Lecture-2
MDu

classmate
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Page

Computer Graphics - Illustration field of CS
CG and its derivative - "visualization" are primary tools for computational science.

Cartography - Maps

Graphic hardware
video display device :
CRT : cathode ray tube
↓
electron beam

phosphor light fades very rapidly.
phosphor glowing → redraw the picture repeatedly by quickly directing electron beam at the same point.
→ Refresh CRT.

Control grid : Metal cylinder that fits over the cathode
High voltage → filament → electron boil off → directed and accelerated by magnetic field

- Brightness is controlled by voltage (# electrons).
- Focusing - converging the beam using EM field. Electrostatic focussing is used widely.
(deflection)

Magnetic deflection coils are mounted on the outside of CRT envelop.

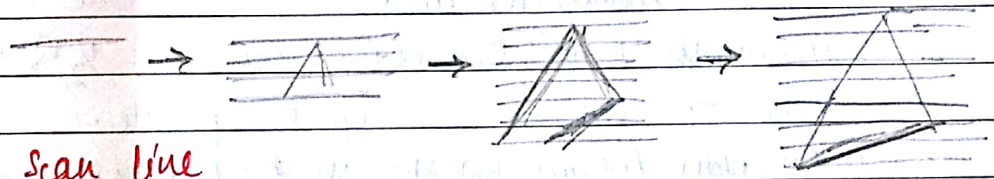
- Colour (frequency) of the light emitted by phosphor is proportional to the energy difference b/w excited quantum state & ground state.

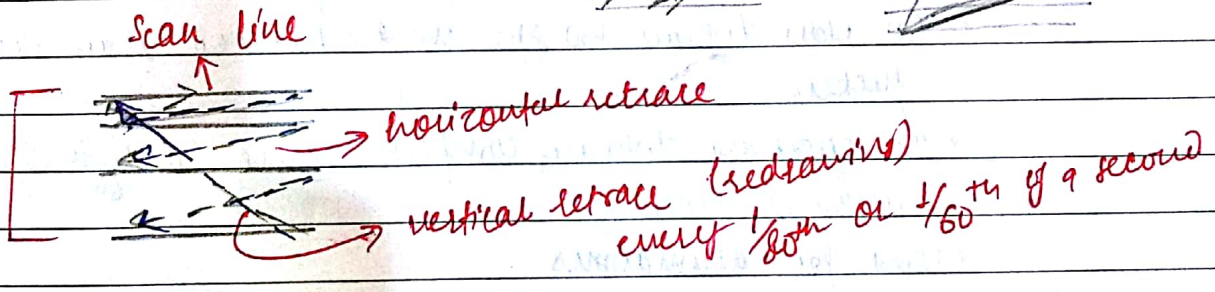
Persistence - The time it takes the emitted light from the screen to decay to one-tenth of its original intensity.
Lower persistence phosphor requires high refresh rate.

Usually used for animation.
High persistence-complex static pictures
Resolution - The max # of pts. that can be displayed on the CRT without overlapping.
Depends on -
- The type of phosphor.
- The intensity
- The focussing and deflection system.

Aspect ratio - The ratio of vertical points to horizontal points
e.g. aspect ratio means length of vertical line with three points is equal to horizontal line with four points.

Raster scan display





Refreshing - 60 to 80 fps

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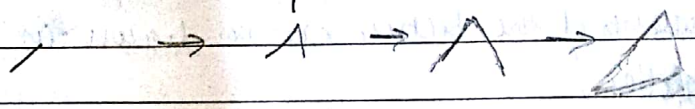
Random scan display



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.