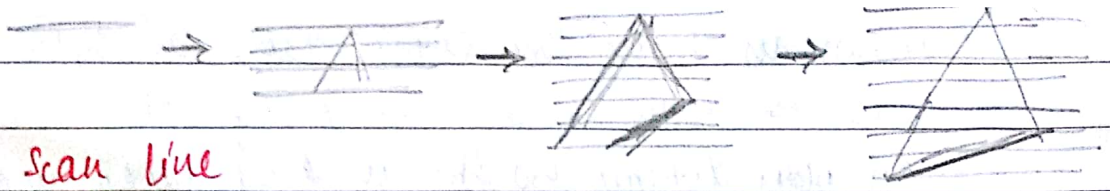
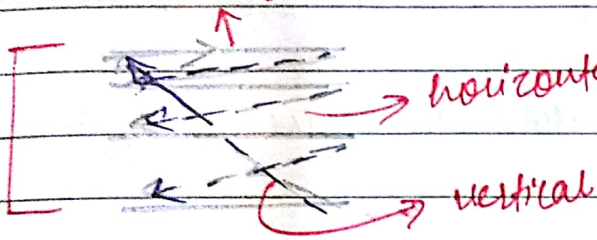
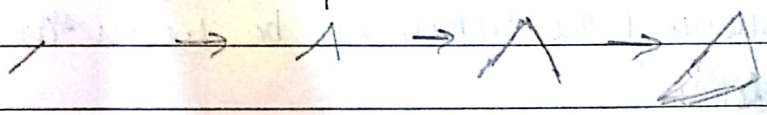





Refreshing - 60 to 80 fps

Lecture 5
MDU
29/01/18

Random scan display



Raster scan display

- Electron beam is swept across the screen, one row at a time from top to bottom. Beam intensity is turn on and off to create a pattern of illuminated spots.
- Picture def$^{n}$ is stored in a memory area called the refresh buffer or frame buffer.
- Each point is called pixel or pel. (Short for picture element)
- As it stores intensity information, they are well suited for display of scenes containing subtle shading & color patterns.

- For b/w system (bilevel)
  ↳ 1 white, 0: black
- 24 bits/pixel and a 1024 × 1024 image requires 3 MB of storage for frame buffer.
- B/w system with 1 bit/pixel, frame buffer is called bitmap.
- For systems with multiple bits per pixel, the frame buffer is often referred to as a pixmap.

Interlacing -

1st pass - the beam sweeps across every other scan line from top to bottom (alternately)

2nd pass - after vertical retrace, beam sweeps out remaining lines.

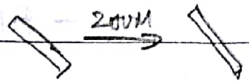
- Allows us to see the entire scene in ½ of time.
  Used ~~for~~ with slower refreshing rate.
- On older display, 30 fps, no of interlaced may show flickers.
- It effectively displays complete scene in 1/60th of a second without flickers.
- Used for animations.

Random

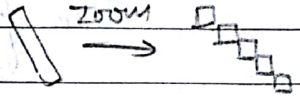
- Directly the image line are drawn.
- Vector display or Calligraphic displays
- Components of the picture can be drawn in any specified order.
- Ex- Pen Plotter.
- Refresh rates depends on no. of lines to be drawn. Picture def$^n$ is stored as a set of line drawing commands in an area of memory called refresh display file, or display list, or display program or refresh buffer capable of displaying 100000 short lines at 30 to 60 fps. Rate > 60 fps can burn out phosphor.

Differences:

Random scan systems -
- designed for line drawing & not realistic shaded scenes.
- generally have higher resolution than raster.
- produce smooth line drawing




Raster-scan system -
- produces jagged lines that are plotted as discrete point sets.

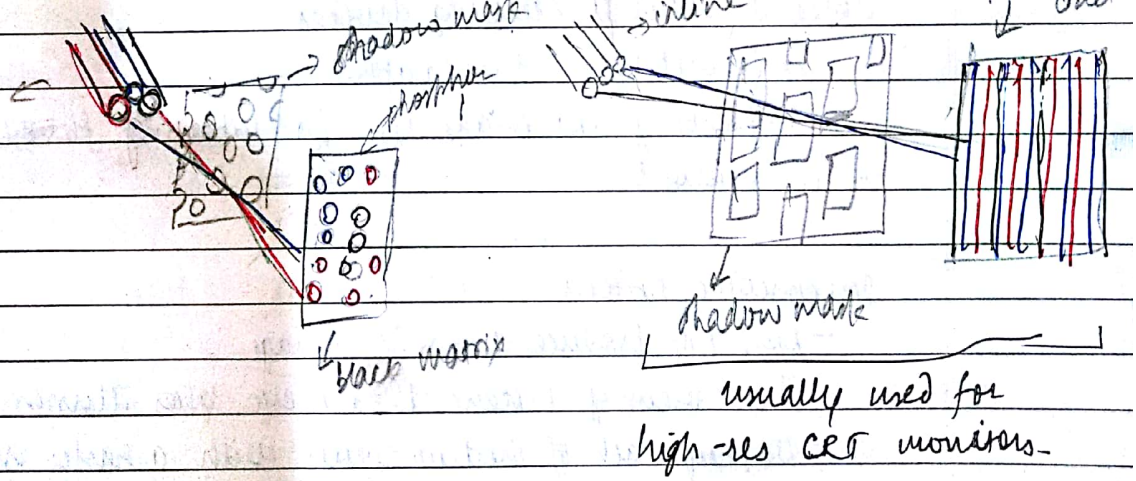



Colour CRT monitor -

Beam penetration:
→ Used combination of phosphor that emits diff lights.
→ used with random scan display.
→ colour depends on how far electron beam penetrates.
→ Slow e⁻ : red
Fast e⁻ : green
Intermediate : yellow & orange (both green & red)
→ inexpensive
→ controlled by beam-voltage.

Shadow mask:

3 e⁻ guns : one for each red, green & blue.




usually used for high-res CRT monitors.

Intensity defines colour.
24 bits/pixel — $2^{24}$ colours — full/true colour systems.

Direct-view Storage tubes (DVST)
- Stores pic info as charge distrib$^{n}$ just behind phosphor screen
- 2 e⁻ guns used
- Primary gun - stores pic pattern.
- Secondary gun - maintains pic display.

Flat panel displays

Plasma Panel / gas discharge displays
- Filling the region

Thin film electroluminescent displays
- Region b/w glass plates is filled with a phosphor: zinc sulphide doped with manganese instead of a gas.

Light emitting diodes (LED)
- Matrix of diodes is arranged to form the pixel position.

Liquid crystal displays (LCDs)
- ~~Used~~ Used polarized light & polarization film.

Three dimensional viewing devices
Ex - GENISCO space graph.
- Reflects a CRT image from a vibrating flexible mirror.

Stereoscopic system
- Does not produce true 3D image.
- Two views of a scene to each eye gives illusion of depth.
- Displays each of the two views with a raster system on alternate refresh cycles.

Virtual reality system
- Uses stereoscopic system.
- Uses gyroscopic sensor.