



SNS COLLEGE OF ENGINEERING



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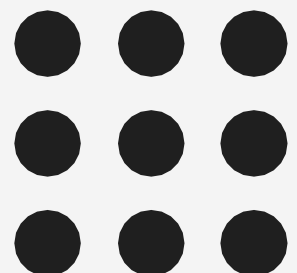
Department of Information Technology

Course Name – COMPUTER GRAPHICS

III Year / V Semester

Unit 1 – INTRODUCTION TO COMPUTER GRAPHICS

Topic :Graphics Display Devices



Identify the concept from the images



Graphics Display Devices-Computer Graphics/Nandakumar/IT/SNSCE

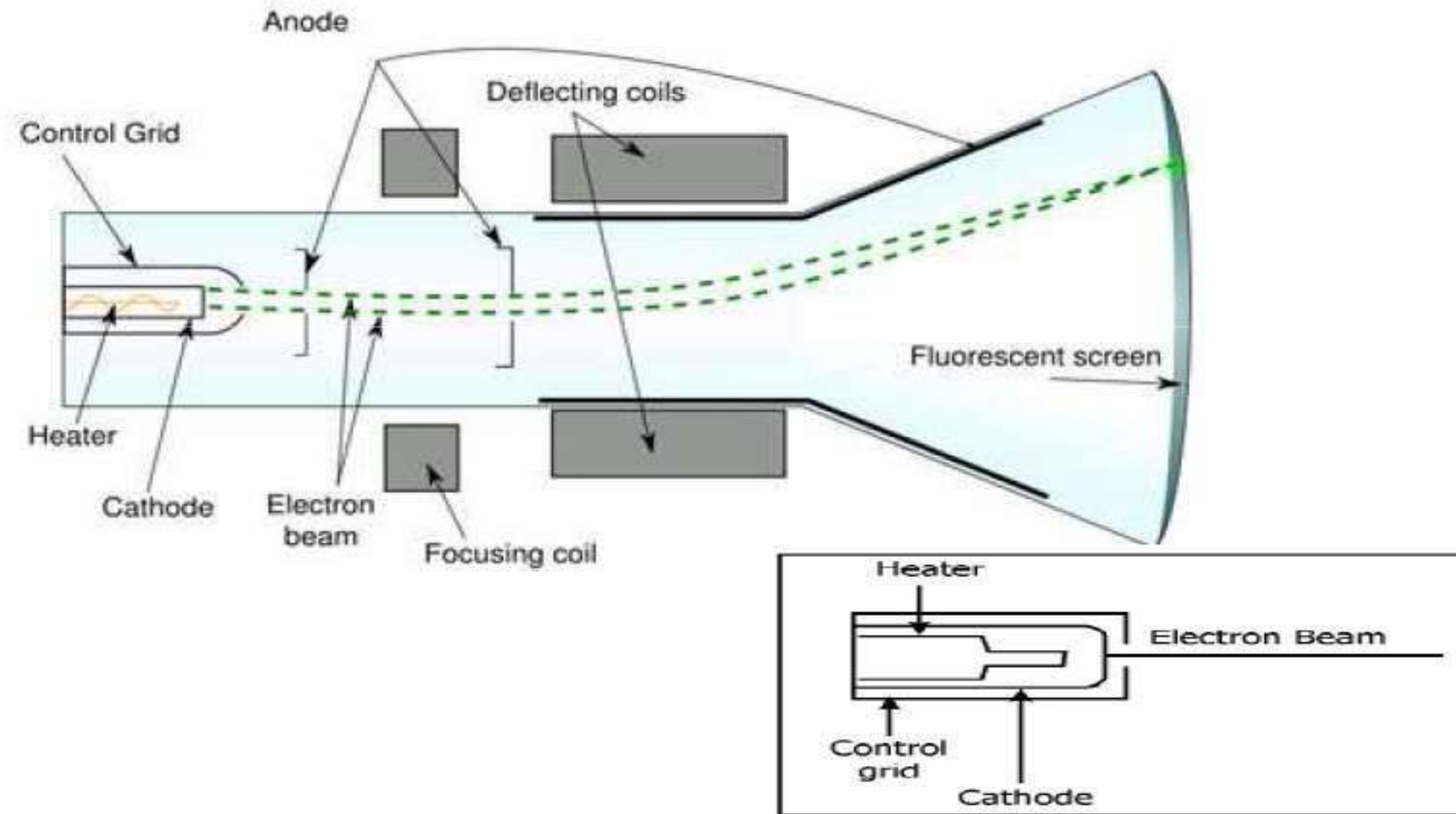


DISPLAY DEVICES



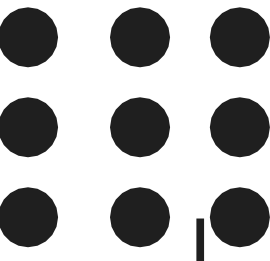
- A display device is a device for presentation of information, such as image or a text, for visual reception, acquired, stored, or transmitted in various forms
- When the input information is supplied as an electrical signal, the display is called electronic display.
- Electronic displays are available for presentation of visual information.

CATHODE RAY TUBES - CRT





CATHODE RAY TUBES - CRT



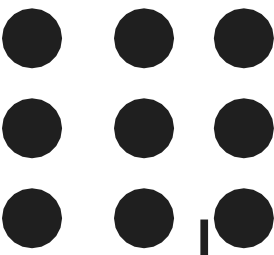
- A CRT is a specialized vacuum tube in which images are produced when an electron beam strikes a phosphorescent surface.
- Most desktop computers make use of CRTs.
- The CRT in a computer display is similar to the picture tube in a television receiver.

Key Elements of CRT

- Heater element and cathode
- Control Grid
- Accelerating Anode
- Focusing And Deflection Coils
- Phosphor Coating



Drawbacks of CRT



- CRT monitors constitute a health hazard and can affect the functioning of living cells.
- In order to increase the screen width in a CRT set, you also have to increase the length of the tube.

RASTER SCAN DISPLAY

- In this method, horizontal and vertical deflection signals are generated to move a beam all over the screen in a pattern for displaying any image.
- The electron beam is swept across the screen one row at a time from top to bottom.
- The electron beam sweeps back and forth from left to right across the screen.
- The beam is on, while it moves from left to right.
- The beam is off, when it moves back from right to left.
- As soon as the beam reaches the bottom of the screen, it is turned off and is rapidly retraced back to the top to start again. This is called the *vertical retrace*.

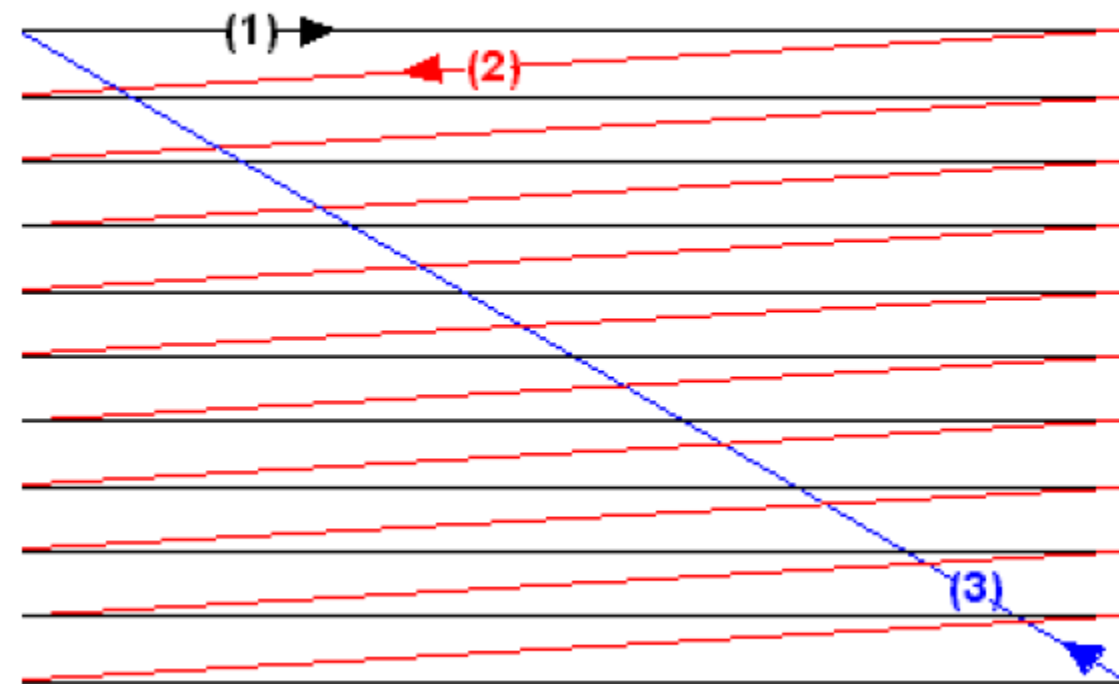


Fig:A raster scan mechanism

RASTER SCAN DISPLAY

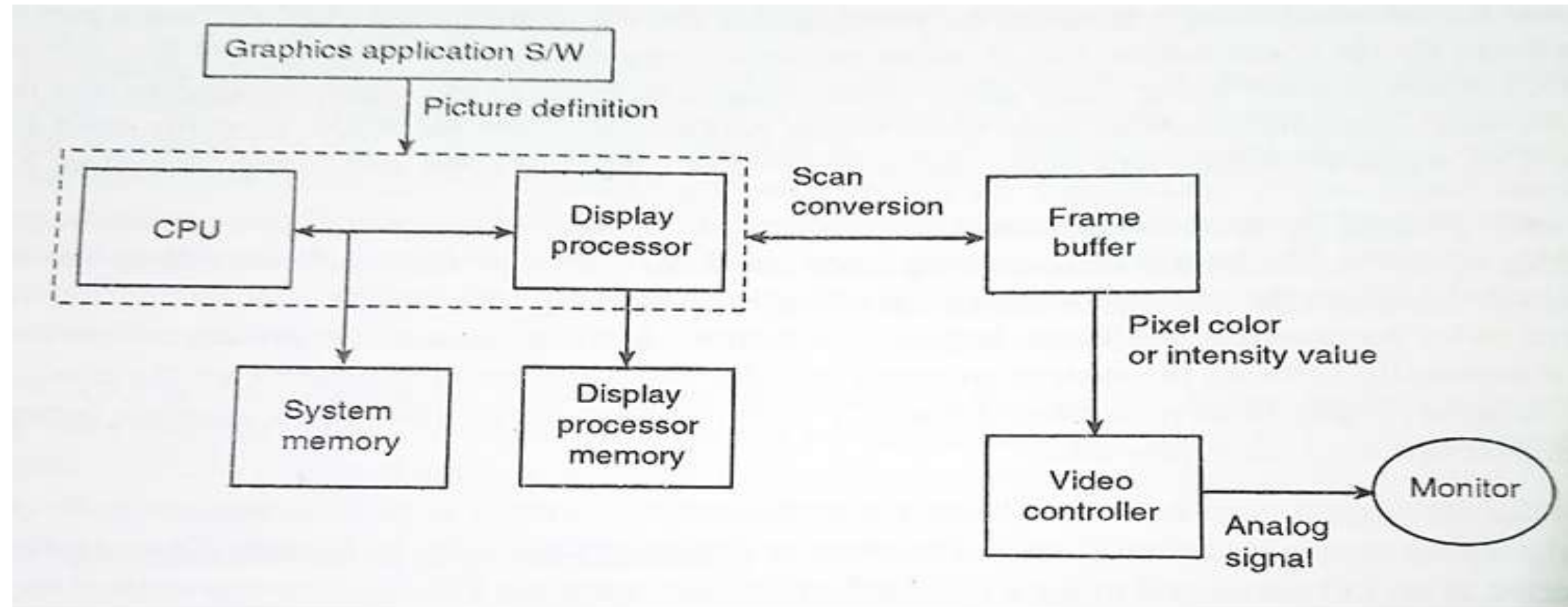


Fig: Architecture of Raster Scan Display



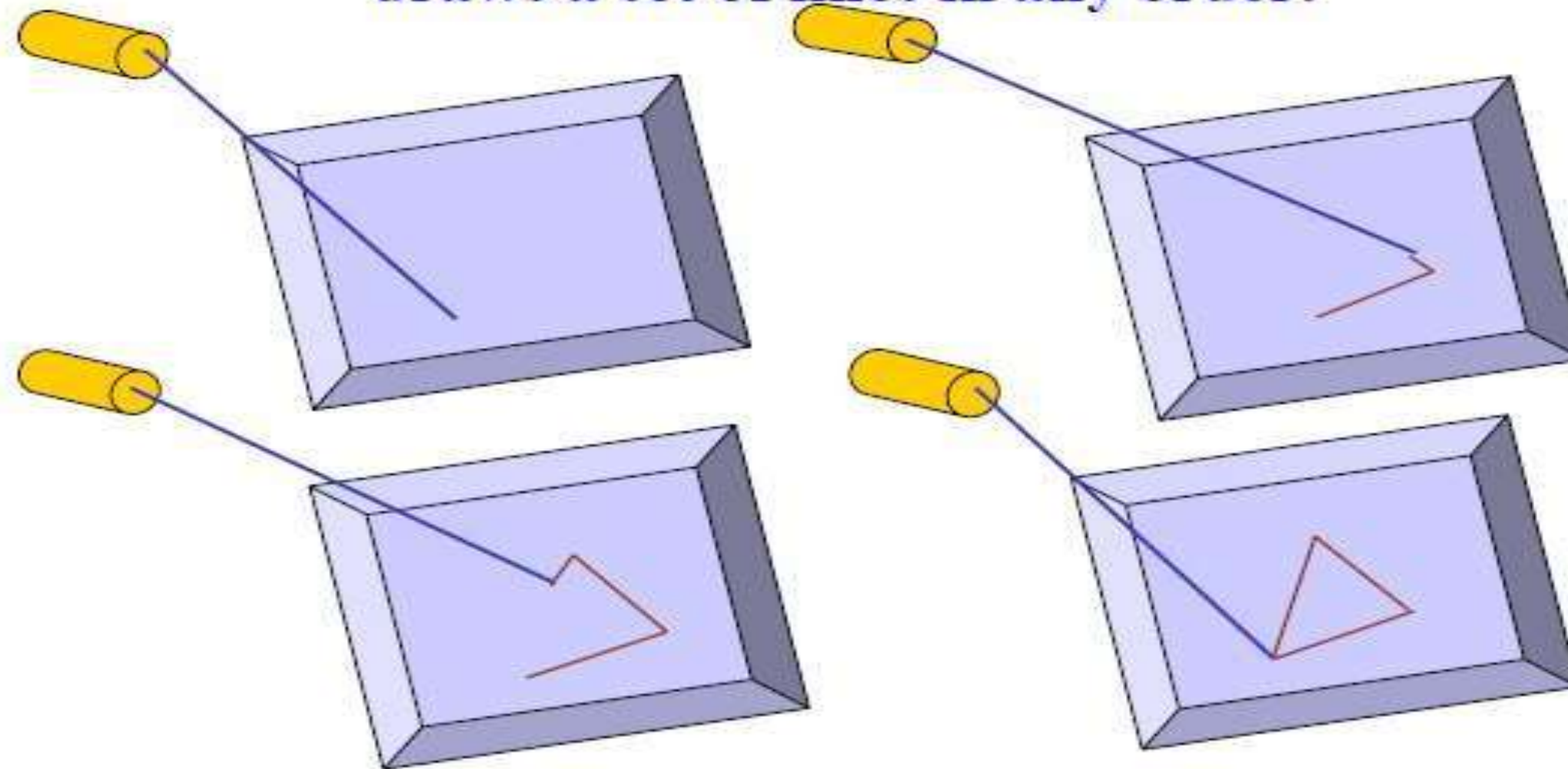
RANDOM SCAN DISPLAY

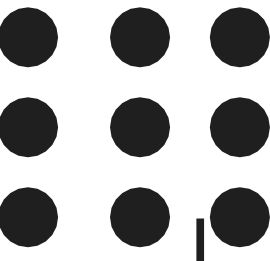


- A CRT, as a random-scan display unit, has an electron beam directed only to the parts of the screen where a picture is to be drawn.
- Random-scan monitors draw a picture one line at a time.
- These are also referred to as *vector displays (or stroke-writing or calligraphic displays)*.
- The component of a picture (lines and curves) can be drawn and refreshed by a random-scan system in any specified order.
- A pen plotter operates in a similar way and is an example of a random scan, hardcopy device.

RANDOM SCAN DISPLAY

Random-scan display system draws a set of lines in any order.





COLOR CRT MONITORS

- A CRT monitor displays color pictures by using a combination of phosphors that emit different-colored light. By combining the emitted light from the different phosphors, a range of colors can be generated. **The two basic techniques for producing color displays with a CRT are**
- **1. The Beam-Penetration method.**
- **2. The Shadow-Mask method**



BEAM-PENETRATION METHOD

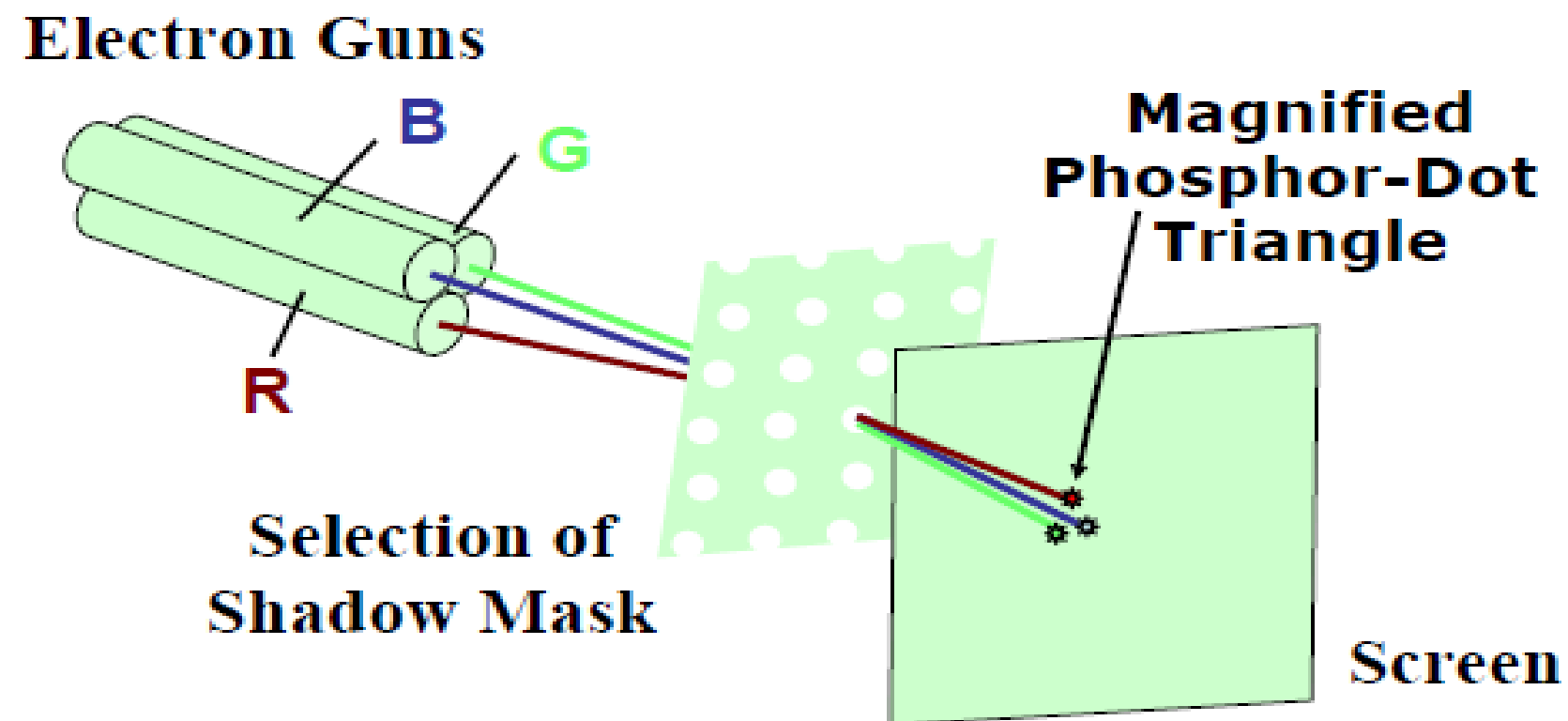


- The beam-penetration method for displaying color pictures has been used with **random-scan monitors**.
- Two layers of phosphor, usually RED and GREEN, are coated onto the inside of the CRT screen, and the displayed color depends on how far the electron beam penetrates into the phosphor layers.
- A beam of slow electrons excites only the outer RED layer.
- A beam of very fast electrons penetrates through the RED layer and excites the inner GREEN layer. At intermediate beam speeds, combinations of red and green light are emitted to show two additional colors, ORANGE and YELLOW.
- The speed of the electrons, and hence the screen color at any point, is controlled by the beam-acceleration voltage.
- **Advantage:** Beam penetration has been an inexpensive way to produce color in random-scan monitors,
- **Disadvantage:** only four colors are possible, and the quality of pictures is not as good as with other methods.

SHADOW-MASK METHODS

- Shadow-mask methods are commonly used in raster scan systems (including color TV) because they produce a much wider range of colors than the beam penetration method.
- A shadow-mask CRT has three phosphor color dots at each pixel position.
- One phosphor dot emits a RED Light, another emits a GREEN light, and the third emits a BLUE light.

**Operation of a delta-delta, shadow-mask CRT.
Three electron guns, aligned with the triangular
color-dot patterns on the screen, are directed
to each dot triangle by a shadow mask.**



FLAT PANEL DISPLAY

The *flat panel display (FPD) technology is becoming increasingly* common in a wide variety of consumer devices that include cellular phones, digital cameras, liquid crystal display (LCD) televisions, computer displays, and personal digital assistants (PDAs).





THANK YOU