Unit 2

Question Bank

Part 1

Q. What is Transformation?

Ans –

Transformation means changing some graphics into something else by applying rules. We can have various types of transformations such as translation, scaling up or down, rotation, shearing, etc. When a transformation takes place on a 2D plane, it is called 2D transformation.

Transformations play an important role in computer graphics to reposition the graphics on the screen and change their size or orientation.

Q. Writeshortnotes on active and passive transformations?

Ans –

A transformation can be active or passive.

An active transformation can change the number of rows that pass through the transformation. For example, the Filter transformation is active because it removes rows that do not meet the filter condition.

A passive transformation does not change the number of rows that pass through the transformation.

You can connect multiple branches to a downstream passive transformation when all transformations in the branches are passive.

You cannot connect multiple active transformations or an active and a passive transformation to the same downstream transformation or transformation input group. You might not be able to concatenate the rows. An active transformation changes the number of rows, so it might not match the number of rows from another transformation.

Q. Define Translation ?

Ans –

A translation process moves every point a constant distance in a specified direction. It can be described as a rigid motion. A translation can also be interpreted as the addition of a constant vector to every point, or as shifting the origin of the coordinate system.

Q. Define Rotation?

Ans –

It is a process of changing the angle of the object. Rotation can be clockwise or anticlockwise. For rotation, we have to specify the angle of rotation and rotation point. Rotation point is also called a pivot point. It is print about which object is rotated.

Types of Rotation:

1. Anticlockwise
2. Counterclockwise

Q . Define Scaling and what are the types of scaling?

Ans –

Scaling technique is a method of placing respondents in continuation of gradual change in the pre-assigned values, symbols or numbers based on the features of a particular object as per the defined rules. All the scaling techniques are based on four pillars, i.e., order , description, distance and origin. In short Scaling changes the shape and size of the object.

Types of scaling-

* Uniform scaling (when Sx = Sy)
* Differential scaling (when Sx != Sy)

Q . What is matrix representation and Homogenous coordinates?

Ans –

Homogenous Coordinates –

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The rotation of a point, straight line or an entire image on the screen, about a point other than origin, is achieved by first moving the image until the point of rotation occupies the origin, then performing rotation, then finally moving the image to its original position.

The moving of an image from one place to another in a straight line is called a translation. A translation may be done by adding or subtracting to each point, the amount, by which picture is required to be shifted.

Translation of point by the change of coordinate cannot be combined with other transformation by using simple matrix application. Such a combination is essential if we wish to rotate an image about a point other than origin by translation, rotation again translation.

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To combine three transformations into a single transformation, homogeneous coordinates are used. In homogeneous coordinate system, two-dimensional coordinate positions (x, y) are represented by triple-coordinates.

Homogeneous coordinates are generally used in design and construction applications. Here we perform translations, rotations, scaling to fit the picture into proper position.

Matrix Representation –

**Matrix representation** is a method used by a computer language to store matrices of more than one dimension in memory.

Q. what is composite transformation?

Ans –

A composite transformation (or composition of transformations) is two or more transformations performed one after the other. Sometimes, a composition of transformations is equivalent to a single transformation.

Q. Define reflection ?

Ans –

It is a transformation which produces a mirror image of an object. The mirror image can be either about x-axis or y-axis. The object is rotated by180°.

Types of Reflection:

* Reflection about the x-axis
* Reflection about the y-axis
* Reflection about an axis perpendicular to xy plane and passing through the origin
* Reflection about line y=x

Q . Define Shear ?

Ans –

Shearing deals with changing the shape and size of the 2D object along x-axis and y-axis. It is similar to sliding the layers in one direction to change the shape of the 2D object.It is an ideal technique to change the shape of an existing object in a two dimensional plane. In a two dimensional plane, the object size can be changed along X direction as well as Y direction.

Q. Define window ?

Ans –

A window is a separate viewing area on a computer display screen in a system that allows multiple viewing areas as part of a graphical user interface ( GUI ). Windows are managed by a *windows manager* as part of a windowing system .

Q. Define viewport ?

Ans –

A viewport defines in normalized coordinates a rectangular area on the display device where the image of the data appears. You define a viewport with the GPORT command. You can have your graph take up the entire display device or show it in only a portion, say the upper right part.

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Q . What is Window to viewport coordinate transformation?

Ans –

Window to Viewport Transformation is the process of transforming 2D world-coordinate objects to device coordinates. Objects inside the world or clipping window are mapped to the viewport which is the area on the screen where world coordinates are mapped to be displayed.

***General Terms:***

* **World coordinate –** It is the Cartesian coordinate w.r.t which we define the diagram, like Xwmin, Xwmax, Ywmin, Ywmax
* **Device Coordinate –**It is the screen coordinate where the objects are to be displayed, like Xvmin, Xvmax, Yvmin, Yvmax
* **Window –**It is the area on world coordinate selected for display.
* **ViewPort –**It is the area on the device coordinate where graphics is to be displayed.

Q. Define clipping?

Ans –

When we have to display a large portion of the picture, then not only scaling & translation is necessary, the visible part of picture is also identified. This process is not easy. Certain parts of the image are inside, while others are partially inside. The lines or elements which are partially visible will be omitted.

For deciding the visible and invisible portion, a particular process called clipping is used. Clipping determines each element into the visible and invisible portion. Visible portion is selected. An invisible portion is discarded.

Q .What are the types of clipping?

Ans - Types of Clipping:

* Point Clipping
* Line Clipping
* Area Clipping (Polygon)
* Curve Clipping
* Text Clipping
* Exterior Clipping

Q . What is polygon clipping and its types ?

Ans A set of connected lines are considered as polygon; polygons are clipped based on the window and the portion which is inside the window is kept as it is and the outside portions are clipped. The polygon clipping is required to deal different cases. Usually it clips the four edges in the boundary of the clip rectangle. The clip boundary determines the visible and invisible regions of polygon clipping and it is categorized as four.

• Visible region is wholly inside the clip window – saves endpoint

• Visible exits the clip window – Save the interaction

• Visible region is wholly outside the clip window – nothing to save

• Visible enters the clip window – save endpoint and intersection Q.

Q . What is purpose of presentation graphics ?

Ans –

Q. define affline transformation?

Ans –

An **affine transformation** is a type of geometric transformation which preserves collinearity (if a collection of points sits on a line before the transformation, they all sit on a line afterwards) and the ratios of distances between points on a line. Types of affine transformations include translation (moving a figure), scaling (increasing or decreasing the size of a figure), and rotation (turning a figure about a point).

Q . What is covering or exterior clipping?

Ans –

The picture parts to be saved are those that are outside the region is referred as exterior clipping. Exterior clipping is used in many applications that require overlapping pictures.

Uses of Exterior Clipping:

It is used for displaying properly the pictures which overlap each other.

It is used in the concept of overlapping windows.

It is used for designing various patterns of pictures.

It is used for advertising purposes.

It is suitable for publishing.

For designing and displaying of the number of maps and charts, it is also used.