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| CSE S-3 |
| ASSIGNMENT - 2 |

# Model Question Paper:-

## 1 Basic Primitives:-

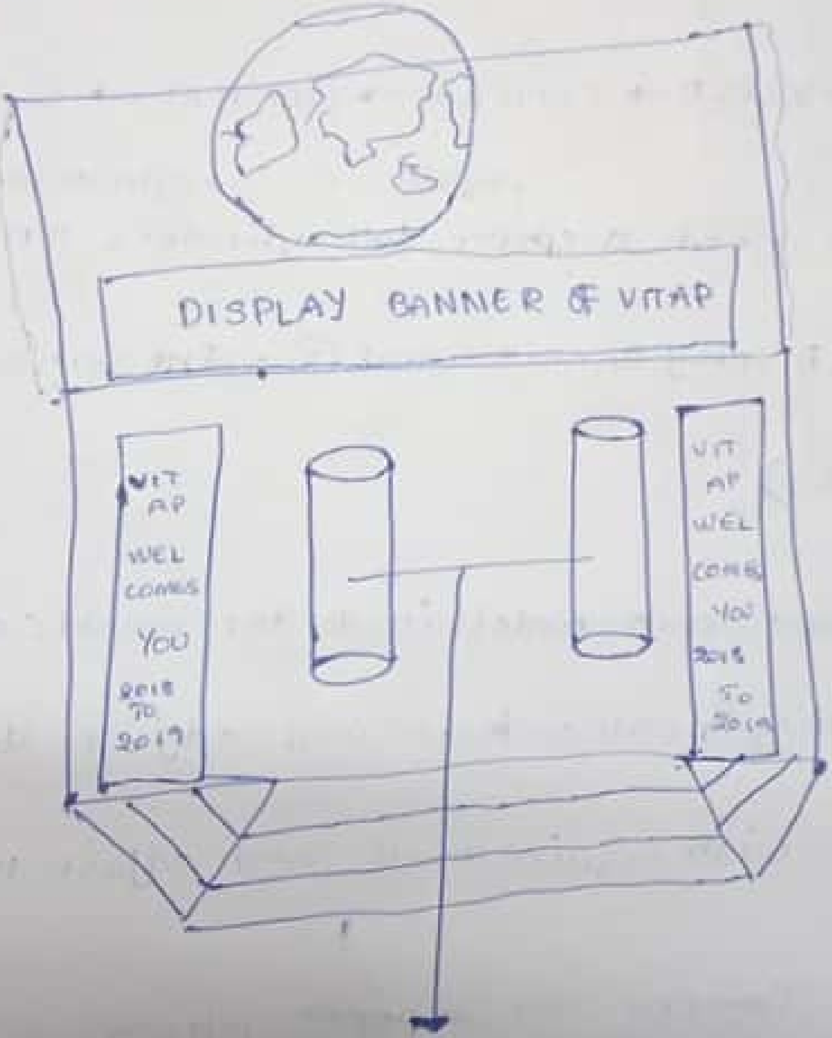
(a)

Circle / elipse / sphere → for Globe

Rectangles → Pillars and all other items

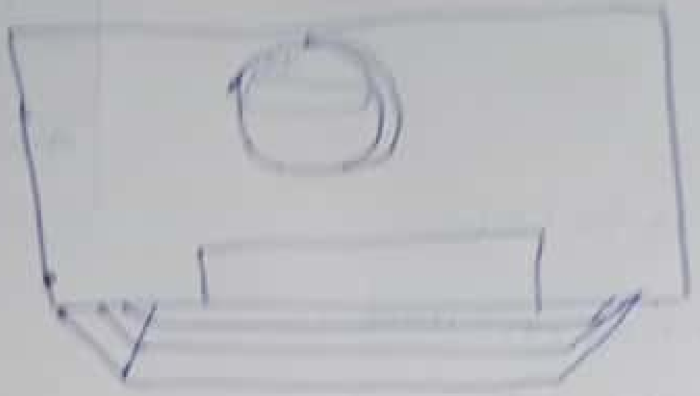
Cylinders → Cylendrical beams.

(b) Front view


DISPLAY BANNER OF VITAP
VIT AP WEL COMES YOU 2018 TO 2019
VIT AP WEL COMES YOU 2018 TO 2019

Cylindrical beams

Top view:-



Ⓒ Graphical pipeline:-

MODEL → WORLD → CAMERA → VIEWPORT → SCREEN

poglobe — cylindrical beams

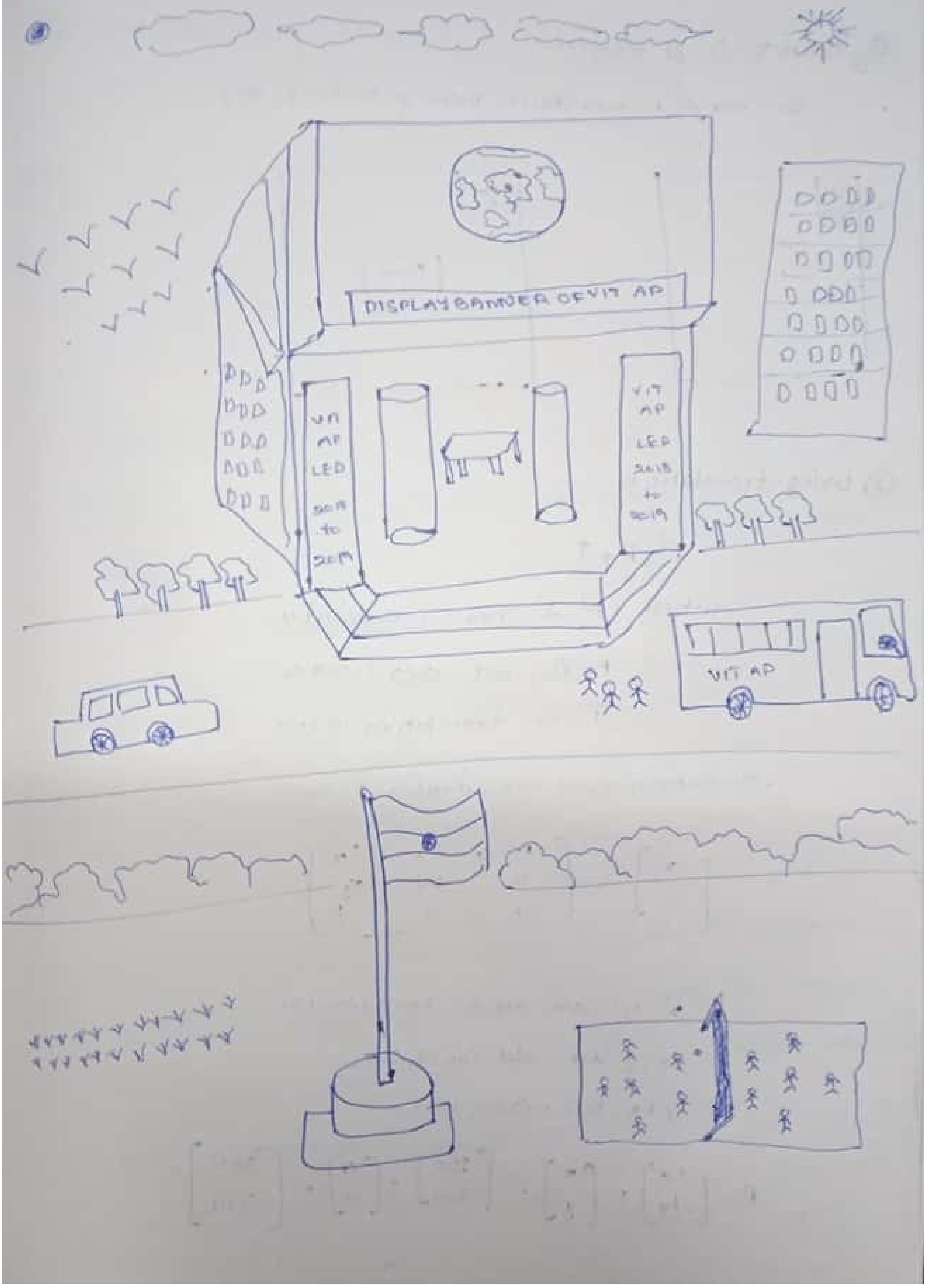
(i) MODEL:- We need a sphere, two cylinders and 3 rectangular surfaces (① Display Banner and ② : Flat vertical surface to display LED's)

(ii) World:- Import each model in to the world (surrounding) And surrounding in point to here and adjust the positions in accordance with requirements and adjust the size

(iii) CAMERA:- Camera for ~~[illegible]~~ getting a proper view and set it to get suitable position

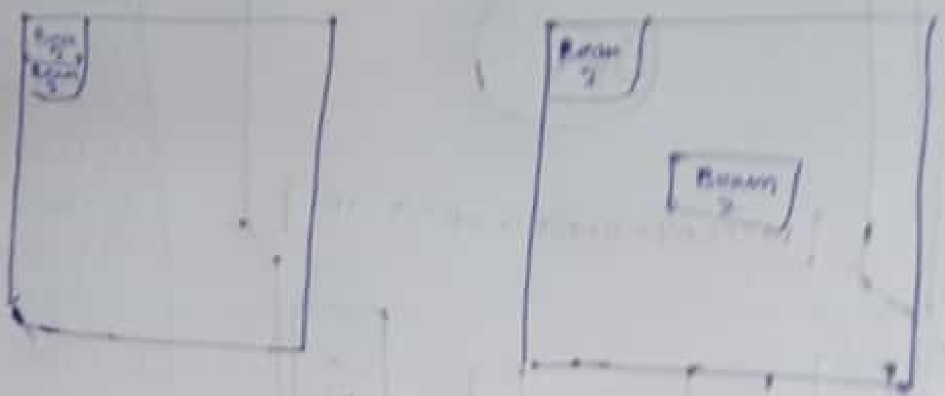
(iv) Viewport:- We have to set view port.

(v) Screen:- Viewport is projected on the screen. That is flush everything to the screen.


DISPLAY BANNER OF VIT AP
VIT AP LED 2018 to 2019
VIT AP LED 2018 to 2019
VIT AP

③ ① Beam 1 is at origin.

we need to transform beam 2 to (300, 300)



② Using translation

$$P' = P + T$$

where $P'$ is new coordinates

$P$ is old coordinates

$T$ is translation vector

- In homogeneous coordinates it is

$$\begin{bmatrix} x' \\ y' \\ 1 \end{bmatrix} = \begin{bmatrix} 1 & 0 & t_x \\ 0 & 1 & t_y \\ 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} x \\ y \\ 1 \end{bmatrix}$$

$x', y'$ are new coordinates

$x, y$ are old coordinates

$(t_x, t_y) = (300, 300)$

$$P = \begin{bmatrix} t_x \\ t_y \end{bmatrix} + \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 300 \\ 300 \end{bmatrix} + \begin{bmatrix} 0 \\ 0 \end{bmatrix} = \begin{bmatrix} 300 \\ 300 \end{bmatrix}$$

(d) The size of canvas is 600×600 and its ratio is 1:1

So its better to choose ratio of 1:1

(f) (i) Aspect ratio

(ii) Camera position

(iii) Depth of field

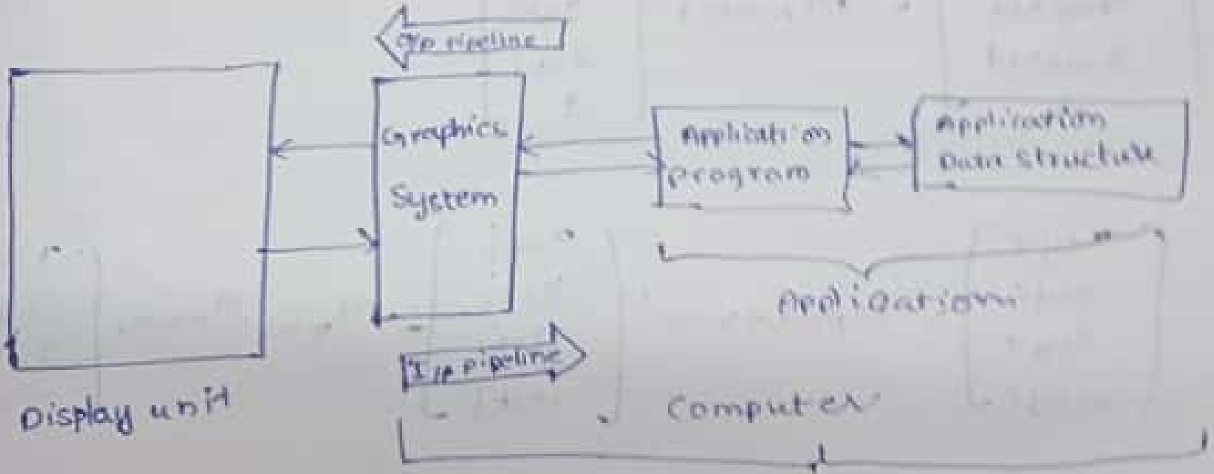
(iv) Lighting & exposure

(v) field of view

(c) Rendering pipeline

Rendering

- projection
- occlusion (lighting exposure)
- colour
- Shado we
- Reflection / Refration
- Indirect illumination



After rendering process a vector image is proceeded which is composed of points and paths rather than pixels. This image contains the image of building with in top view or front view as defined with all the requirements

(g) This can be done by ray tracing which is a rendering technique for generating an image by tracing the path of light as pixels in an image plane and simulating the effects of its encounters with vertical objects.

(h) By using push matrixes and popMatrix(), we can apply transformation on beam 2 without effecting beam1 and other objects. Push matrix saves the current coordinate system in stack where as pop matrix restore it.

(i)
$$\begin{bmatrix} x_{world} \\ y_{world} \\ z_{world} \\ 1 \end{bmatrix} = M_{model} \cdot \begin{pmatrix} x_{obj} \\ y_{obj} \\ z_{obj} \\ 1 \end{pmatrix}$$

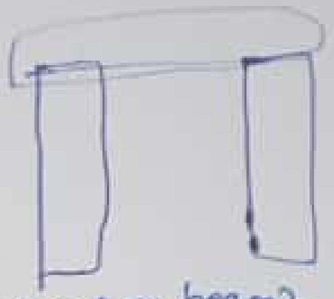
$$\begin{bmatrix} x_{eye} \\ y_{eye} \\ z_{eye} \\ w_{eye} \end{bmatrix} = M_{modelview} \cdot \begin{pmatrix} x_{obj} \\ y_{obj} \\ z_{obj} \\ w_{obj} \end{pmatrix} = \cdot M_{view} \cdot M_{model} \begin{pmatrix} x_{obj} \\ y_{obj} \\ z_{obj} \\ w_{obj} \end{pmatrix}$$

$$\begin{bmatrix} x_{clip} \\ y_{clip} \\ z_{clip} \\ w_{clip} \end{bmatrix} = M_{projection} \begin{pmatrix} x_{eye} \\ y_{eye} \\ z_{eye} \\ w_{eye} \end{pmatrix}$$

(j) No, it can't be done unless you restore the picture Because any operation such as colour correction, adding ~~[illegible]~~ texture etc can be done only through pixels which is a primitive or raster picture. This can be easily found in Photoshop where you would rasterise picture for applying some color correct and all.

(k) Since clipping is cutting out a position of an object, after

Clipping beams you can only see beams



(l) When we apply culling to beam 1, it has no effect on beam2 but beam 1 wi'l be completely excluded out of the pipeline.

(m) RGB stands for Red, green and blue anand ranges from 0 to 255 for R, G & B

(i) (0,0,0) → Beams will be filled with black colour.

(ii) (255,255,255) → Beams will be filled with white color

So we will get BLACK and WHITE