Subject: Computer graphics
Topic : Reflection example problems
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PRACTICE PROBLEMS BASED ON 2D REFLECTION

## Reflection

- Reflection is a kind of rotation where the angle of rotation is 180 degree.
- The reflected object is always formed on the other side of mirror.
- The size of reflected object is same as the size of original object.


## Reflection On X-Axis:

This reflection is achieved by using the following reflection equations-

- $X_{\text {new }}=X_{\text {old }}$
- $Y_{\text {new }}=-Y_{\text {old }}$


## Reflection On Y-Axis:

- This reflection is achieved by using the following reflection equations-
- $X_{\text {new }}=-X_{\text {old }}$
- $Y_{\text {new }}=Y_{\text {old }}$


## Problem-01:

- Given a triangle with coordinate points $A(3,4)$, $B(6,4), C(5,6)$. Apply the reflection on the $X$ axis and obtain the new coordinates of the object.


## Solution-

## For Coordinates A(3, 4)

Applying the reflection equations, we have-
$X_{\text {new }}=X_{\text {old }}=3$
$Y_{\text {new }}=-Y_{\text {old }}=-4$

New coordinates of $A$ after reflection $=(3,-4)$.

## For Coordinates B(6, 4)

Applying the reflection equations, we have-
$X_{\text {new }}=X_{\text {old }}=6$
$Y_{\text {new }}=-Y_{\text {old }}=-4$

New coordinates of $B$ after reflection $=(6,-4)$.

## For Coordinates C(5, 6)

Applying the reflection equations, we have-
$X_{\text {new }}=X_{\text {old }}=5$
$Y_{\text {new }}=-Y_{\text {old }}=-6$

New coordinates of $C$ after reflection $=(5,-6)$.

New coordinates of the triangle after reflection =

$$
A(3,-4), B(6,-4), C(5,-6) .
$$



## Problem :2

- Given a triangle with coordinate points $A(3,4)$, $B(6,4), C(5,6)$. Apply the reflection on the $Y$ axis and obtain the new coordinates of the object.


## Given-

- Old corner coordinates of the triangle =

$$
A(3,4), B(6,4), C(5,6)
$$

- Reflection has to be taken on the $Y$ axis


## For Coordinates A(3, 4)

Let the new coordinates of corner A after reflection $=$ ( $X_{\text {new }}, Y_{\text {new }}$ ).

Applying the reflection equations, we have-
$X_{\text {new }}=-X_{\text {old }}=-3$
$Y_{\text {new }}=Y_{\text {old }}=4$

New coordinates of corner A after reflection $=(-3,4)$.

## For Coordinates B(6, 4)

Applying the reflection equations, we have-
$X_{\text {new }}=-X_{\text {old }}=-6$
$Y_{\text {new }}=Y_{\text {old }}=4$

New coordinates of corner B after reflection $=(-6,4)$.

## For Coordinates C(5, 6)

Applying the reflection equations, we have-
$X_{\text {new }}=-X_{\text {old }}=-5$
$Y_{\text {new }}=Y_{\text {old }}=6$

New coordinates of corner C after reflection $=(-5,6)$.


