Applications

Computer graphics may be used in the following areas:

Computational biology

Computational physics

Computer-aided design

Computer simulation

Digital art

Education

Graphic design

Infographics

Information visualization

Rational drug design

Scientific visualization

Video Games

Virtual reality

Web design

The following are also considered graphics applications

**Paint programs**: Allow you to create rough freehand drawings. The images are stored as bit maps and can easily be edited. It is a graphics program that enables you to draw pictures on the display screen which is represented as bit maps (bit-mapped graphics). In contrast, draw programs use vector graphics (object-oriented images), which scale better.

Most paint programs provide the tools shown below in the form of icons. By selecting an icon, you can perform functions associated with the tool.In addition to these tools, paint programs also provide easy ways to draw common shapes such as straight lines, rectangles, circles, and ovals.

Sophisticated paint applications are often called image editing programs. These applications support many of the features of draw programs, such as the ability to work with objects. Each object, however, is represented as a bit map rather than as a vector image.

**Illustration/design programs**: Supports more advanced features than paint programs, particularly for drawing curved lines. The images are usually stored in vector-based formats. Illustration/design programs are often called draw programs. Presentation graphics software: Lets you create bar charts, pie charts, graphics, and other types of images for slide shows and reports. The charts can be based on data imported from spreadsheet applications.

A type of business software that enables users to create highly stylized images for slide shows and reports. The software includes functions for creating various types of charts and graphs and for inserting text in a variety of fonts. Most systems enable you to import data from a spreadsheet application to create the charts and graphs. Presentation graphics is often called business graphics.  
  
**Animation software**: Enables you to chain and sequence a series of images to simulate movement. Each image is like a frame in a movie. It can be defined as a simulation of movement created by displaying a series of pictures, or frames. A cartoon on television is one example of animation. Animation on computers is one of the chief ingredients of multimedia presentations. There are many software applications that enable you to create animations that you can display on a computer monitor.

There is a difference between animation and video. Whereas video takes continuous motion and breaks it up into discrete frames, animation starts with independent pictures and puts them together to form the illusion of continuous motion.

**CAD software**: Enables architects and engineers to draft designs. It is the acronym for computer-aided design. A CAD system is a combination of hardware and software that enables engineers and architects to design everything from furniture to airplanes. In addition to the software, CAD systems require a high-quality graphics monitor; a mouse, light pen, or digitizing tablet for drawing; and a special printer or plotter for printing design specifications.

CAD systems allow an engineer to view a design from any angle with the push of a button and to zoom in or out for close-ups and long-distance views. In addition, the computer keeps track of design dependencies so that when the engineer changes one value, all other values that depend on it are automatically changed accordingly. Until the mid 1980s, all CAD systems were specially constructed computers. Now, you can buy CAD software that runs on general-purpose workstations and personal computers.

**Desktop publishing**: Provides a full set of word-processing features as well as fine control over placement of text and graphics, so that you can create newsletters, advertisements, books, and other types of documents. It means by using a personal computer or workstation high-quality printed documents can be produced. A desktop publishing system allows you to use different typefaces, specify various margins and justifications, and embed illustrations and graphs directly into the text. The most powerful desktop publishing systems enable you to create illustrations; while less powerful systems let you insert illustrations created by other programs.

As word-processing programs become more and more powerful, the line separating such programs from desktop publishing systems is becoming blurred. In general, though, desktop publishing applications give you more control over typographical characteristics, such as kerning, and provide more support for full-color output.

A particularly important feature of desktop publishing systems is that they enable you to see on the display screen exactly how the document will appear when printed. Systems that support this feature are called WYSIWYGs (what you see is what you get). Until recently, hardware costs made desktop publishing systems impractical for most uses. But as the prices of personal computers and printers have fallen, desktop publishing systems have become increasingly popular for producing newsletters, brochures, books, and other documents that formerly required a typesetter.

Once you have produced a document with a desktop publishing system, you can output it directly to a printer or you can produce a PostScript file which you can then take to a service bureau. The service bureau has special machines that convert the PostScript file to film, which can then be used to make plates for offset printing. Offset printing produces higher-quality documents, especially if color is used, but is generally more expensive than laser printing.

In general, applications that support graphics require a powerful CPU and a large amount of memory. Many graphics applications—for example, computer animation systems—require more computing power than is available on personal computers and will run only on powerful workstations or specially designed graphics computers. This is true of all three-dimensional computer graphics applications.

In addition to the CPU and memory, graphics software requires a graphics monitor and support for one of the many graphics standards. Most PC programs, for instance, require VGA graphics. If your computer does not have built-in support for a specific graphics system, you can insert a video adapter card.

The quality of most graphics devices is determined by their resolution—how many pixels per square inch they can represent—and their color capabilities.