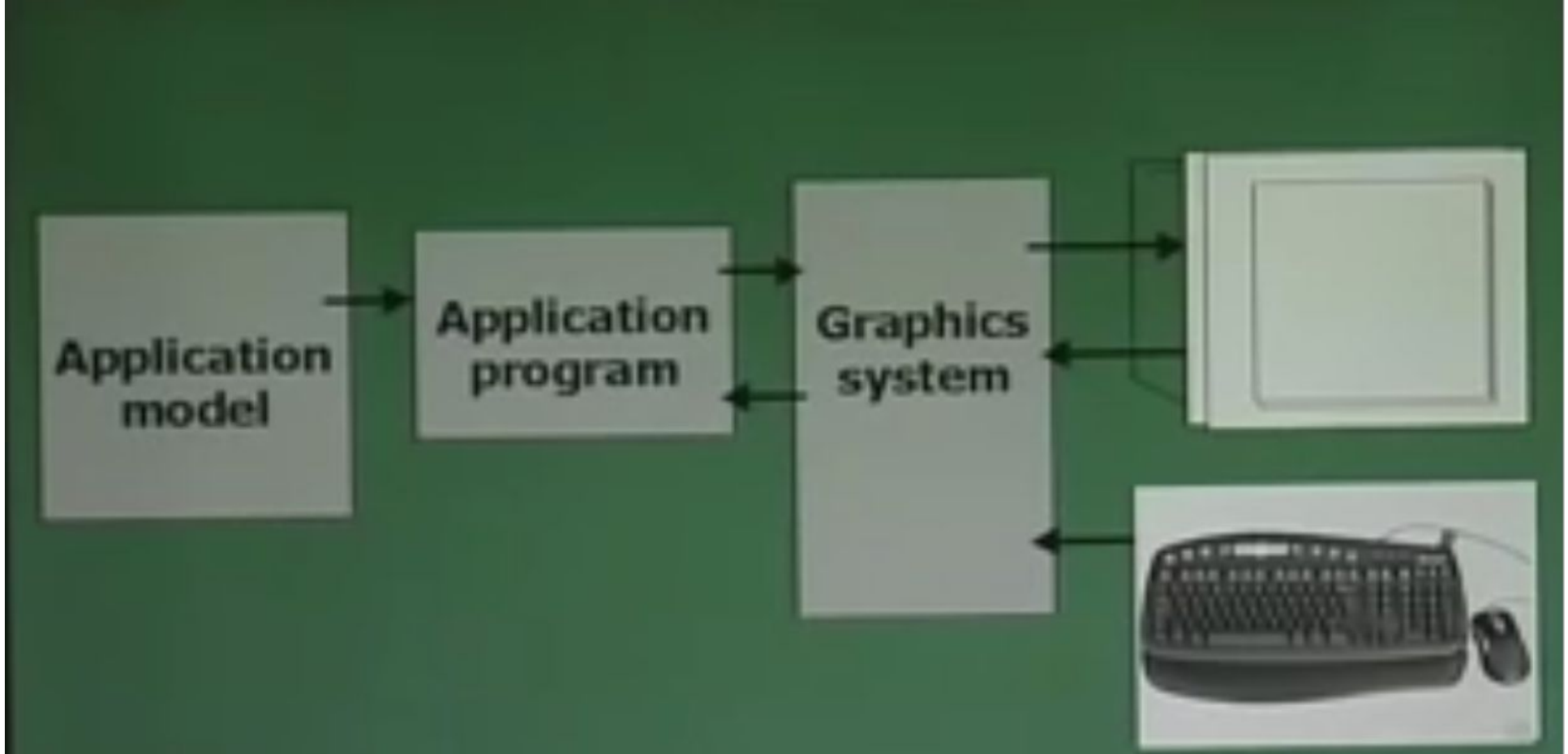
Introduction to COMPUTER GRAPHICS

Computer Graphics involves display, manipulation and storage of pictures and experimental data for proper visualization using a computer.

Typical graphics system comprises of a host computer with support of fast processor, large memory, frame buffer and

- Display devices (color monitors),
- Input devices (mouse, keyboard, joystick, touch screen, trackball)
- Output devices (LCD panels, laser printers, color printers. Plotters etc.)
- Interfacing devices such as, video I/O, TV Interface etc.



Conceptual framework for interactive graphics

Typical applications areas are

- GUI
- Plotting in business
- Office automation
- Desktop publishing
- Plotting in science and technology
- Web/business/commercial publishing and advertisements
- CAD/CAM design (VLSI, Construction, Circuits)
- Scientific Visualization

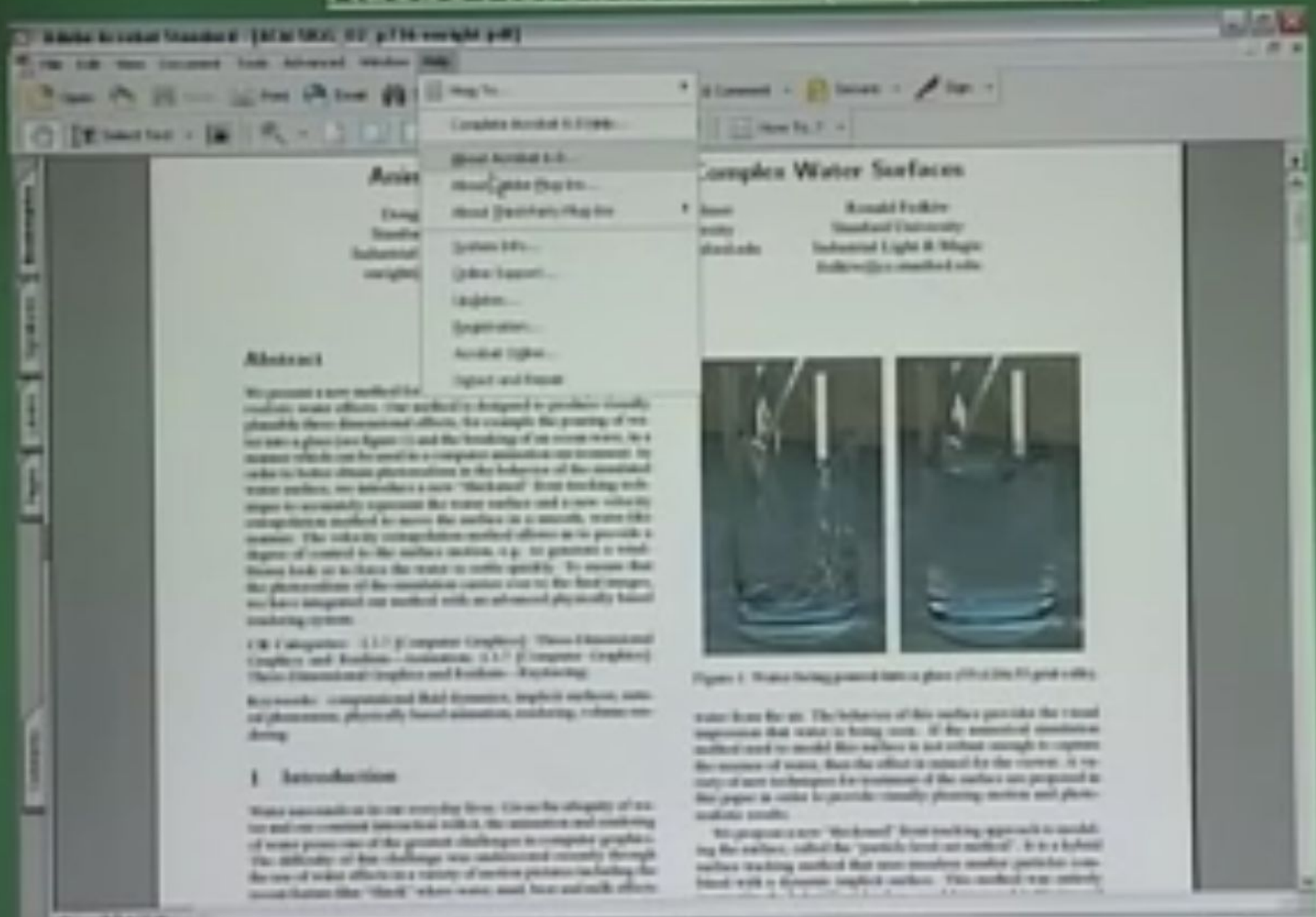
- Entertainment
  (movie, TV Advt., Games etc.)
- Simulation studies
- Simulators
- Cartography
- Multimedia
- Virtual reality
- Process Monitoring
- Digital Image Processing
- Education and Training

GUI – Graphical User Interface

Typical Components Used:

- Menus
- Icons
- Cursors
- Dialog Boxes
- Scroll Bars
- Buttons
- Valuators
- Grids
- Sketching
- 3-D Interface

An example of a GUI available in Adobe Acrobat reader (for pdf files)



Various application packages and standards are available:

- Core graphics
- GKS
- SRGP
- PHIGS, SPHIGS and PEX 3D
- OpenGL (with ActiveX and Direct3D)
- X11-based systems.

GKS – Graphics Kernel System

by ISO (International Standards Organization)
& ANSI (American National Standards Institute)

SRGP – Simple Raster Graphics Package

PHIGS – Programmers Hierarchical
Interactive Graphics System

On various platforms, such as

DOS,	Windows,
Linux,	OS/2,
SGI,	SunOS,
Solaris,	HP-UX,
Mac,	DEC-OSF.

Various utilities and tools available for web-based design include: Java, XML, VRML and GIF animators.

Certain compilers, such as, Visual C/C++, Visual Basic, Borland C/C++, Borland Pascal, Turbo C, Turbo Pascal, Gnu C/C++, Java provide their own graphical libraries, API, support and help for programming 2-D/3-D graphics.

Some these systems are

- device-independent (X11, OpenGL)
- device-dependent (Solaris, HP-AGP).

Four basic output primitives (or elements) for drawing pictures:

- **POLYLINE**
- **Filled POLYGONS (regions)**
- **ELLIPSE (ARC)**
- **TEXT**
- **Raster IMAGE**

Four major areas of Computer Graphics are:

- Display of Information,
- Design/Modeling,
- Simulation and
- User Interface.

Computer Graphics systems could be *active* or *passive*.

In both cases, the input to the system is the scene description and output is a static or animated scene to be displayed.

In case of *active* systems, the user controls the display with the help of a GUI, using an input device.

Computer Graphics is now-a-days, a significant component of almost all systems and applications of computers in every field of life.

References

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