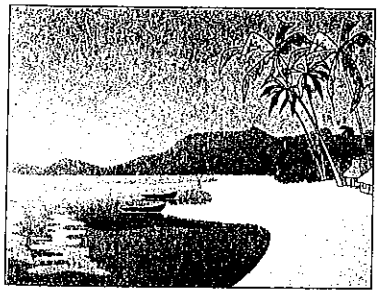
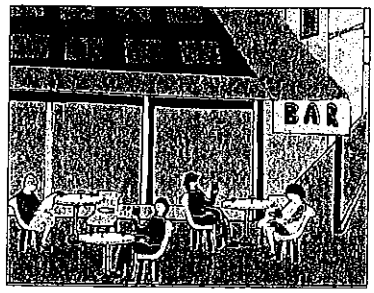
Working with graphics and colour systems

Types of computer graphics

Computers store two types of graphics: bitmap and vector.

- **Bitmap graphics** use a grid of colours known as **pixels** to represent images. Bitmap images can be modified by changing individual pixels. They are commonly used to reproduce images created by scanners and digital cameras, particularly photographs. Bitmap images contain a number of fixed pixels and, as a result, can lose detail if they are scaled (resized). Bitmap images lose detail if printed at too low a resolution, and can have jagged edges if printed at too large a size. Image-editing software packages, such as Adobe Photoshop and Microsoft Paint, are used to manipulate bitmap graphics.





- **Vector graphics** (shown above) are made up of lines connected by points (vectors) that are plotted using a mathematical formula. The objects in a vector graphic can be individually selected, sized, modified and filled with colour. Vector graphics print crisply and clearly at any size, without losing any detail. As a result, they should be used for graphics such as logos and illustrations. Clip-art images are commonly stored as vector graphics. Illustration software packages, such as Adobe Illustrator and CorelDRAW, are used to create vector graphics.

Bitmap graphics use a grid of colours known as pixels to represent images.

A **pixel** (PICture ELement) is a single dot (bit) in a graphics image and is the smallest element that an output device can display.

Vector graphics are made up of lines connected by points (vectors) that are plotted using a mathematical formula.

[3.23] Working with graphics file formats and colour systems.

Graphics file formats

File format	Category of image	Suitable images	File extension	Suitable output
JPEG (Joint Photographic Expert Group)	Bitmap	Photographs	.jpg	An efficient and lossy compression technique suitable for low-resolution scanning of photographs (72 dpi) for web pages (the maximum resolution of most display screens is 72 dpi). The use of low-resolution images for use in web pages facilitates fast downloads. The JPEG file format is also suitable for high-resolution scanning for print documents, but is not an industry standard as many commercial printing devices cannot output compressed files. However, the format is suitable for inhouse printing on an inkjet printer. This file format is supported on both Windows and Macintosh platforms.
GIF (Graphics Interchange Format)	Bitmap	Illustrations, diagrams, logos, line drawings, cartoons	.gif	A widely used format for buttons, bullets, banners, logos and other graphics used in web pages. This format is also used for animated graphics. GIF is not a preferred file format in commercial printing as GIFs are compressed, indexed colour files that may not print correctly.
BMP	Bitmap	Illustrations, diagrams, logos, line drawings, cartoons	.bmp	The standard Windows image file format. This format supports colour, greyscale and black-and-white display/print modes. BMP images are not compressed. Suitable for printing on an inkjet printer or laser printer, and for commercial printing.
WMF (Windows Metafile Format)	Vector	Illustrations, diagrams, logos, line drawings	.wmf	Suitable for vector graphics for Microsoft Windows applications. Commonly used to store clipart images for Windows applications. Suitable for inkjet or laser printers.
TIFF (Tagged Image File Format)	Bitmap	Photographs, illustrations, logos, diagrams, drawings, cartoons	.tif	A versatile bitmap graphics file format used for high-resolution scanning of all types of images for print output. Photographs should be scanned at 240–300 dpi, line drawings at 600 dpi. This format is suitable for inkjet or laser printers, and for commercial printing. The format is supported on both Windows and Macintosh platforms.
EPS (Encapsulated Postcript)	Vector	Illustrations and logos	.eps	A high-resolution graphics file format supported on both Windows and Macintosh platforms. Used to create illustrations. Clipart images for Macintosh applications are commonly stored in this file format. Requires a Postcript printer.