Ques 13

Ans → Bresenham's algorithm draws lines extremely quickly, but it doesnot perform anti-aliasing Additionally, it can't handle any cases where the line endpoints do not lie exactly on integers point of pixel grid. A naive approach to anti-aliasing the line would take an extremely long time.

Wu's algorithm is comparatively fast, but it is still slower than Bresenham's algo.

The algo consists of drawing pairs of pixels stradding the line, each coloured according to its distance from the line. Pixels at the end line are handled separately.
Line less than one pixel long are handled as a special case.

Ques 20

Ans → An affine transformation is a linear mapping method which preserves points, straight lines and planes, set of parallel lines remain parallel after an affine transformation. This technique is typically used to correct for geometric distortions or deformation that occur with non-ideal Camera Angles.

Ques. 1

<u>Answer</u> → Xerox alto is one of the first computer system which used a GUI and a mouse.

Ans 12.

<u>Ans</u> → Bresenham's Algorithm is faster than DDA because Bresenham's algo is more efficient and accurate.
Bresenham algorithm includes only integer value while DDA algorithm includes floating point values.
So Bresenham algo. involves addition and subtraction which causes less consumption of time.
Hence, Bresenham algo is faster than DDA.

Ques 5.

<u>Ans</u>   ~~VFX (visual effects) is the process~~ by which

In addition to that, values in DDA is never rounded off, while in Bresenham it is rounded off to the closest integer value.

Therefore, Bresenham algo is also more optimized as compared to DDA algorithm.

Ques 5

Ans   VFX (Visual effects) is the process by which imagery is created or manipulated outside the context of a live action shot in film-making. The integration of live action footage and CG elements to create realistic imagery.

Ans Sutherland - Hodgman Polygon clipping is performed by processing the boundary polygon against each window corner and edge.

In this case, at first polygon is clipped against edge then the resulting polygon is considered. And then the polygon is clapped against second edge and resulting polygon is considered. this thing repeats for all four edges.

Ques 33

Ans The difference between Boundary fill and flood fill algorithm is mentioned →

~~The crucial differing point in these algorithms is that the f~~

(1) Flood fill first checks whether a random pixels ~~is the~~ is having the region's original colour or not.

While the boundary fill examines for boundary pixel whether ~~that~~ it has already been filled or not.

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Ques 14

Ans   less sampling frequency is the main propellor of the apache helicopter Static in the radio

Ques 10

Ans →   No, Translation is not a linear transformation. It is a geometric transformation.

Ques 6

Ans

Cylenderical to Cartesian

$$x = r \cos \theta \qquad r^2 = x^2 + y^2$$
$$y = r \sin \theta$$
$$z = z \qquad \tan \theta = \frac{y}{r}$$
$$z = z$$

spherical to Cartesian

$$x = p \sin \phi \cos \theta \qquad p^2 = x^2 + y^2 + z^2$$
$$y = p \sin \phi \sin \theta \qquad \tan \theta = y/x$$
$$z = p \cos \phi \qquad \phi = \arccos\left(\frac{x}{\sqrt{x^2 + y^2 + z^2}}\right)$$

Ans   Polygons which have congruent sides and
       angles are regular, all others are irregular
       Polygons with interior angle less than 180° are
       convex and polygons with atleast one
       angle greater than 180° is concave.

       The intersecting polygon are a set of two
       or more polygon which intersects or it can
       be a self intersecting polygon too which
       cuts its own edge.

       A polygon with holes is a simple polygon
       minus the interiors of some other simple
       polygos. It's boundary has more than one
       connected component.

Ques 9

Ans → The standard way to describe the camera
       depth axis is z-axis.
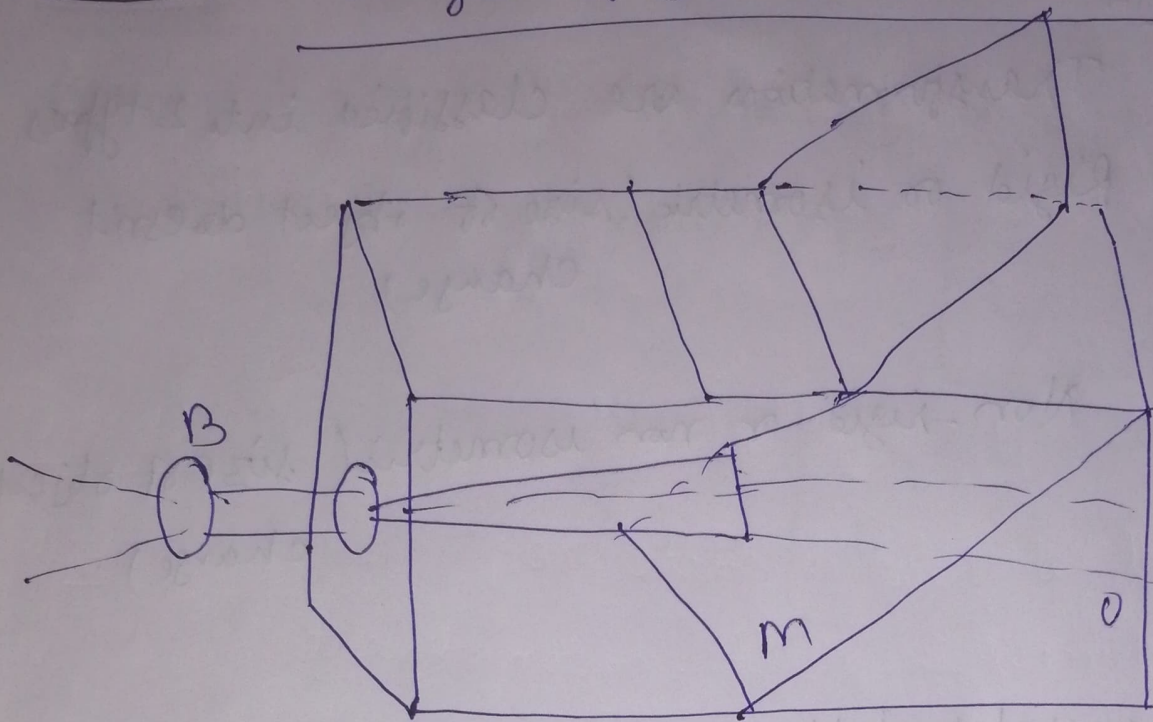
Ques 3

Ans   Linear perspective was used in which the
       objects closer appear to be larger and parallel
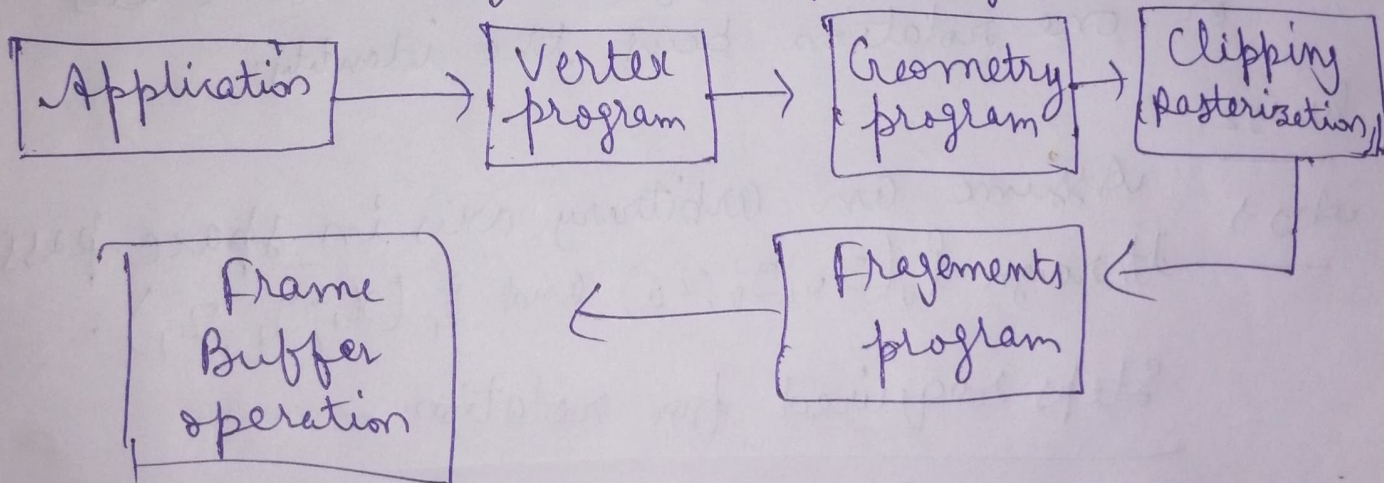   lines appear to be converge to single
                        point.

Ques 4   Diagram of the device used there from
                                                              reality

Ques 8

The block diagram of Graphical pipeline.

| Application | → | Vertex program | → | Geometry program | → | Clipping Rasterization |

| Frame Buffer operation | ← | | ← | Fragements program | ← |

Ques 18

Any s linear transformation is function from one
vector space to another that respects

the linear structure of each vector space
The two vector space must have the same
underlying (linear) field.

Ques 17

Ans → Transformations are classified into 2 types

(I) Rigid or isometric (size of object doesn't
change)

(II) Non-rigid or non isometric (size of object
change)

Ques 23

Ans → General rotation matrices don't commute
The only exceptions are special cases such as
both rotations being about the same axis
or one rotation being the identity.

Ques 21

Ans → Assume an arbitrary axis in space passing
through $P_0(x_0, y_0, z_0)$ and $P_1(x_1, y_1, z_1)$.

Steps required for rotation —

(1) Translate P_0 axis point to origin.

② Perform approximate rotations to make the
axis of rotation coincident with z-axis.

③ Rotate about z-axis by angle θ.

④ Perform the inverse of combined rotation transfo-
-rmation

⑤ Perform the inverse of translation.

Ans 22

Ans →   Let the transformation be T_1 & T_2.

The scaling matrix $S = \begin{bmatrix} S_x & 0 \\ 0 & S_y \end{bmatrix}$

$$S_1 S_2 = \begin{bmatrix} S_{x_1} & 0 \\ 0 & S_{y_1} \end{bmatrix} \begin{bmatrix} S_{x_2} & 0 \\ 0 & S_{y_2} \end{bmatrix}$$

$$= \begin{bmatrix} S_{x_1 x_2} & 0 \\ 0 & S_{y_1} S_{y_2} \end{bmatrix}$$

$$S_2 \cdot S_1 = \begin{bmatrix} S_{x_2} & 0 \\ 0 & S_{y_2} \end{bmatrix} \begin{bmatrix} S_{x_1} & 0 \\ 0 & S_{y_1} \end{bmatrix}$$

$$= \begin{bmatrix} S_{x_2} S_{x_1} & 0 \\ 0 & S_{y_2} y_1 \end{bmatrix}$$

Since multiplication is commutative

$$S_{x_1} S_{x_2} = S_{x_2} S_{x_1}$$
$$\& \quad S_{y_1} S_{y_2} = S_{y_2} S_{y_1}$$

$$\Rightarrow \quad S_1 S_2 = S_2 S_1$$

∴ Hence, Commutative proved

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Ques 35

Ans →

we should clip the polygon to the display window because we need to remove the objects, lines and line segment that are outside the viewing pane