Subject: Computer graphics
Topic : Random and Raster display
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RASTER AND RANDOM SCAN DISPLAYS

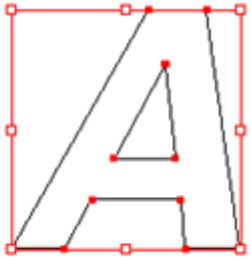
There are 2 kinds of computer graphics

1)RASTER (COMPOSED OF PIXELS) AND

2) VECTOR OR RANDOM (COMPOSED OF PATHS).

- Raster images are more commonly called *bitmap* images.
- Bitmaps are composed of pixels
- Vector graphics use mathematical relationships between points and the paths connecting them to describe an image.
- Vector graphics are composed of paths.

Bitmap image



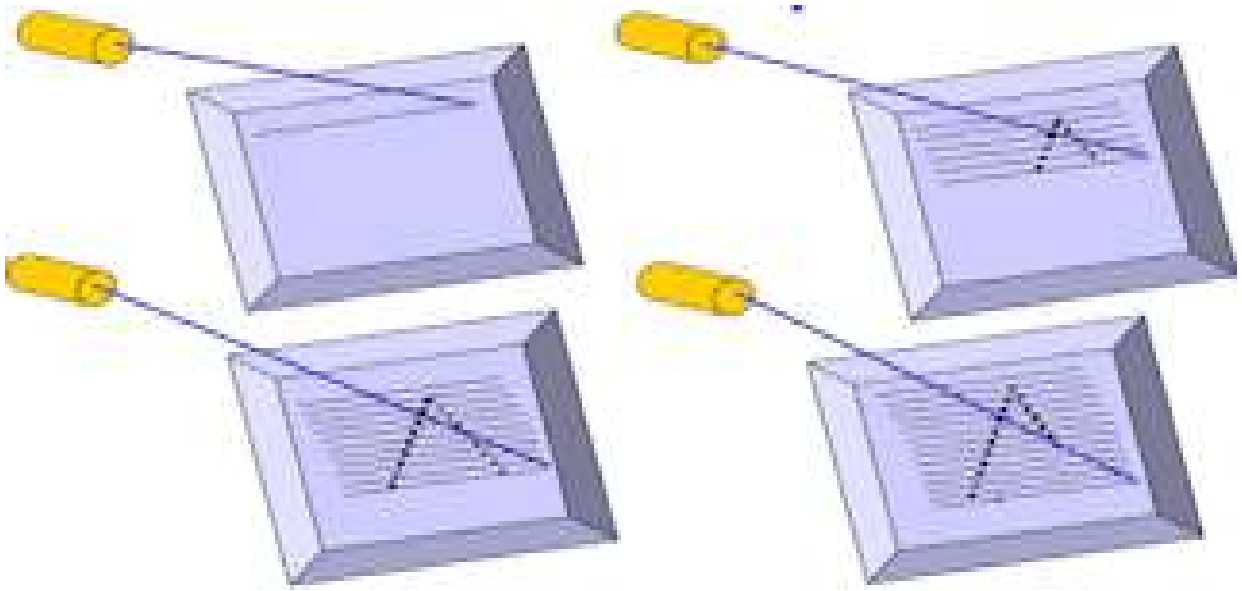
Vector Image

RASTER SYSTEMS

- Almost all current computer output devices, including CRTs, LCDs, LEDs, and plasma screens, use raster graphics.

- In this systems, an electron beam is swept across the screen, one row at a time from top to bottom.

- As the electron beam moves across each row, the beam intensity is turned on and off to create a pattern of illuminated spots



Electron beam in raster display

- Picture definition is stored in a memory area called the refresh buffer or frame buffer.

- This memory area holds the set of intensity values for all the screen points.

- Stored intensity values are then retrieved from the refresh buffer and "painted" on the screen one row (scan line) at a time

- The refreshing rate, called the frame rate, is normally 60 to 80 frames per second, or described as **60 Hz to 80 Hz**

Pros and cons

Raster systems

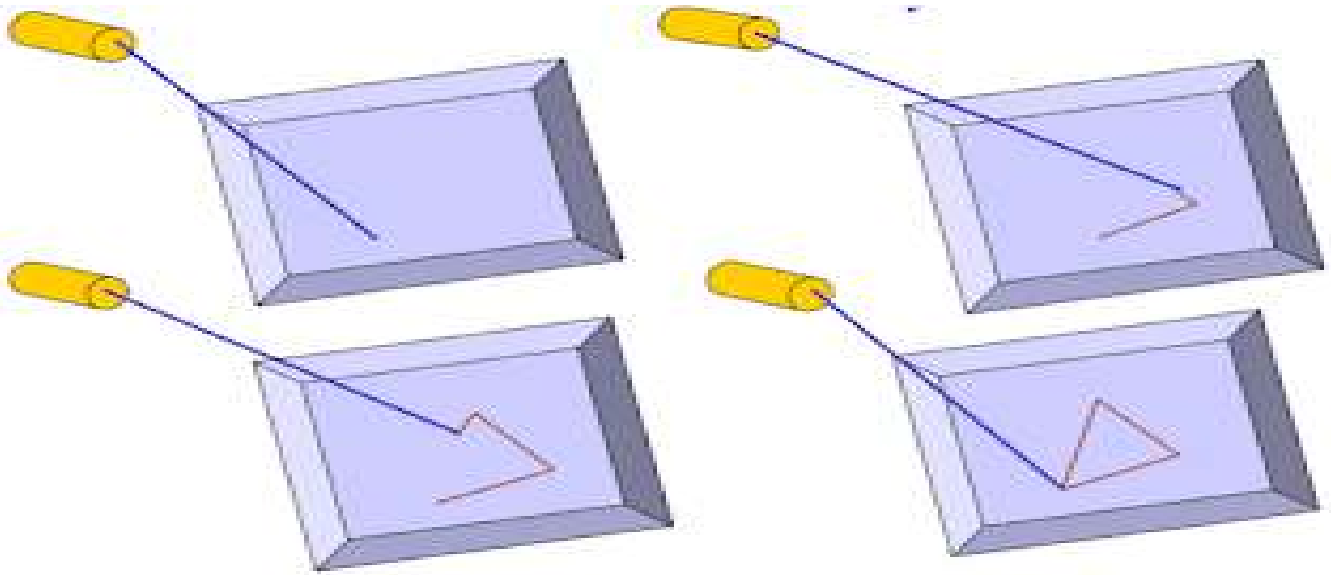
+ It is well suited for realistic display of scenes containing colors and shaded patterns

- It produces **jagged lines** that are plotted as discrete point sets

RANDOM-SCAN DISPLAYS

- Here The CRT's electron beam is directed only to the parts of the screen where a picture is to be drawn.

- Random scan monitors draw a picture one line at a tim and for this reason are also referred to as vector display (or stroke-writing or calligraphic displays or line drawing displays)



Electron beam in Random scan display

- The picture definition is stored as a set of **line-drawing commands** in a refresh display file or a refresh buffer in memory.

- Random-scan displays are designed to draw all the component lines of a picture **30 to 60** times each second

- **A pen plotter** operates in a similar way and is an example of a random-scan device

ADVANTAGES OF RASTER SYSTEMS

It is well suited for realistic display of scenes containing colors and shaded patterns

DISADVANTAGES OF RASTER SYSTEMS

- It produces **jagged lines** that are plotted as discrete point sets

Random systems(Advantages)

- They produce smooth line drawings because the CRT beam directly follows the line path.
- Used by both analog and digital computers
- Vector displays generally have higher resolution than raster systems

Random systems(Disadvantages)

- Expensive
- Designed for line drawing applications and cannot display realistic shaded scenes