Computer graphics

The term computer graphics includes almost everything on computers that is not text or sound. Computer graphics can be a series of images which most often called video or a single image. Computer graphics can be created as either raster or vector images. Raster graphics are bitmaps – a grid of individual pixels that collectively compose an image.

However, because raster graphics are pixel based, they suffer from image degradation. Just like photographic images that get blurry and imprecise when blown up, a raster image gets jagged and rough. When you look closer enough, you can begin to see the individual pixels comprising the image. Hence, your raster-based logo, magnified to 1000% becomes bitmapped before you know it, although raster graphics can be scaled down, smaller versions often appear less crisp than the original.
Unlike pixel-based raster images, vector graphics are based on mathematical formulas that define geometric primitives. They are best used to represent more structured images. Inherently, vector graphics are more malleable than raster images- thus, they are much more versatile, flexible and easy to use. The most obvious advantage of vector graphics over raster graphics is that vector images are perfectly scalable. There is no upper or lower limit for sizing images.

Most modern computer graphics packages let you draw an image using a mixture of raster or vector graphics, as you wish, because sometimes one approach works better than another—and sometimes you need to mix both types of graphics in a single image. With a graphics package such as the GIMP (GNU Image Manipulation Program), you can draw curves on screen by tracing out and then filling in "paths" before converting them into pixels ("rasterizing" them) to incorporate them into something like a bitmap image.

Almost all computer users use some form of graphics. Home users and professional artists use image-editing programs to manipulate 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.

Real life isn't like a computer game or a virtual reality simulation. The very best **CGI (computer-generated imagery)** animations are easy to tell apart from ones made on film or video with real actors. When we look at objects in the world around us, they don't appear to be drawn from either pixels or vectors. In the blink of an eye, our brains gather much more information from the real-world than artists can include in even the most realistic computer-graphic images. To make a computerized image look anything like as realistic as a photograph (let alone a real-world scene), we need to include far more than simply millions of colored-in pixels. Really sophisticated computer graphics programs use a whole series of techniques to make hand-drawn (and often completely imaginary) two-dimensional images look at least as realistic as photographs.
The simplest way of achieving this is to rely on the same tricks that artists have always used—such things as **perspective** (how objects recede into the distance toward a "vanishing point" on the horizon) and **hidden-surface elimination** (where nearby things partly obscure ones that are further away).

Graphic artists and designers use drawing programs to create freehand drawings and illustrations for books or for the Web. Businesses use graphics design to convey a message more effectively and grab the required attention of the target audiences. Most consumers tend to be more attracted in products and services that have high-quality graphics. This will help businesses improve and achieve a higher level of sales' success.

Mechanical engineers use **CAD** (**C**omputer **A**ided **D**esign) software to develop, model and test car designs before the actual parts are made. This can save a lot of time and money. 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 **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.

Computer art, or **digital art**, is used in advertising, publishing and film to produce visual effects. 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.

1 What are the differences between raster graphics and vector graphics?

2 Why is it easy to recognize CGI animations from real ones?

3 What makes graphic design so important for businesses?

4 Which word in the text means **having an uneven edge**?

5 Which is the best synonym for **enlarged'** in the text?

6 What is the antonym of **soft** in the text?