26/4/2018

Graphics is a word derived out of 'graphico' of Greek Language which represents drawing or writing.

Comp Graphics is the terminology used to draw pictures on the monitor of a computer. Every monitor has resolution, which is nothing but no. of pixels, where each pixel might be a shape of a circle or a rectangle.

(N)

Multitasking, Multi Processing, Parallel processing.

Parallel processing can be done only if there are more than one processors.

(I) "Send the graphics configuration & possible resolutions of the monitor".

We can choose any 3 colours, with certain properties, as base colours. CMY can also be base colours.

Why, then, are R, G, B base colours?

The human eye's base colours are RGB.

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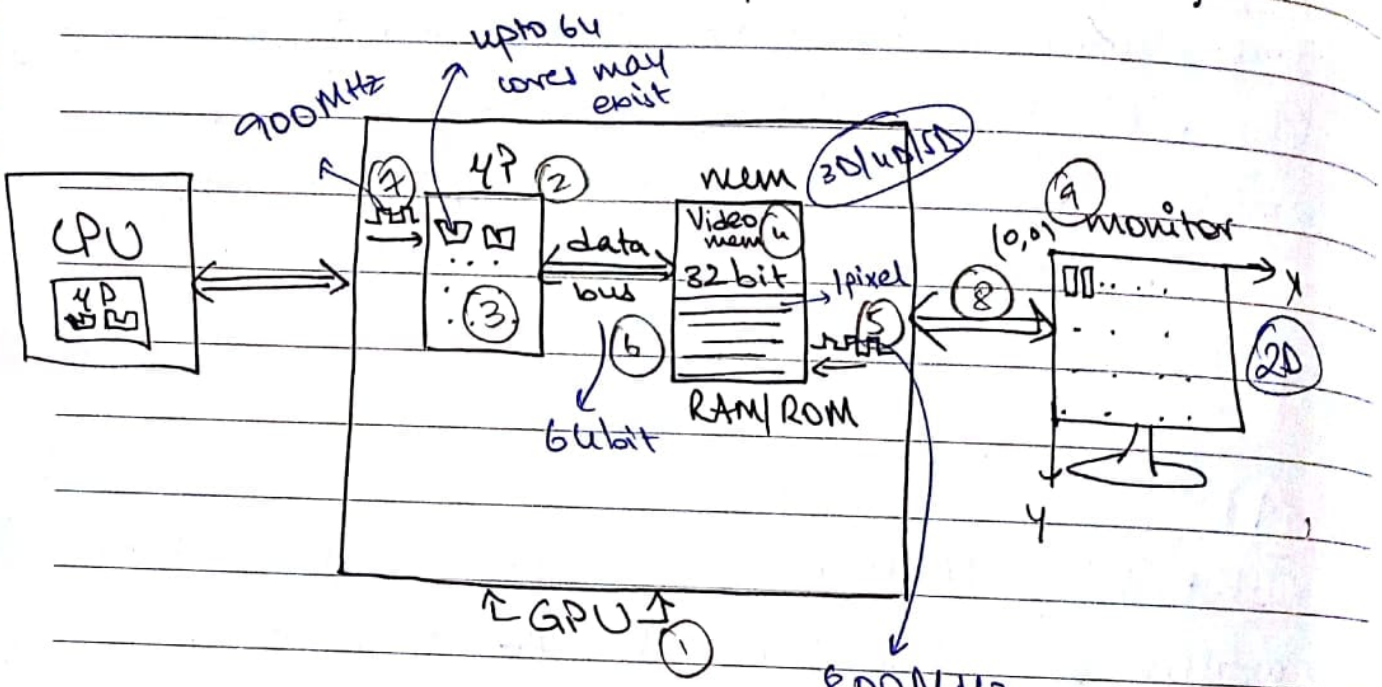
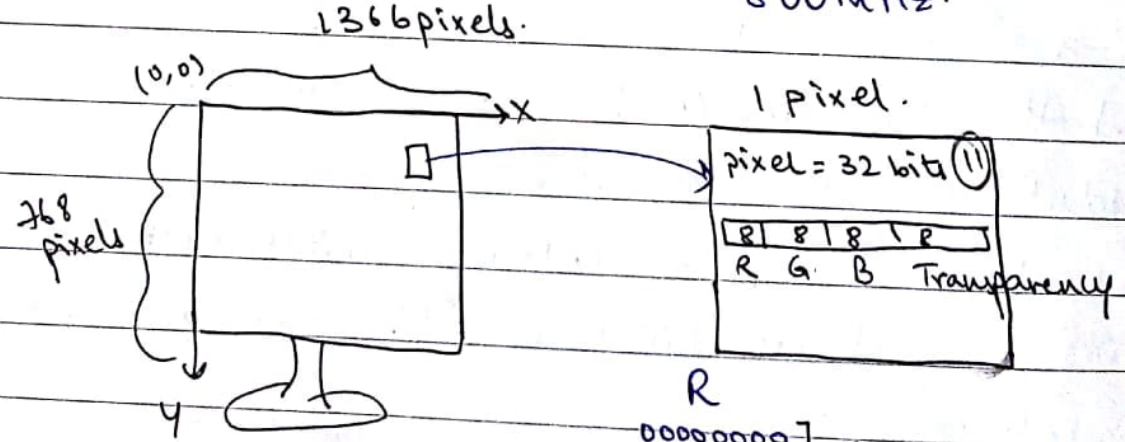
1/8/18

Q) Explain the basic configuration of GPU and monitor? (13 points)

Q) Explain how RGB is split into 32 bits?





R

00000000
:
11111111

2^8 = 256 shades of Red

111^4 256 shades of G & B each

$\therefore 256 \times 256 \times 256 = 2^{24}$

$= 2^4 \times 2^{20}$

= 16 Mega colours (12)

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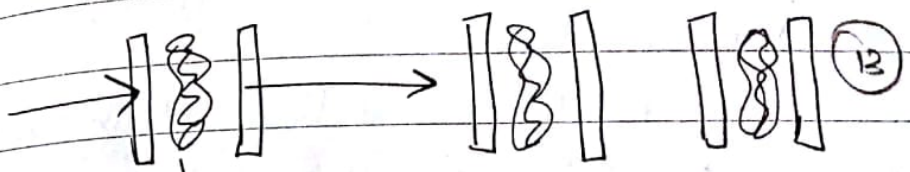
Monitor resolution is 1366×768 (10) × (60 Hertz).
↳ Refresh rate.

Display types :-

① Liquid Crystal Display :- Crystal is a semi solid thing through which light is passed in different wavelengths to get different colours.



crystal

RED GREEN BLUE

All three will be there in one pixel.

1 pixel.

② Light Emitting Diode.

The pixels were circular or disc shaped earlier. But they were converted to ~~a~~ rectangles (II) to save space.

II HOMEWORK Bresenham's straight line Algorithm. (Java/C/C++) use putpixel command.

III Circle.

Step 1 :- initialise the graphics drivers on the computer using initgraph method of the graphics.h library.

Step 2 :- void initgraph (int *graphicsDriver, int *graphicsMode, char* driverDirectoryPath);

It initialises the graphics system by loading the passed graphics driver, then changing the system into graphics mode.
It also resets all graphics settings like colour, palette, current position etc. to their default values.

→ graphicsDriver : pointer specifying the graphics driver to be used or automatically detect the driver. We use DETECT macro of graphics.h library that does auto detection.

→ graphicsMode : pointer specifying the graphics mode to be used. If graphicsDriver is set to DETECT, then mode is set to highest resolution.

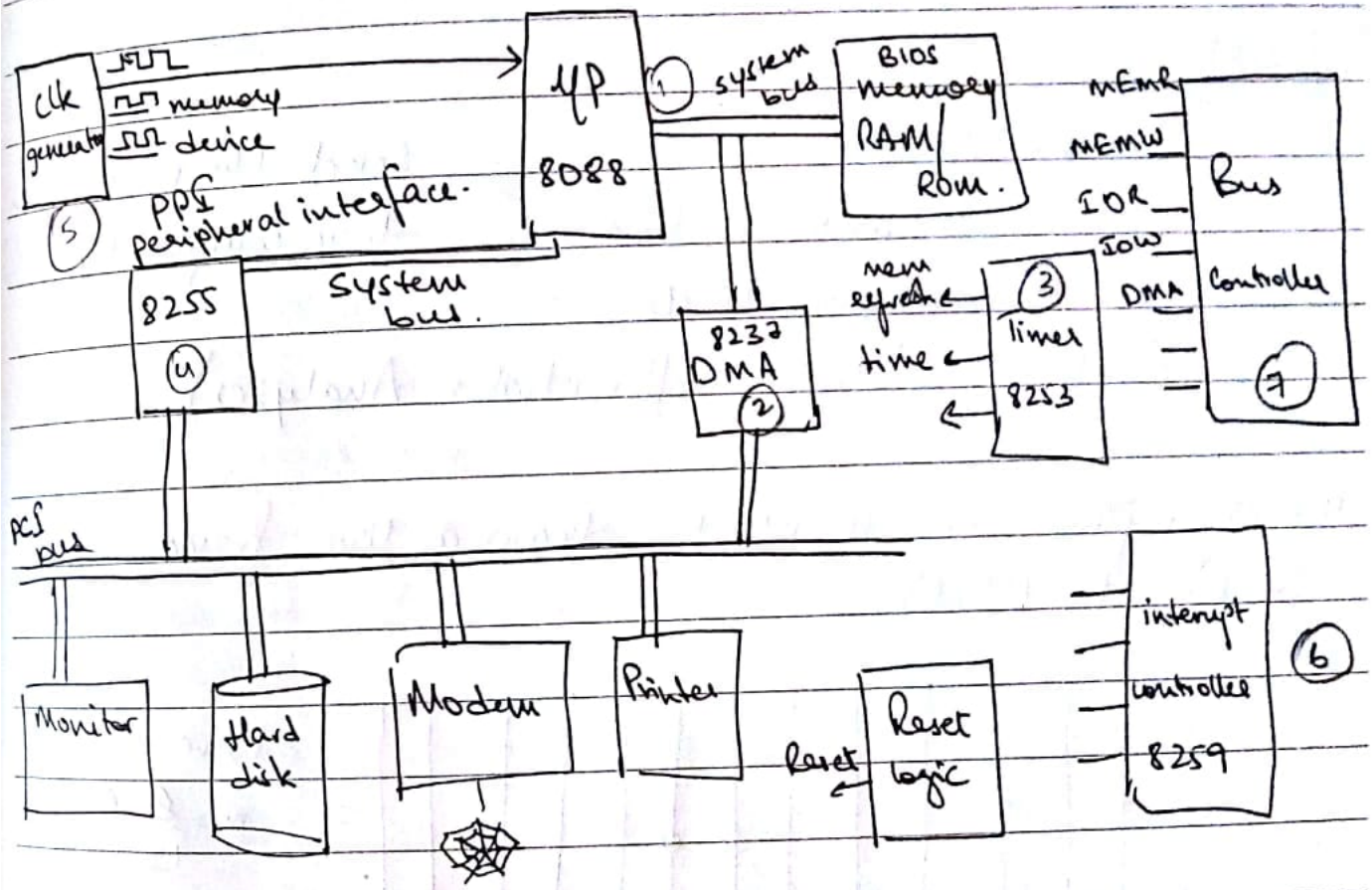
→ driverDirectoryPath : path where the graphics driver files are located.

We have 16 colours in C Graphics. We can either do setcolor(RED) or setcolor(4) to set a colour.

At the end of the graphics program, we have to set the screen back to text mode by calling a 'closegraph' function.

2/8/2018

(8) Explain how peripheral devices are connected to µProcessor thru PCI Bus.?



There are 3 buses :-

Address bus, Control Bus, Data Bus.

Pendrive is connected to a serial port which is connected to PCI bus.

Timer is used to reset memory, etc.

There are 64 possible interrupts.

Refresh on memory has two meanings.

- change data → done by writing a program.
- just refresh → time

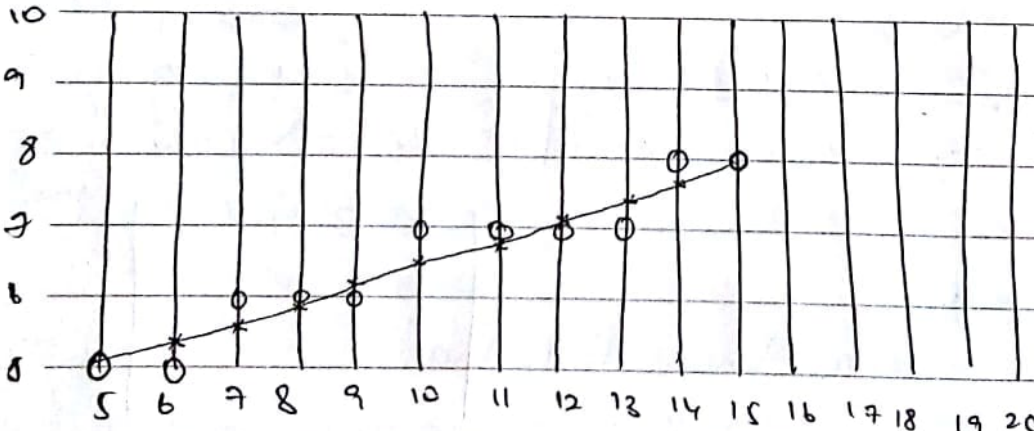
9/8/2018

Assignment 1

1. Bresenham's st line
2. Bresenham's circle.
3. DDA (Digital Differentiator Analyzer).

→ send the prog with time complexity.

For example, we want to draw a line from (5,5) to (15,8)

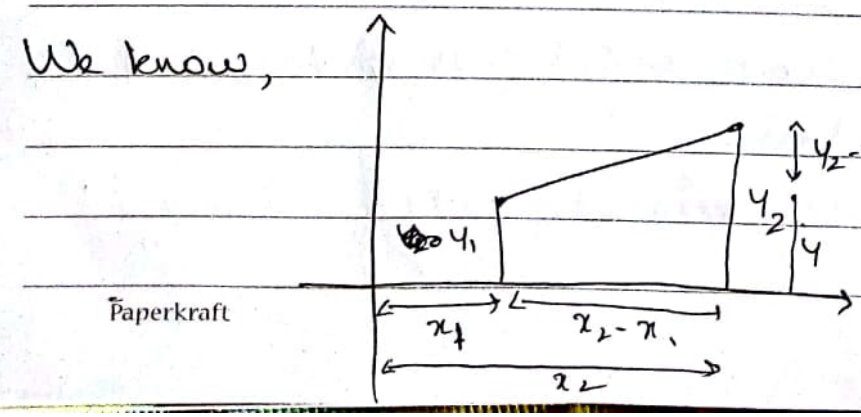


here slope

$m = \frac{8-5}{15-5} = \frac{3}{10}$

$= 0.3$

We know,



$m = \tan\theta = \frac{y_2 - y_1}{x_2 - x_1}$

↓ slope

x changes by 1, y changes by m.

(5,5) → (5,5)
(6,5.3) → (6,5)
~~(7,5.6) → (7,6)~~
(8,5.9) → (8,6)
(9, 6.2) → (9,6)
(10, 6.5) → (10, 7)
(11, 6.8) → (11, 7)
(12, 7.1) → (12, 7)
:
(15, 8) → (15, 8)

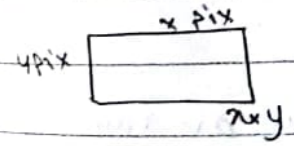
16/8/2018 → Absent

```
x = x1 , y = y1
while ( y < y1)
{
putpixel (round(x), round(y), ...)
x ← x+1;
y ← y+m;
    ↳ float
}
```

3/8/2018

Resolution

monitor — image.

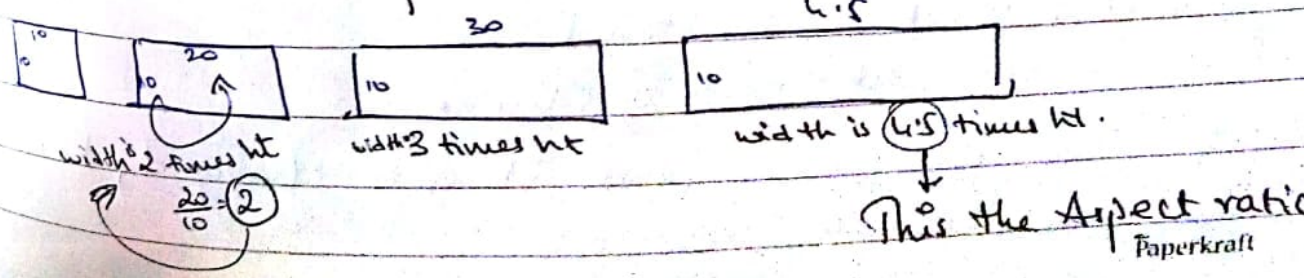


no of pixels in one inch

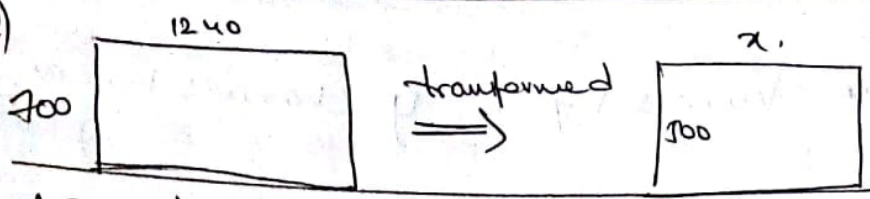
Bright light company camera has 157000 pixels on x direction and 18000 on y direction. Total is 2.8GB

There are effective & non effective pixels.

Aspect Ratio :- Aspect means characteristic



Q)

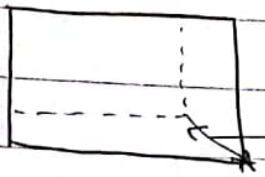


AR = $\frac{1240}{700}$

Aspect ratio is the same.

$$\frac{1240}{700} = \frac{x}{500} \Rightarrow x = 886.$$

Aspect ratio is important in zooming concepts.

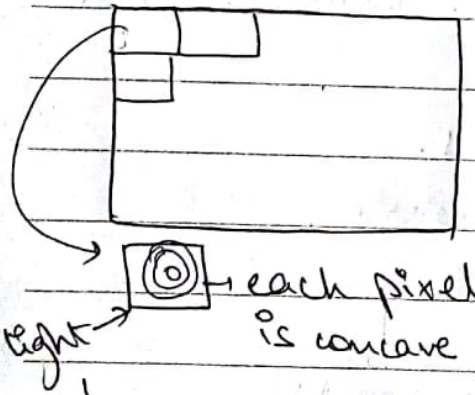


in vertical & horizontal directions AR changes.

* Bayer's filter and Demosaicing Algo :-

- Mosaicing :- arranging small pieces to form a big picture

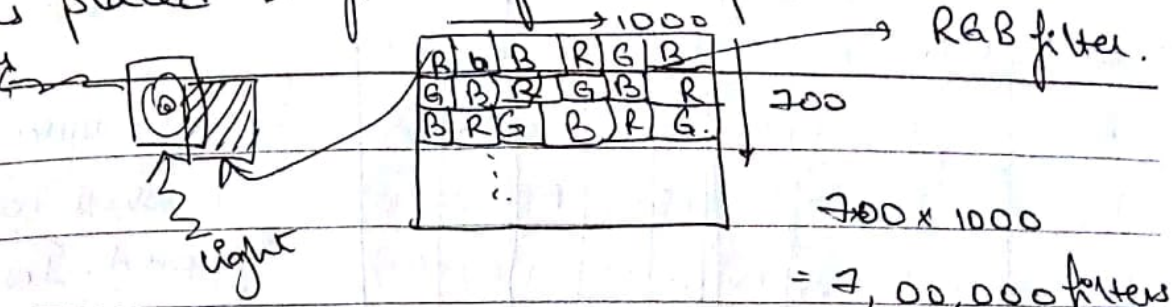
  Demosaicing :- removing the pieces from an image.
- Sensor :- it reacts to the changes in the environment.



When the pixel gets charged, according to the no of photons, values from 0 to 255 (2^8) are stored.

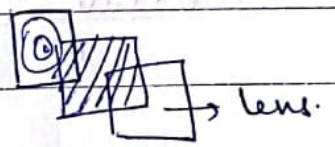
When light falls on the pixel, it gets charged, because the photons are collected.

But the images were captured in B&W only. So, a filter was placed in front of the pixel.



700 × 1000
= 7,00,000 filters are used.

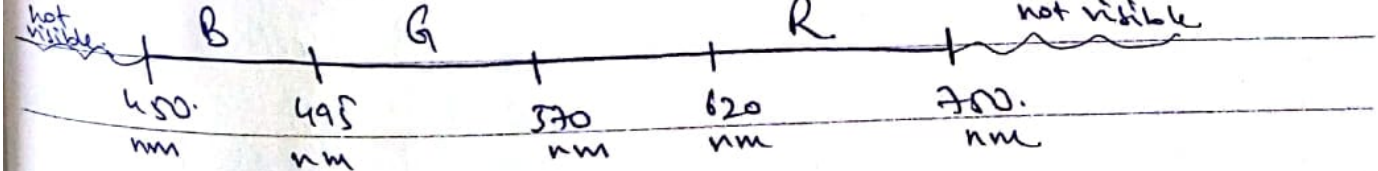
Acc to the intensity i.e, the no of photons falling on the pixel, the intensity of the colour varies. The electricity produced as the result will not tell the colour. For any colour, the no of electrons produced are the same (at that intensity)



lens converges all the light to fall on the concave part of the pixel.

The colour denoted by the pixel depends on the filter. The quality of the picture depends on the filter used.

RGBG is the Bayer's filter. The human eye can see all possible greens but not beyond red & blue. So, 50% of the filter is G. 25% is R & 25% is B.



Bayer's filter (RGBG filter).

RG	R1	G1	R2	G2	R3	G3	R4	G4	R5
GB	G5	B1	G6	B2	G7	B3	G8	B4	G9
RG	R6	G10	R7	G11	R8	G12	R9	G13	R10
GB	G14	B5	G15	B6	G16	B7	G17	B8	G18
RG	R11	G19	R12	G20	R13	G21	R14	G22	R15

for some outer pixel the whole column is ignored. ∴ INEFFECTIVE PIXELS.

$$RBG\left(\underset{12}{Green}\right) = \left(\frac{R_8+R_9}{2}, \frac{B_3+B_7}{2}, \frac{G_7+G_8+G_{12}+G_{16}+G_{17}}{5}\right)$$

$$RBG\left(\underset{5}{Blue}\right) = \left(\frac{R_6+R_7+R_{11}+R_{12}}{4}, B_5, \frac{G_{10}+G_{14}+G_{15}+G_{19}}{4}\right)$$