COMPUTER GRAPHICS

NUMERICAL PROBLEMS

1. Find out the time required to scan one row of screen if the screen resolution is 20MP (mega pixel), aspect ratio 5/4 and refresh frequency is 30Hz.
2. How much time is spent scanning across each row of pixels during screen refresh on a raster system with resolution of 1280 X 1024 and a refresh rate of 60 frames per second?
3. Consider three different raster systems with resolutions of 640 x 480, 1280 x 1024, and 2560 x 2048.
   (a) What size is frame buffer (in bytes) for each of these systems to store 12 bits per pixel?

   (b) How much storage (in bytes) is required for each system if 24 bits per pixel are to be stored?
4. Find out the aspect ratio of the raster system using 8 x 10 inches' screen and 100 pixels/inch.
5. Consider two raster systems with the resolutions of 640 x 480 and 1280 x 1024.
   (a) How many pixels could be accessed per second in each of these systems by a display controller that refreshes the screen at a rate of 60 frames per second?

   (b) What is the access time per pixel in each system?
6. Compute the following:
   (a) Size of 800 x 600 image at 240 pixels per inch.
   (b) Resolution of 2 x 2-inch image that has 512 x 512 pixels.
   (c) Height of the resized image 1024 x 768 to one that is 640 pixels wide with the same aspect ratio.
   (d) Width of an image having height of 5 inches and an aspect ratio 1.5
7. Find out the size of frame buffer in MB if the screen resolution is 12MP (mega pixel), aspect ratio 3/4 and number of color combination required 12345.
   (RGB all are having equal no. of Frame buffer).
8. Find the number of colors a frame buffer of 8 bit planes each red, green and blue, and 10 bits wide lookup table can produce.
9. Find the amount of memory required by an 8 plane frame buffer each of red, green and blue, having 1024 x 768 resolution.
10. Find the refresh rate of a 512 x 512 frame buffer, if the access time for each pixel is 200 nanoseconds(ns).
11. Find the amount of memory required by a 3 plane frame buffer each of red, green and blue, having 800 x 600 resolution.
12. Find the refresh rate of a 1024 x 1024 frame buffer, if it can access 32 pixels in a group simultaneously, in an access time of 200 ns.
13. Find the number of colors that is possible on a 512 x 512 raster screen with a 3 plane frame buffer each of red, green and blue.

Aspect ratio = no. of pixels in one row / no. of rows = width / height = no. of vertical lines/ no. of horizontal lines

Resolution of any screen = p x r = no. of pixels in one row x no. of rows

Refresh Frequency = no. of frames in 1 sec.

The refresh rate is the number of times a display's image is repainted or refreshed per second. The refresh rate is expressed in hertz so a refresh rate of 75 means the image is refreshed 75 times in a second.