

# CHAPTER 1

## INTRODUCTION

### 1.1 Computer Graphics

Computer graphics is concerned with all aspects of producing pictures or images using a computer. This field began almost 50 years ago, with the display of a few lines on a cathode ray tube. Now we can create images by computer that is indistinguishable from photographs of real objects.

Computer graphics is one of the most effective and most commonly used means of communication with the user. It displays the information in the form of graphical objects such as pictures, charts, graphs and diagrams instead of simple text. The pictures or graphical objects may vary from engineering drawings, business graphs and architectural structures to animated movies. All the functionalities required for the development and presentation of such as environment or interface to the user is provided by the graphics package.

There are numerous ways in which computer graphics had made user interaction fast, effective and fun. Graphics has enabled the designers to introduce the concept of windows that act as the virtual graphics terminals, each of which is capable of running an independent application. The introduction of the mouse has made the selection of the objects on the interface easy by the “point and click” facility and a lot more.

With the speedily increasing enhancements in the field of computer graphics one can simulate real world objects, create motion by using the different strategies introduced in 2D, 3D and 4D dynamics, one can produce independent frames, produce packages for scientific and engineering visualizations, in the field of medicine for the study of human behaviour and a lot more. So, we can see that computer graphics has become an integral part of life today and will continue and the usage of computers further more in the near future.

## 1.2 History of Computer Graphics

Computer Graphics is the creation, manipulation, and storage of models and images of picture objects by the aid of computers. This was started with the display of data on plotters and CRT. Computer Graphics is also defined as the study of techniques to improve the communication between user and machine, thus Computer Graphics is one of the most effective medium of communication between machine and user.

William Fetter was credited with coining the term Computer Graphics in 1960, to describe his work at Boeing. One of the first displays of computer animation was Future World (1976), which included an animation of a human face and hand-produced by Catmull and Fred Parke at the University of Utah.

There are several international conferences and journals where the most significant results in computer-graphics are published. Among them are the SIGGRAPH and Eurographics conferences and the Association for Computing Machinery (ACM) Transactions on Graphics journals.

## 1.3 Applications of Computer Graphics

The applications of computer graphics can be divided into four major areas:

- Display of information
- Design
- Simulations and animation
- User interfaces

### Display of information

Computer graphics has enabled architects, researchers and designers to pictorially interpret the vast quantity of data. Cartographers have developed maps to display the celestial and geographical information. Medical imaging technologies like Computerized Tomography (CT), Magnetic Resonance Imaging (MRI), Ultrasound and many others make use of computer graphics.

## **Design**

Professions such as engineering and architecture are concerned with design. They start with a set of specifications, seek cost-effective solutions that satisfy the specifications. Designing is an interactive process. Designers generate a possible design, test it and then use the results as the basis for exploring other solutions. The use of interactive graphical tools in computer Aided Design(CAD) pervades the fields including architecture, mechanical engineering, the design of very large scale integrated (VLSI) circuits and creation of characters for animation.

## **Simulation and animation**

Once, the graphic system evolved to be capable of generating sophisticated images in real time, engineers and researches began to use them as simulations. Graphical flight simulators have proved to increase the safety and to reduce the training expenses. The field of virtual reality(VR) has opened many new horizons. A human viewer can be equipped with a display headset that allow him/her to see the images with left eye and right eye which gives the effect of stereoscopic vision. This has further led to motion pictures and interactive video games.

## **User interfaces**

Computer graphics has to lead to the creation of graphical user interface (GUI) using which even naive users are able to interact with a computer. Interaction with the computer has been dominated by a visual paradigm that includes windows, icons, menus and a pointing device such as mouse. Millions of people are internet users, they access the internet through the graphical network browsers such as Microsoft internet explorer and Mozilla Firefox.