS and windowing system.
- Well documented



OpenGL System Interactiong

- OpenGL is completely window system independent.
- But we need the window system for things like:
 - Opening and closing windows
 - Interaction
 - Handling events
- We can work directly with the window system (X-windows, Win 32...) or use a higher level toolkit (GLUT, Motif...).



OpenGL Utility Toolkit

- GLUT has been ported to all platforms that support OpenGL.
- Provides basic window system interaction
 - Open/Close Window
 - Mouse/Keyboard callbacks
 - “Idle” callback for animation
 - Pop-Up Menus



OpenGL Libraries

