3911037 3

CAE-2 Computer Graphics

HARIHARAN BP

(6) (a)

(b) Given Coordinates are

A (3, 4, 1), B(6, 4, 2), C(5, 6, 3)

Reflection coordinates are :-

1. On xy plane

$x' = x$

$y' = y$

$z' = -z$

$T_x = 1$

$T_y = 1$

$T_z = 2$

$(T_x, T_y, T_z) = (1, 1, 2)$

for Coordinate A(3, 4, 1)

A(0, 3, 1), B(3, 3, 2), C(3, 0, 0), D(0, 0, 0)

For Coordinates A(0, 3, 1)

A New Coordinate are for A = (x', y', z')

$x' = x + T_x = 0 + 1 = 1$

$y' = y + T_y = 3 + 1 = 4$

$z' = z + T_z = 1 + 2 = 3.$

$\Rightarrow A(x', y', z') = A(1, 4, 3)$

For Coordinate B(3,3,2)

New B = (x', y', z')

$x' = x + T_x = 3 + 1 = 4$

$y' = y + T_y = 3 + 1 = 4$

$z' = z + T_z = 2 + 2 = 4$

∴ New Coordinates of B = (4, 4, 4)

For Coordinate C(3,0,0)

New coordinates of C = (x', y', z')

$x' = x + T_x = 3 + 1 = 4$

$y' = y + T_y = 0 + 1 = 1$

$z' = z + T_z = 0 + 2 = 2$

∴ New Coordinate of C = (4, 1, 2)

For D (0,0,0)

New Coordinate of D = (x', y', z')

$x' = 0 + 1 = 1$

$y' = 0 + 1 = 1$

$z' = 0 + 2 = 2$

∴ New Coordinate of D = (0, 1, 1, 2)

Thus, New coordinate of object are

A(1,4,3); B(4,4,4), C(4,1,3), D(1,1,2)

6 b)

Parrallel Projection	Perspective Projection
1) In this case a view place is used	Here object position are transformed to the view plane
2) Lines projection are parallel	Line projection are not parrallel

→ The following are the advantages of Parallel projection.

Advantages (Pros)

1) Good for exact measurement
2) Parallel lines remain parallel

Disadvantages (Cons)

1) Less Realistic looking
2) Angles are not preserved.

Perspective projection :-

Pros

1) Better look
2) Clear Representation

Cons:

1) Difficult to Draw
2) Not suitable of multi/many-dimensional images

3911037 3

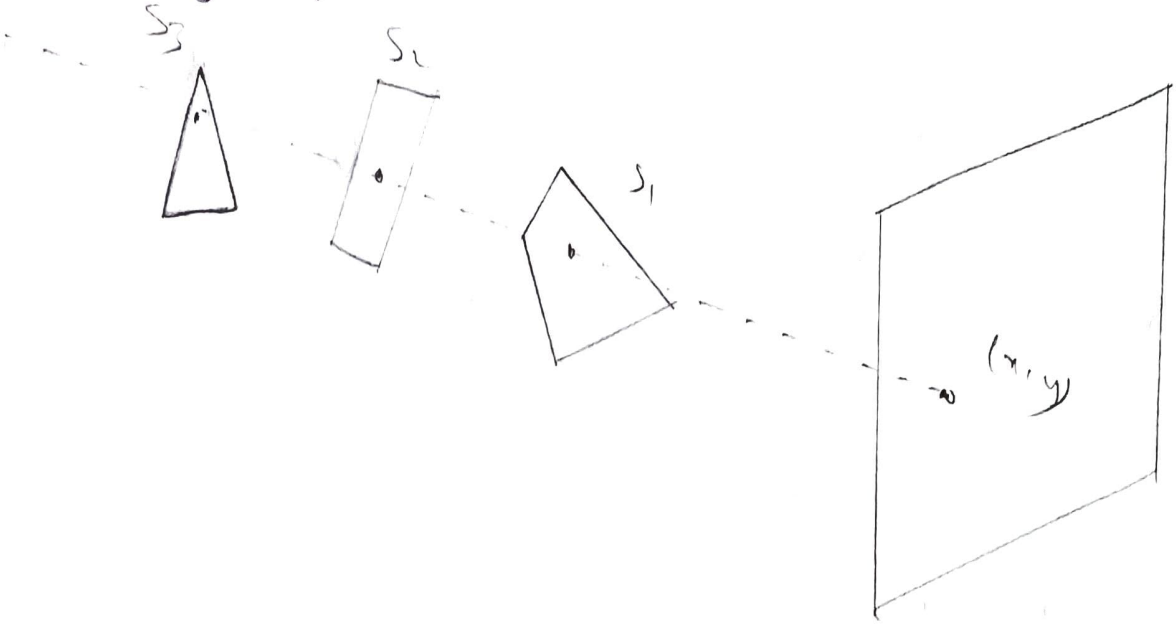
(8) The following are the 4 types:-

① Depth buffer:-

→ Image space method

→ Compares surface depths at each pixel position throughout the scene on the projection plane

→ Usually, applied to images having polygons.

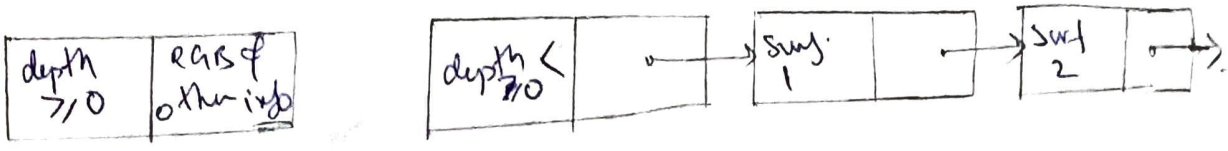


(11) A-buffer

→ Extension of depth buffer

→ Each buffer position can be referred to as linked list of surfaces.

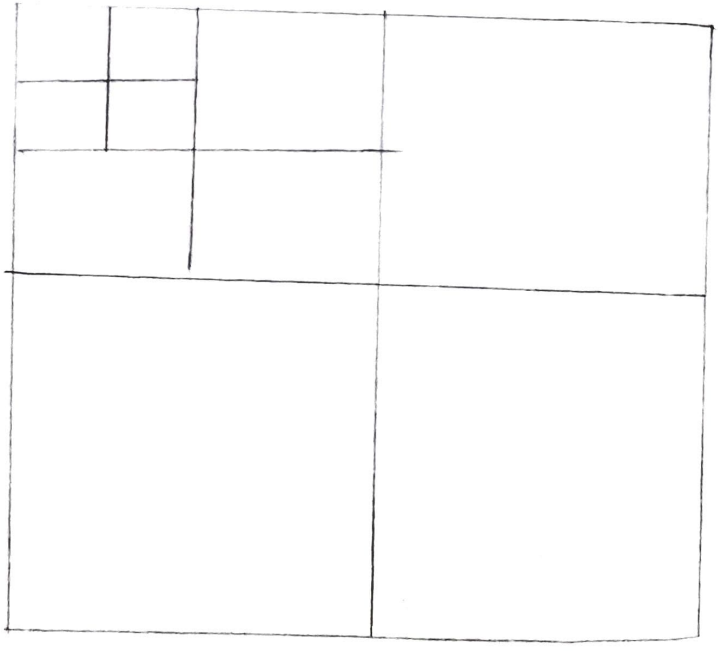
→ Each position has 2 fields.



(iii) Area Sub division method :-

→ Takes advantage by locating those view areas that represent part of a single surface

→ Divides the total viewing area into smaller and smaller rectangles until each small area is the projection of part of a single visible surface / no surface.

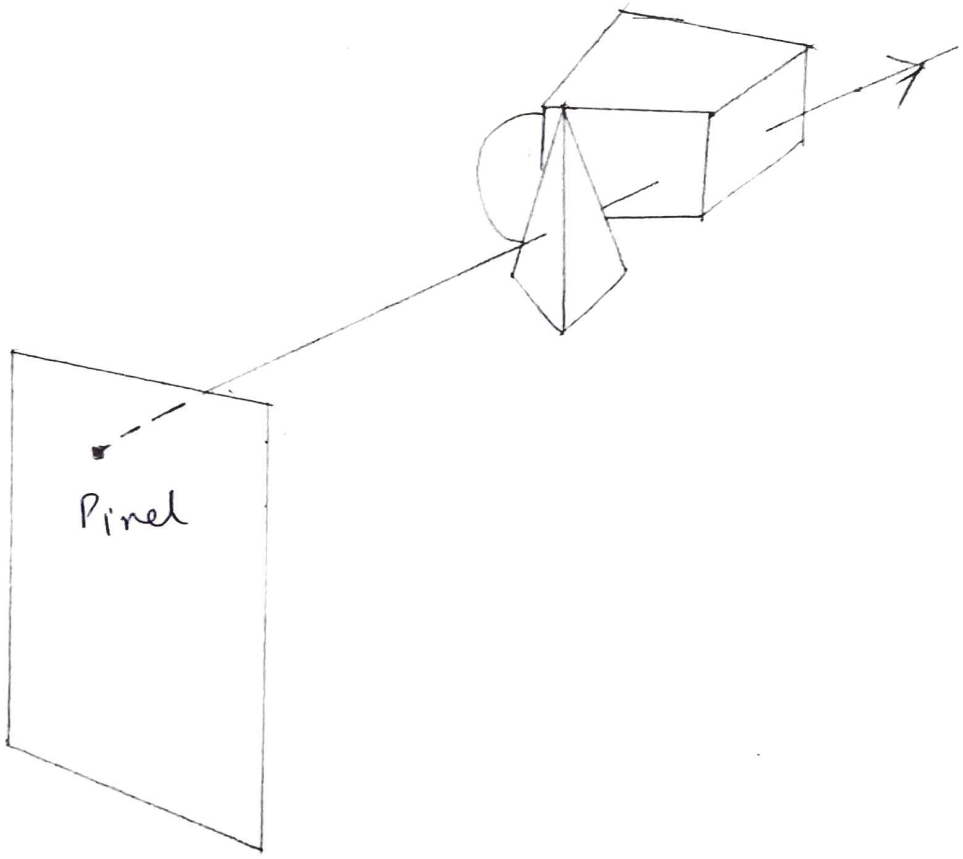


3911037

(iv) Ray Casting Method :-

→ Trace the path of light rays.
→ line of sight from a pixel position on the view plane through a scene.
→ Determine which objects intersect this line

→ Identify the visible surface whose intersection point is ~~dosrt~~ closest to the pixel.



PART-A

① Boundary Representation (or B-Rep) is an ~~extension~~ extension to the ~~to~~ wireframe model which describes the solid in terms of its surface boundaries.

② Vertex table

$V_1 : x_1, y_1, z_1$

$V_2 : x_2, y_2, z_2$

$V_3 : x_3, y_3, z_3$

$V_4 : x_4, y_4, z_4$

$V_5 : x_5, y_5, z_5$

(3) (i) Implicit curves

Eqn $x^2 + y^2 - R^2 = 0$

(ii) Parametric Curve

Equation: $P(t) = f(t), g(t)$

or $P(t) = x(t), y(t)$

(4)

Object Space Method	Image Space method
(i) Compares object & parts of ~~obj~~ objects to each other ~~within a~~ its to determine visibility	Visibility is determined by point-by-~~point~~ point at each pixel position on the projection plane
(ii) Efficient for small no. of objects	* Efficient for large pixels.

(5) The following are the types of light source :-

(i) ~~Point~~ Por

(i) Point Source

(ii) Parallel Source

(iii) Distributed Source.