



CAPACITARTE

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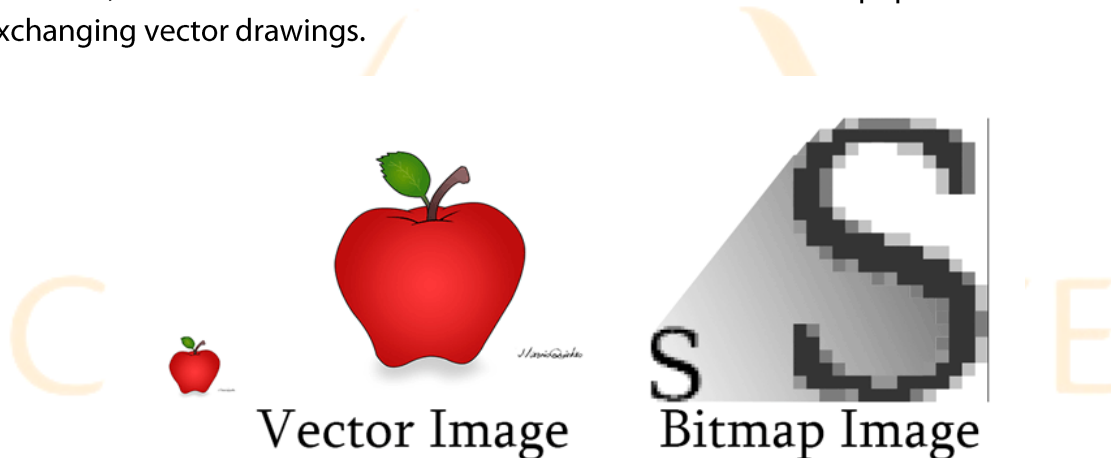


Graphics Software

Computer graphics are pictures and drawings produced by computer. There are two main categories:

Raster graphics, or **bitmaps**, are stored as a collection of pixels. The sharpness of an image depends on the density of pixels, or **resolution**. For example, text or pictures that are scaled up – that is, made bigger – may show **jagged** edges. Paint and photo-editing programs like Adobe Photoshop focus on the manipulation of bitmaps. Popular raster formats are **JPEG**, **GIF** and **TIFF**.

Vector Graphics represent images through the use of geometric objects, such as lines, curves and polygons, based on mathematical equations. They can be changed or scaled without losing quality. Vector data can be handled by drawing programs like Adobe Illustrator, Corel Draw or Macromedia Freehand. **EPS** is the most popular file format for exchanging vector drawings.



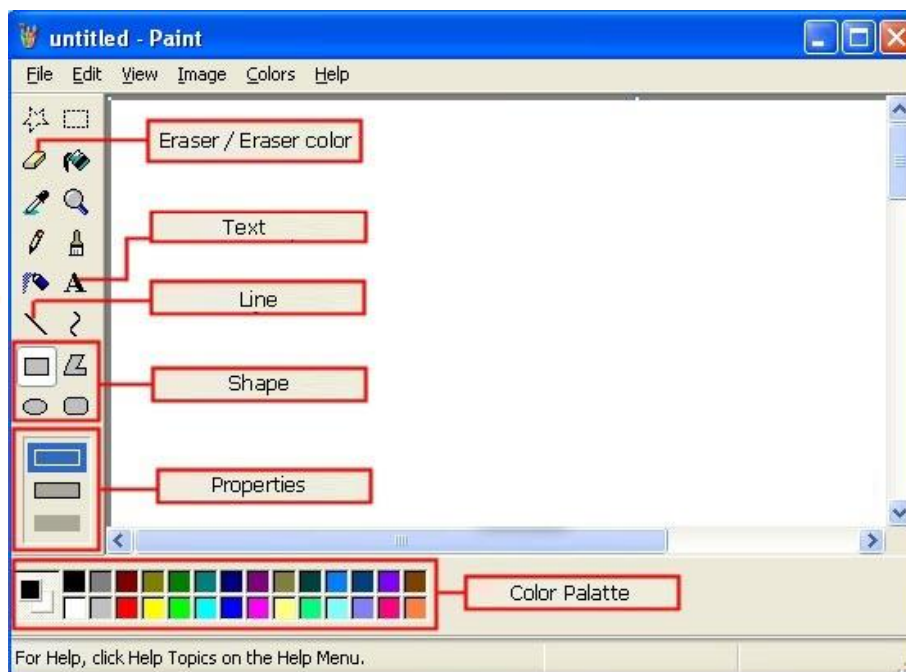
Almost all computer users use some form of graphics.

Home users and professional artists use image-editing programs to manipulate images. By using **Image Manipulation programs** you can edit your favourite images. For example, you can add **filters** (special effects) to your favourite photos, or you can **composite** images. Compositing is combining parts of different images to create a single image.



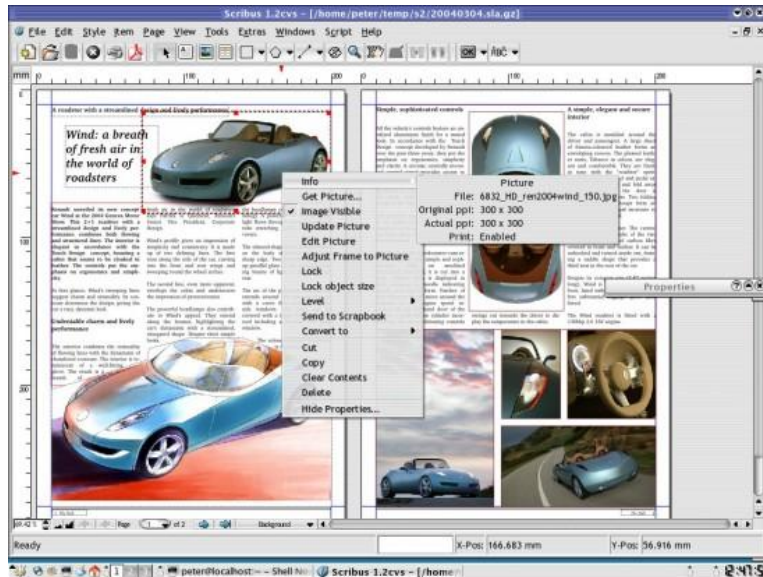
Filtered Image

Painting and drawing programs, also called **illustration packages**, offer facilities for freehand drawing, with a wide choice of pens and brushes, colours and patterns. One example is *Windows Paint*. Graphic artists and designers use drawing programs to create freehand drawings and illustrations for books or for the Web.



Windows Paint Sample

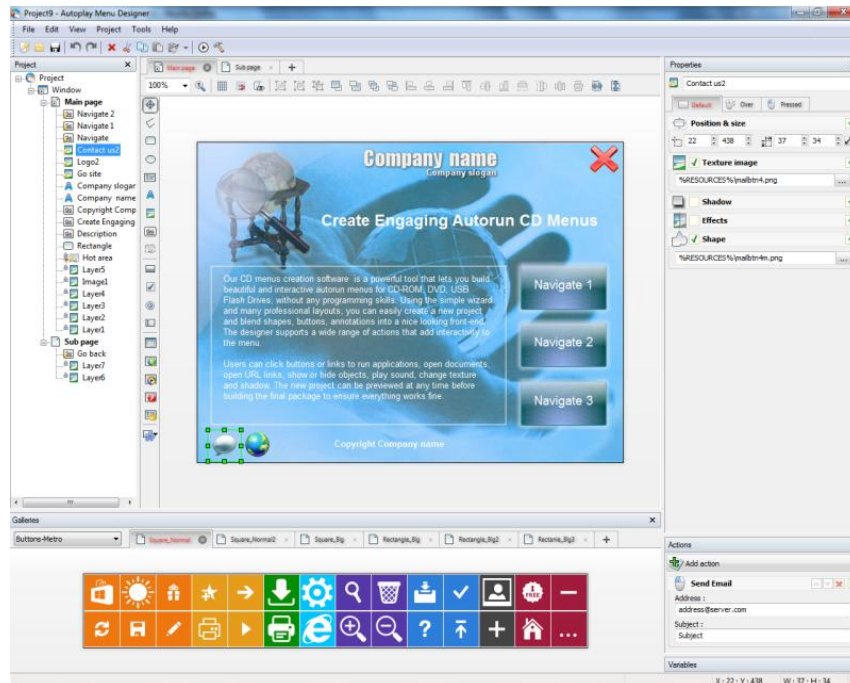
Desktop publishing (DTP) is based around a page layout program, which lets you import text from a word processor, **clip-art** (ready-made pictures) from graphics packages, and images from scanners or cameras, and arrange them all on a page. It is used to design and publish books, newspapers, posters, advertisements, etc.



Scribus, a desktop publisher app

Businesspeople use **presentation graphics** to make information more interesting visually – graphs and diagrams can be more effective ways of communicating with clients than lists of figures. These business graphics programs, also called **presentation software**, let you create pie charts, bar charts and line graphs of all kinds for slide shows and reports. You can import data from a database or spreadsheet to generate the graphs.

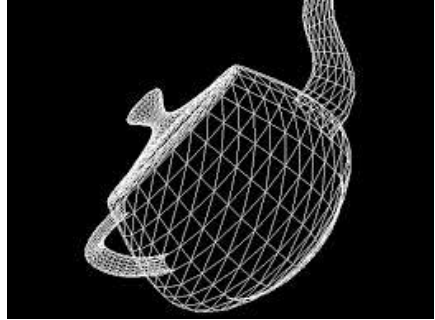
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Presentation Software

Electrical engineers use graphics to design circuits in order to present data in a more understandable form. Mechanical engineers use **CAD** (Computer Aided Design) software to develop, model and test car designs before the actual parts are made. This can save a lot of time and money.

CAD is also used in the aerospace, architecture and industrial sectors to design everything from aeroplanes and buildings to consumer products. Designers start a project by making a **wireframe**, a representation showing the outlines of all edges in a transparent drawing. They then specify and fill the surfaces to give the appearance of a 3-D solid object with volume. This is known as **solid modeling**. Next, they add paint, colour and filters to achieve the desired 'look and feel': this is called **texturing** the object. Finally, they **render** the object to make it look real. Rendering includes lighting and shading as well as effects that simulate shadows and reflections.



A wireframe model of teapot



Smooth shading of the teapot

Computer art, or **digital art**, is used in adverts and TV programmes. Artists and scientists use special graphic applets to create amazing **fractals**. Fractals are geometrical patterns that are repeated at small scales to generate irregular shapes, some of which describe objects from nature. Government agencies use **GIS** (Geographic Information Systems) to understand geographic data and then plan the use of land or predict natural disasters. Cartographers use GIS to make detailed maps. Animators use **computer animation** software to create animated cartoons or add effects in movies and video games.



A fractal

Choosing Graphics Software

When dealing with the activity of choosing the best or most adequate graphics software, you can use the following expressions:

- *If I need to, what software **would you recommend?***
- *For that kind of task, the **best thing would be ...***
- *It **allows** you to (infinitive verb) and*
- *I **wouldn't recommend** X software **because ...***
- *A **good program** of this type is ...*

Describing graphics

Here follows some useful expressions to describe graphics in the different steps of the graphics creation process.

- *The picture **shows ...***
- *In this (next) stage, we can **see/find ...***
- *The designer has **used ...***
- *This stage **is called ...***
- *Rendering techniques **include ...***
- *As a **finishing touch ...***

Multimedia

Multimedia applications are used in all sorts of fields. For example, museums, banks and estate agents often have information kiosks that use multimedia; companies produce training programs on optical discs; business people use Microsoft powerpoint to create slideshows; and teachers use multimedia to make video projects or to teach subjects like

art and music. They have all found that moving images and sound can involve viewers emotionally as well as inform them, helping make their message more memorable.

The power of multimedia software resides **in hypertext, hypermedia** and **interactivity** (meaning the user is involved in the programme). If you click on a hypertext link, you can jump to another screen with more information about a particular subject. Hypermedia is similar, but also uses graphics, audio and video as hypertext elements.

As long as your computer has a **sound card** you can use it to capture sounds in digital format and play them back. Sound cards offer two important capabilities; a built-in stereo synthesizer and a system called **MIDI** (Musical Instrument Digital Interface), which allows musical instruments to communicate with computers. A **DAW** (Digital Audio Workstation) lets you mix and record several tracks of digital audio.

You can also listen to music on your PC, or transfer it to a portable **MP3** player. MP3 is short for **MPEG audio layer 3**, a standard format that compresses audio files. If you want to create your own MP3 files from CDs, you must have a **CD ripper**, a program that extracts music tracks and saves them on a disk as MP3s.

Audio is becoming a key element of Web. Many radio stations broadcast live over the Internet using **streaming audio technology**, which lets you listen to audio in a continuous stream while it is being transmitted. The broadcast of an event over the Web, for example a concert, is called a **webcast**. Be aware that you won't be able to play audio and video on the Web unless you have a **plug-in** like RealPlayer or QuickTime.

Video is another important part of multimedia. **Video computing** refers to recording, manipulating and storing video in digital format. If you wanted to make a movie on your computer, first you would need to capture images with a digital video camera and then transfer them to your computer. Next, you would need a **video editing program** like iMovie to cut your favourite segments, re-sequence the clips and add transitions and other effects. Finally, you could save your movie on a DVD or post it on websites like YouTube and Google Video.

Multimedia is used to produce educational courses on history, science and foreign languages. They often come on DVDs, but are also available on the web. If you like entertainment, you'll love the latest multimedia **video games** with surround sound, music soundtracks, and even film extracts.

Applications of multimedia

Multimedia is used in various situations.



Virtual Reality



Business Presentation



Distance Learning



Touch screen information kiosk



A mobile phone

We can use the following expression to describe multimedia applications

- *In distance learning, multimedia **is used to** ...*
- *Information kiosks **take the advantage of** multimedia in order to ...*
- *In virtual reality, the use of multimedia **allows you to** ...*
- *With mobile phones, you **can** ...*
- *Slide presentations **integrate** a wide range of media, **such as***

Programming

It is a process of writing a program using a computer language. A program is a set of instructions which a computer uses to do a specific task.

The only language a PC can directly execute is **machine code**, which consists of 1s and 0s. This language is difficult to write, so we use symbolic languages that are easier to understand. For example, **assembly languages** use abbreviations such as ADD, SUB, MPY to represent instructions. The program is then translated into machine code by software called an **assembler**. Machine code and assembly languages are called **low-level languages** because they are closer to the hardware.

High-level languages, however, are closer to human languages; they use forms resembling English, which makes programming easier. The program is translated into machine code by a software called a **compiler**. Some examples are:

- **FORTRAN** was developed by IBM in 1954 and is still used for scientific and engineering applications.
- **COBOL** (Common Business Oriented Language) was developed in 1959 and is mainly used for business applications.
- **BASIC** was developed in the 1960s and was widely used in microcomputer programming because it was easy to learn. Visual BASUC is a modern version of the old BASIC language, used to build graphical elements such as buttons and windows in Windows programs.
- **PASCAL** was created in 1971, it is used in universities to teach the fundamentals of programming.
- **C** was developed in the 1980s at AT&T. It is used to write system software, graphics and commercial applications. **C++** is a version of C which incorporates object-oriented programming: the programmer concentrates on particular things (e.g. a graphic or a table) and gives each object functions which can be altered without changing the entire program. For example, to add new graphics format, the programmer needs to rework just the graphics object. This makes programs easier to modify.
- **Java** was designed by Sun in 1995 to run on the Web. **Java** Applets provide animation and interactive features on web pages.

As explained above, programs written in high-level languages must be translated into machine code by a **compiler** or an **interpreter**. A compiler translates the source code

into **object code** – that is, it converts the entire program into machine code in one go. On the other hand, an interpreter translated the source code line by line as the program is running.

It is important not to confuse programming languages with **mark up languages**, used to create web documents. Markup languages use instructions, known as **markup tags**, to format and link text files. Some examples include:

- **HTML**, which allows us to describe how information will be displayed on web pages.
- **XML**, which stands for Extensible Markup Language. While HTML uses pre-defined tags, XML enables us to define our own tags; it is not limited by a fixed set of tags.
- **VoiceXML**, which makes Web content accessible via voice and phone. VoiceXML is used to create voice applications that run on the phone, whereas HTML is used to create visual applications (e.g. web pages).

Steps in writing a program

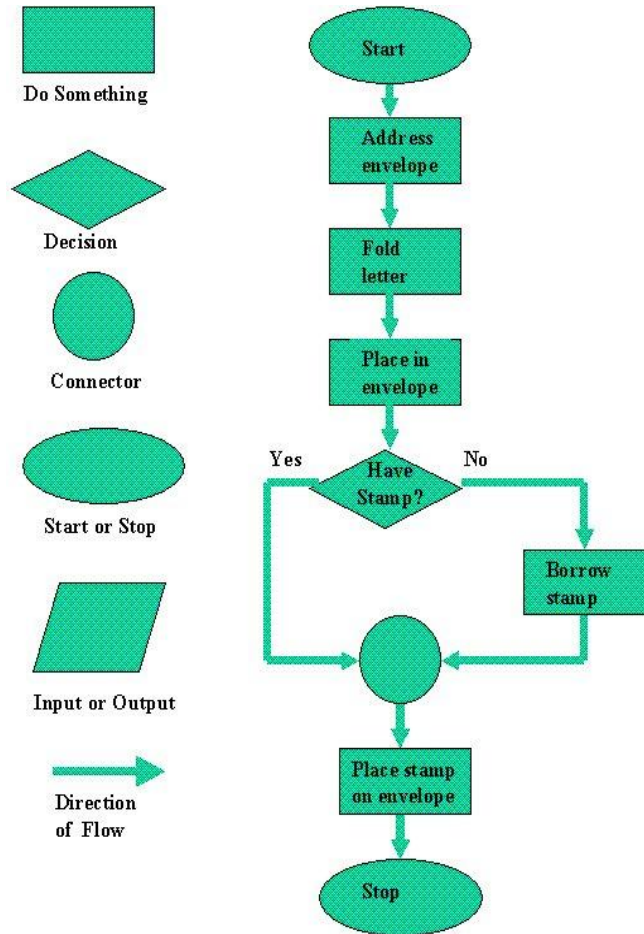
To write a program, software developers usually follow these steps:

First, they try to understand the problem and define the purpose of the program. They design a **flowchart**, a diagram which shows successive logical steps of the program.

Next, they write instructions in a high-level language. This is called **coding**. The program is then **compiled**.

When the program is written, they **test** it; they run the program to see if it works and use special tools to detect **bugs** or errors. Any errors are corrected until it **runs smoothly**. This is called **debugging**, or **bug fixing**.

Finally, software companies write detailed description of how the program works, called **program documentation**. They also have a **maintenance program**. They get reports from users about any errors found in the program. After it has been improved, it is published as an **updated version**.



Flow Chart Symbols and Flow Chart For Mailing Letter

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