Computer Graphics

LECTURE-1

Contents

- Computer Graphics
  - Definition
- Application of Computer Graphics
  - CAD
  - Presentation Graphics
  - Computer Art
  - Entertainment
  - Education and Training
  - Visualization
  - Image processing
  - Graphical User Interface

Graphics Systems and Models

- Computer Graphics:

  Computer Graphics is the use of computers to display and manipulate information in graphical or pictorial form, either on a visual-display unit or via a printer or plotter.

Applications of Computer Graphics

- **COMPUTER AIDED DESIGN**
  - Animations are often used in CAD applications.
  - Real-time animations using wire frame displays are useful for testing performance of a vehicle.
  - Wire frame models allow the designer to see the interior parts of the vehicle during motion.
  - When object designs are complete, realistic lighting models and surface rendering are applied.
  - Manufacturing process of object can also be controlled through CAD.
  - Interactive graphics methods are used to layout the buildings.
  - Three-dimensional interior layouts and lighting also provided.
  - With virtual-reality systems, the designers can go for a simulated walk inside the building.

- **PRESENTATION GRAPHICS**
  - It is used to produce illustrations for reports or to generate slide for with projections.
  - Examples of presentation graphics are bar charts, line graphs, surface graphs, pie charts and displays showing relationships between parameters.
  - 3-D graphics can provide more attraction to the presentation.

- **COMPUTER ART**
  - Computer graphics methods are widely used in both fine art and commercial art applications.
  - The artist uses a combination of 3D modeling packages, texture mapping, drawing programs and CAD software.
  - “Mathematical Art” can be produced using mathematical functions, fractal procedures.
  - Photorealistic techniques are used to render images of a product.
  - Animations are also used frequently in advertising, and television commercials are produced frame by frame.

- **ENTERTAINMENT**
  - CG methods are now commonly used in making motion pictures, music videos and television shows.
  - Many TV series regularly employ computer graphics method.
  - Graphics objects can be combined with a live action.

- **EDUCATION AND TRAINING**
  - Computer-generated models of physical, financial and economic systems are often used as educational aids.
  - For some training applications, special systems are designed. Eg. Training of ship captains, aircraft pilots etc.,
  - Some simulators have no video screens, but most simulators provide graphics screen for visual operation.

- **VISUALIZATION**
  - The numerical and scientific data are converted to a visual form for analysis and to study the behavior called visualization.
  - Producing graphical representation for scientific data sets are calls scientific visualization.
  - And business visualization is used to represent the data sets related to commerce and industry.
  - The visualization can be either 2D or 3D.

- **IMAGE PROCESSING**
  - Computer graphics is used to create a picture.
  - Image processing applies techniques to modify or interpret existing pictures.
  - To apply image processing methods, the image must be digitized first.
  - Medical applications also make extensive use of image processing techniques for picture enhancements, simulations of operations, etc.

GRAPHICAL USER INTERFACE

- Nowadays software packages provide graphics user interface (GUI) for the user to work easily.
- A major component in GUI is a window.
- Multiple windows can be opened at a time.
- To activate any one of the window, the user needs just to check on that window.
- Menus and icons are used for fast selection of processing operations.
- Icons are used as shortcut to perform functions. The advantages of icons are which takes less screen space.
- And some other interfaces like text box, buttons, and list are also used.


Thank you