BCA -403

COMPUTER GRAPHICS AND MULTIMEDIA SYSTEMS

UNIT-I

INTRODUCTION TO COMPUTER GRAPHICS: - Graphics is defined as any sketch or a drawing. Computer Graphics is used where a set of image needs to be manipulated or the creation of the image in the form of pixels and is drawn on the computer. Computer Graphics can be used in digital photography, film, entertainment, electronic gadgets and all other core technologies which are required. Computer Graphics can be used in UI design, rendering, geometric object, animation and many more. There are several tools used for implementation of Computer Graphics. The basic is the <graphics.h> header file in Turbo-C. It was invented in 1960 by great researchers Verne Hudson and William Fetter from Boeing.

Types of Computer Graphics

- **Raster Graphics:** In raster graphics pixels are used for an image to be drawn. It is also known as a bitmap image in which a sequence of image is into smaller pixels. Basically a bitmap indicates a large number of pixels together.
- **Vector Graphics:** In vector graphics, mathematical formulae are used to draw different types of shapes, lines, objects and so on.

Representative Uses of Computer Graphics

- **Computer Graphics are used for aided design for engineering and architectural system-** These are used in electrical automobile, electro-mechanical, mechanical, electronic devices. For example: gears and bolts**.**

1. **USER INTERFACES** :- User friendliness is one of the main factor underline the success and popularity it is now well established fact that graphical interfaces provide attractive and easy interactions between users and computer.The built-in graphics provided with user interfaces which uses visual control items such as buttons, menu, icons , scrollbars etc. which allows user to interact with computer only by mouse click .

2. **PLOTTING OF GRAPH & CHARTS : -** In industry ,business, government and educational organizations *, "Computer graphics is the most commonly used to create 2D and 3D graph of mathematical and physical ,economic function in form of histogram ,bar and pie chart ."* These graphs and charts are very useful in decision making.

3. **OFFICE AUTOMATION & DTP :-**
The DTP allows the use of computer graphics for the creation and spreading of information. Many organizations does the inhousecreation and printing of documents. The DTP allows user to create documents which contains text , table , graphs and other forms of drawn or scanned images. This is one approach towards the office automation.

4. **COMPUTER AIDED DRAFTING AND DESIGNING [AUTO-CAD] :-** The CAD uses graphics to design components and systems electricals, mechanical, electromechanical and electronic devices such as *automobile bodies , structure of building, aeroplane design, ships designs, VLSI chips ,optical system and computer network.*

5. **SIMULATION AND ANIMATION:-** The use of graphics in simulation makes mathematical model and mechanical system more realistic and easy to study .The interactive graphics supported by animation software and proved their use in production of animated movies and cartoons films . for examples movies like spiderman batsman , jungle book Jurassic park and cartoons like shinchan, doremon, pokemon, ninja hatori etc.

6. **ART AND COMMERCE:-** There is a lot of development in the tools provided by computer graphics. This allows user to create artistic pictures which express messages and attract attention. Such pictures are very useful in advertising. For ex :- Vodafone ZooZoo ads .

7. **PROCESS CONTROL:-** By the use of computer now it is possible to control various process in the industry from remote control. In such cases, process system and processing parameters are shown on the computer with graphics symbols and identifications. This makes it easy for operator to monitor and control various processing parameters at same time .

8. **CARTOGRAPHY:-** Computer graphics is also used to represent geographic maps ,weather maps, oceanographic ,contour map, population density map and so on .

THE ADVANTAGES OF INTERACTIVE GRAPHICS

1. Today, a high quality graphics display the personal computer graphics and provide one of the most natural means of communication with a computer.

2. It provides a tools fo producing pictures not only of real world objects but also of abstract, synthetic objects such as mathematical surface in 4D that have no inherent job entry such as a survey result.

3. It has an ability to show moving pictures . Thus , it is possible to produce animation with interactive graphics .

4. With interactive graphics , we can also control the animation , adjusting the speed of any portion of the total scene in the view and the geometric relationship of the object in the scene to one another.

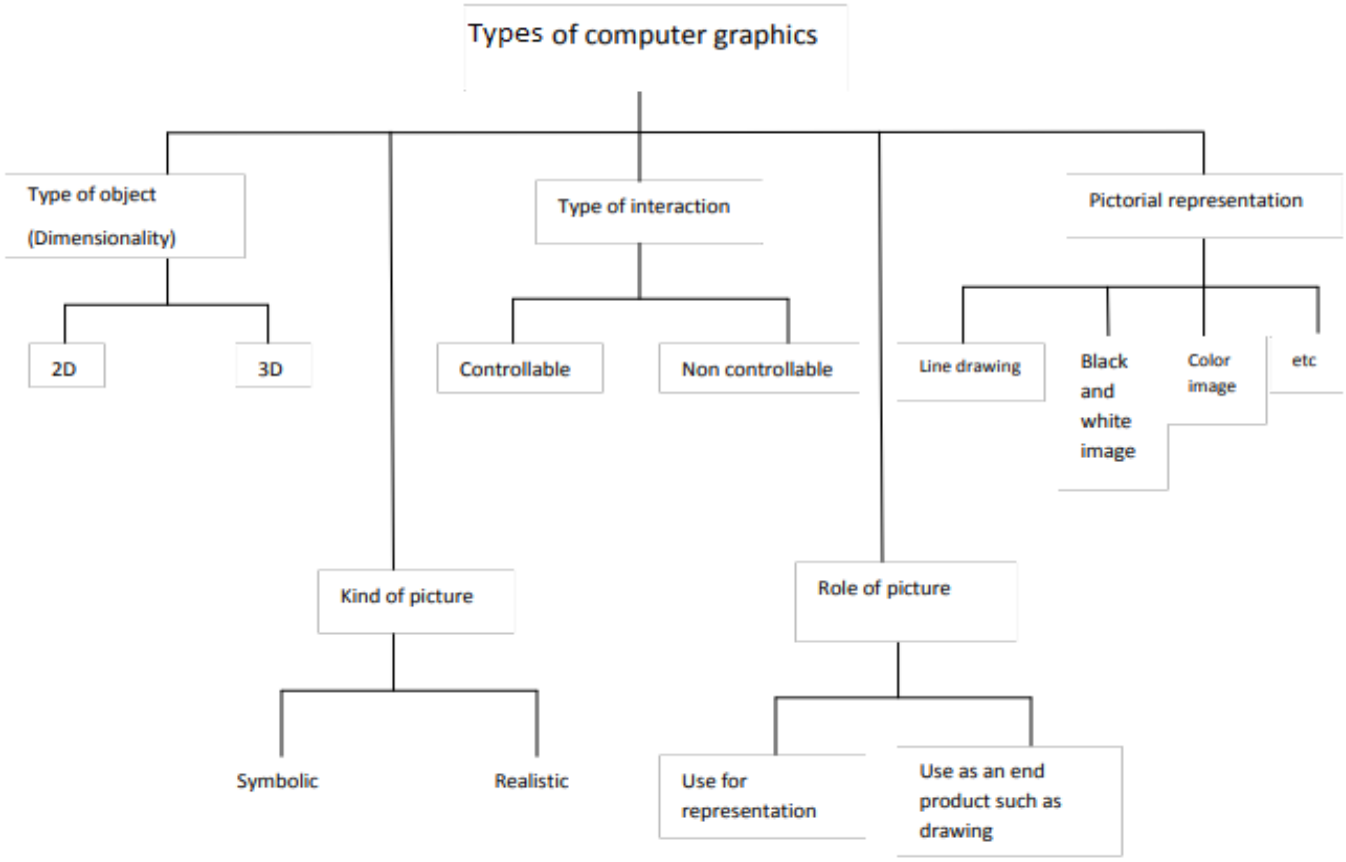
5. The interactive graphics provide the tools called *motion dynamics*. With this tool, the user can move and tumble the objects with respect to the stationary observer .or he can make objects stationary and the viewer moving around them.

6. The interactive graphics also provide the facility called *update dyanamics.*

   with this , it is possible to change the shape , colour and size of the object and the properties of the object being viewed .

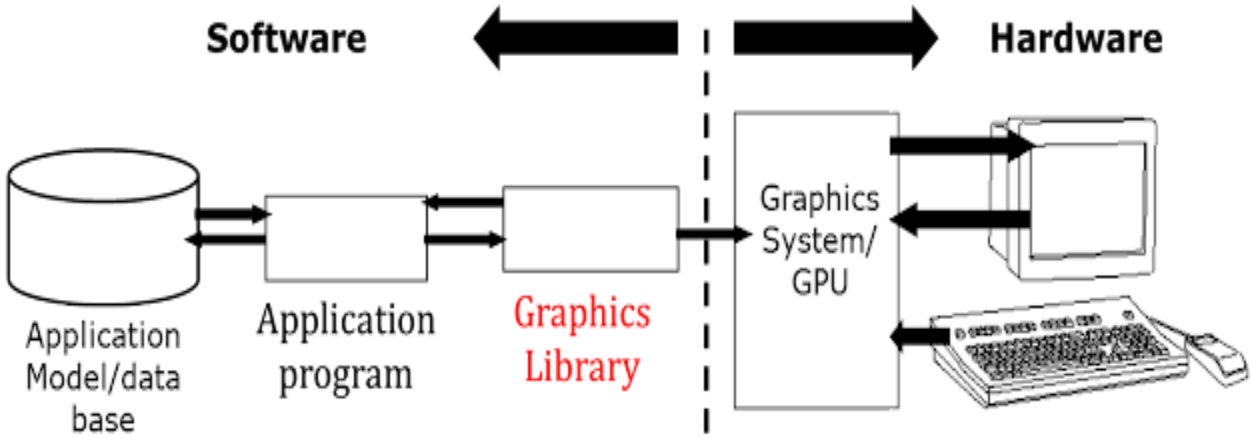
7. With the recent development of digital signal processing (DSP) and audio synthesis chip , the interactive graphics can now provide the audio feedback along with the graphical feedback to make the *simulated* *environment* even more realistic .

CLASSIFICATION OF HARDWARE AND SOFTWARE FOR COMPUTER GRAPHICS



CONCEPTUAL FRAMEWORK FOR INTERATIVE GRAPHICS

- Graphics library/package is intermediary between application and display hardware (Graphics System)
- Application program maps application objects to views (images) of those objects by calling on graphics library. Application model may contain lots of non-graphical data (e.g., non-geometric object properties)
- User interaction results in modification of model and/or image



Application Model
- represents the data, objects, or scene elements to be drawn

Application Program
- creates, stores into, and retrieves data from the application model
- handles user input
- produces view by sending information to the graphics system
- program calls special functions to perform graphics operations
- functions are part of some graphics software library (written by others)

Graphics System (software & hardware)
- series of graphics output commands
- detailed geometric description of what is to be viewed
- detailed descriptions of how the objects are to appear (also called attributes)
- responsible for actually producing the picture from the descriptions
- passes user's input to the application program for processing
- "intermediary" between the application program and the display hardware

Graphics program developer (application programmer)
- specify what data items or objects are to be generated and represented
- specify how the user interacts with the application program to create/modify the representation
- concerned with creating and editing the model/scene and handling user interaction
- *not* actually creating views or drawing geometry (handled by the graphics system)