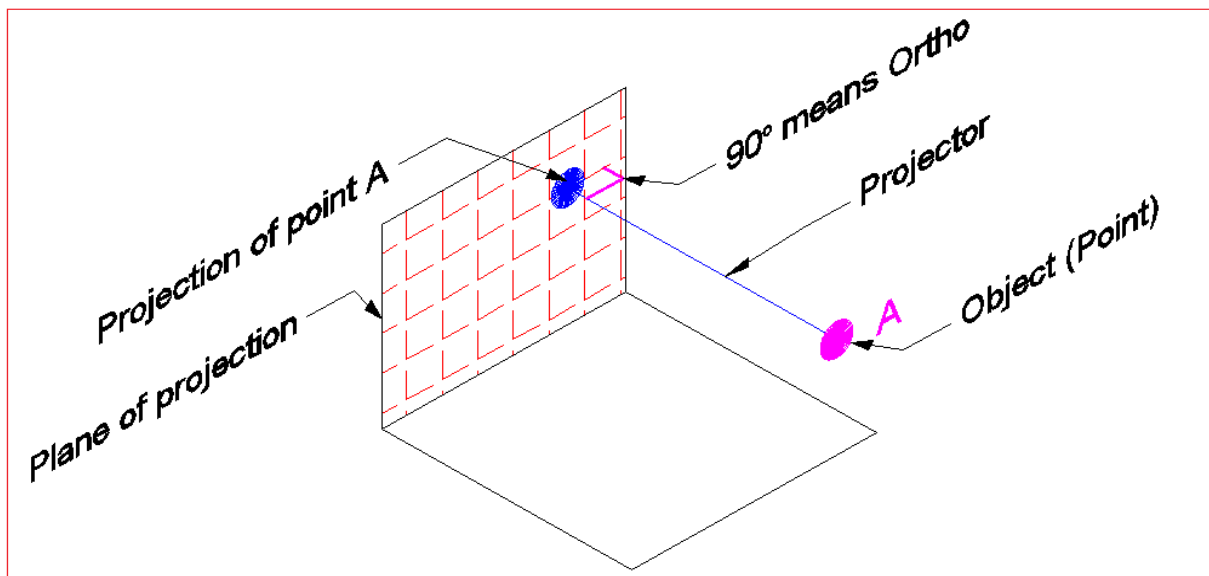


Introduction to Orthographic Projection

Introduction

To design and develop machines and structures mainly involvement of engineers will be there. Engineers also direct the construction of the machines and structures.

It is difficult to represent any 3D object exactly on a sheet of paper by using a single view. Hence a set of views from different positions are prepared to define the object completely. Though different methods of projection are available to obtain the views of the objects, orthographic projection is used for most of the engineering works since it is possible to describe the exact shape of any material object by using orthographic views.



Note:

1. A straight line drawn from a point A to the surface is called a **Projector** and the surface is called the **plane of projection**.
2. If the projector is perpendicular to the plane of projection, then such a projection is called an **Orthographic Projection**.

Object:

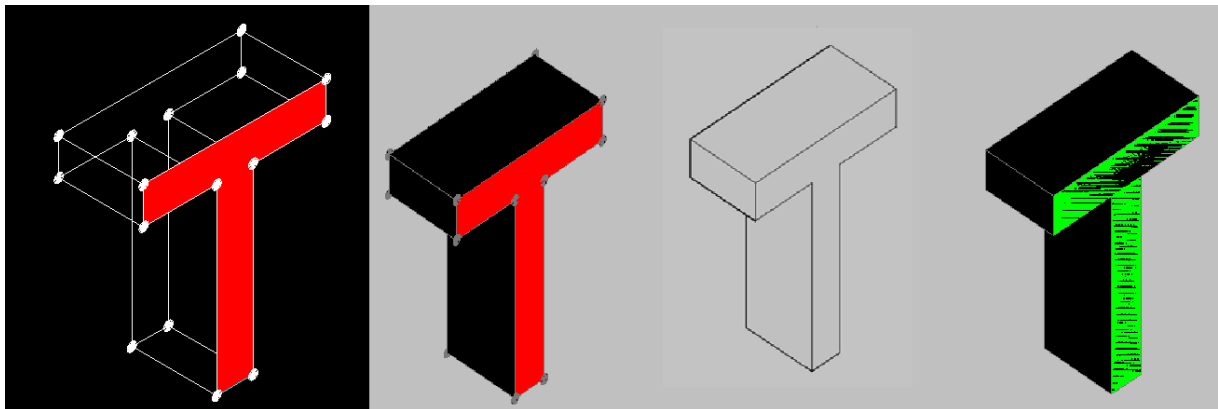
Object may be any one of the type below.

1. **Combination of solids**
2. **Solids**
3. **Planes**

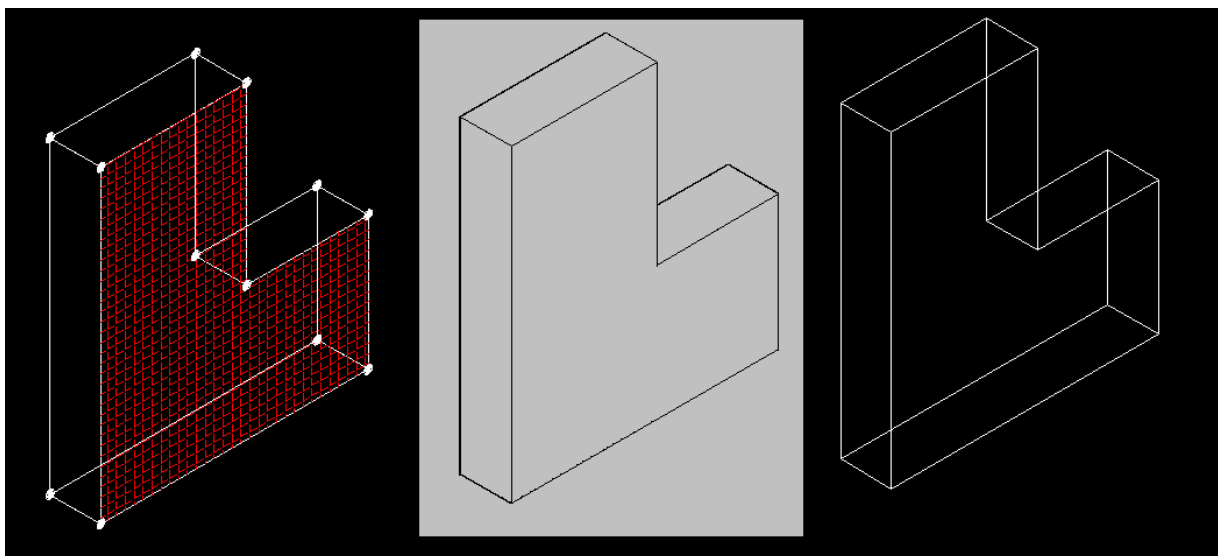
4. Lines

1. **Combination of solids** – means combining different solids.

E.g.1: Solids are- Prisms, types of prisms, Pyramids, types of Pyramids, Cube, Cone, Cylinder and Tetrahedron.

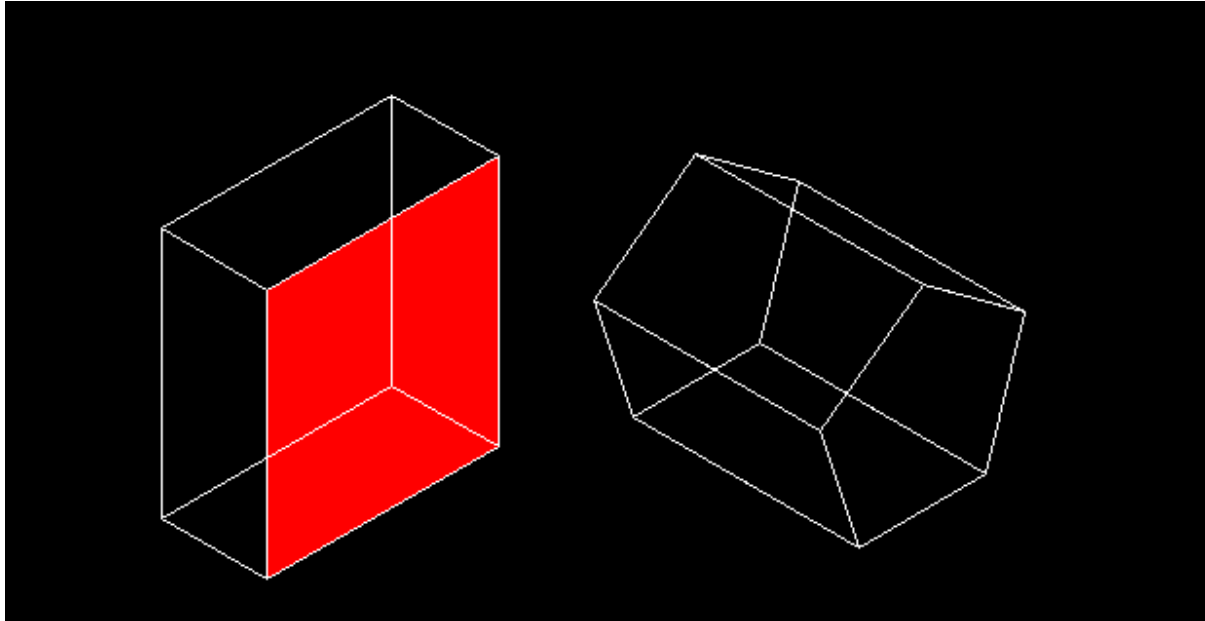


E.g.2:



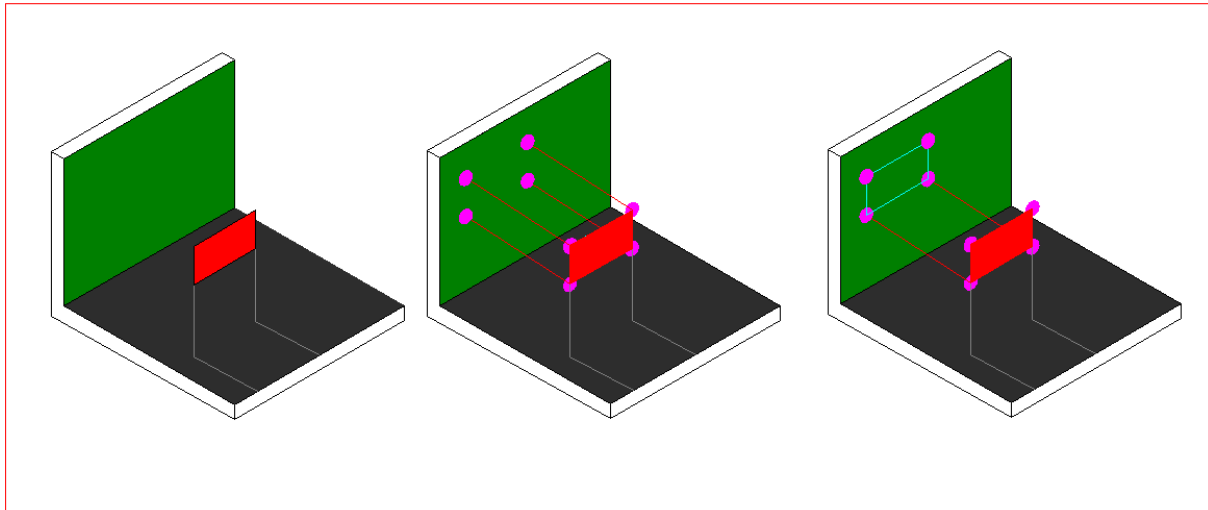
1. Solids – Combination of planes

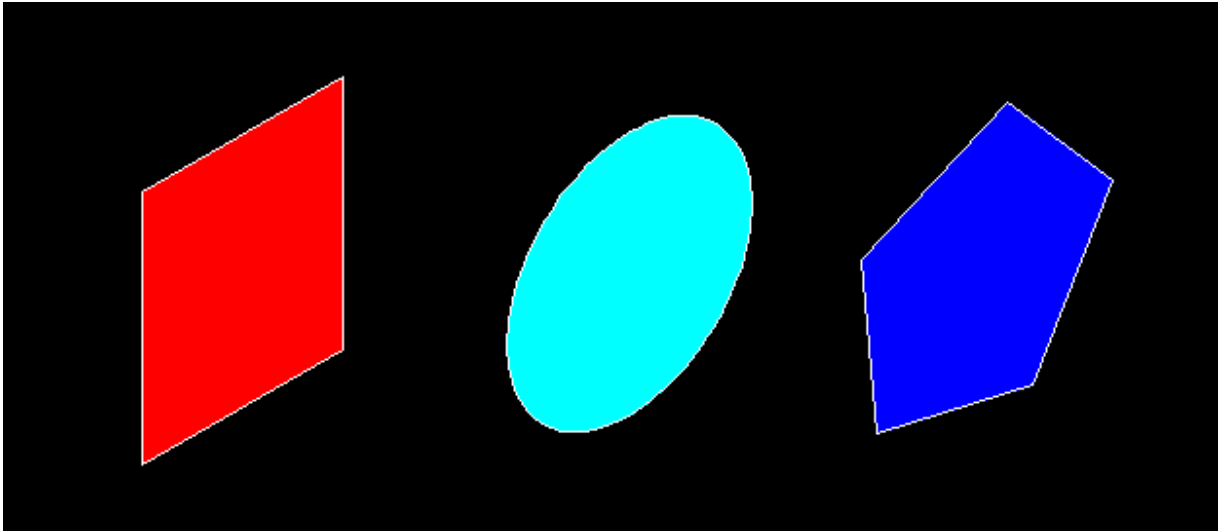
e.g.: Planes are Triangular, Square, Rectangular, Pentagon, Hexagon, circular and Rhombus Planes.



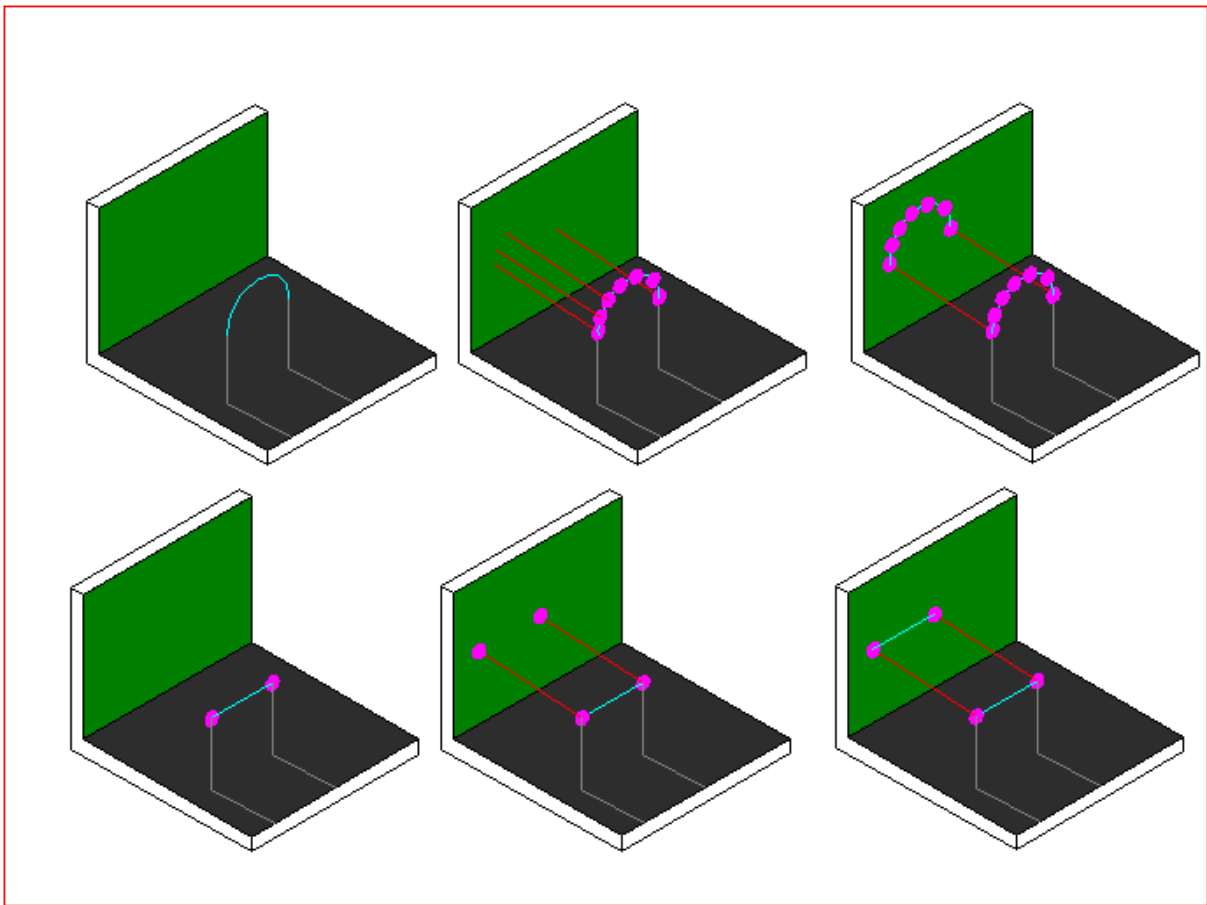
2. Planes – Combining of lines(except for a circle)

e.g.:





3. Lines – Combining of points



Quadrant System:

The picture planes used for obtaining the orthographic projections are called the Principal planes of projection or reference planes or co- ordinate planes of projection.

VP:

The plane in front of observer is the vertical plane. (VP) or it is also called a Frontal plane.

Front View (FV): The projection on the VP is called the **Front View (FV)** or Vertical Projection or front elevation or Elevation.

HP:

The plane which is Horizontal and perpendicular to VP is Horizontal Plane.

Top View (TV): The projection on the HP is called the **Top View (TV)** or Horizontal Projection or Plan.

Note: The planes HP and VP are called **Principal Planes**.

Reference Line

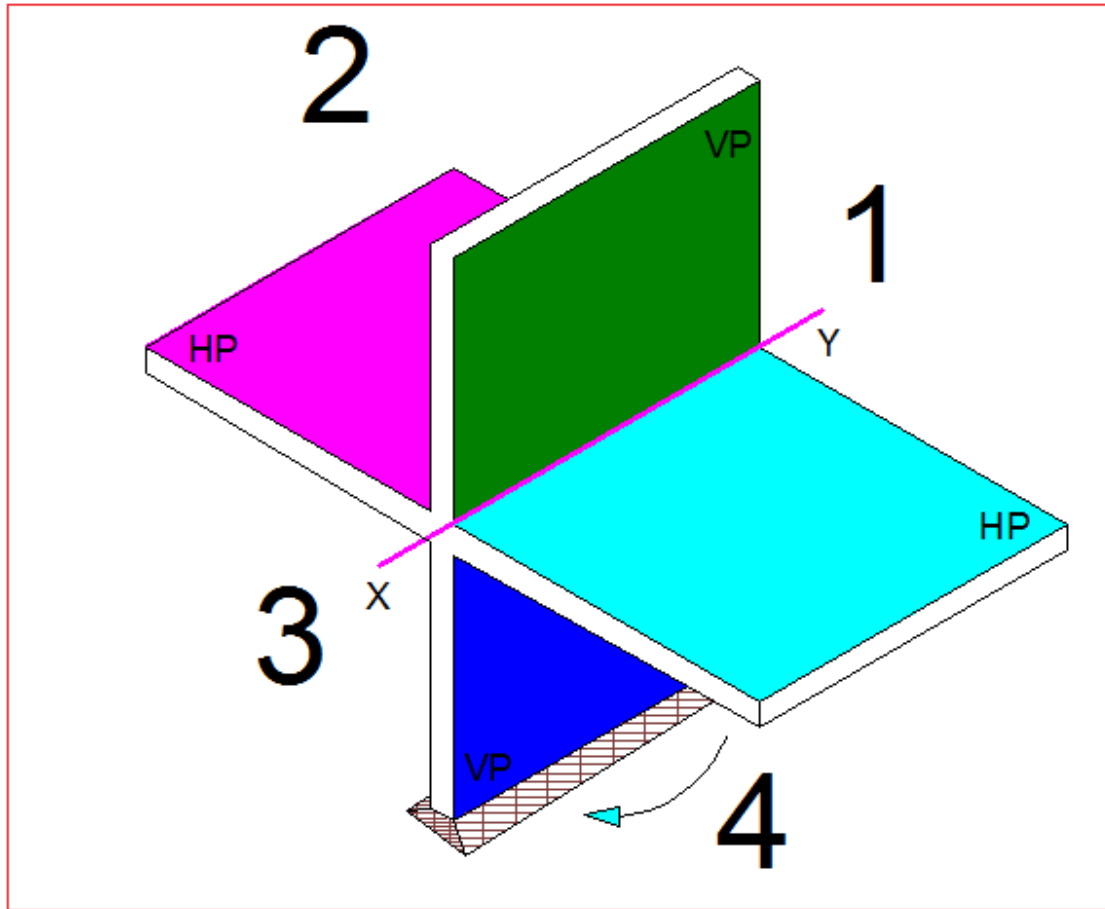
The line of intersection of HP and VP is called reference line, which is denoted by X-Y.

Auxiliary Plane (A.P)

The plane inclined at any angle to the principal planes is called Auxiliary plane.

Profile Plane

The plane perpendicular to the principal planes is called Profile plane.



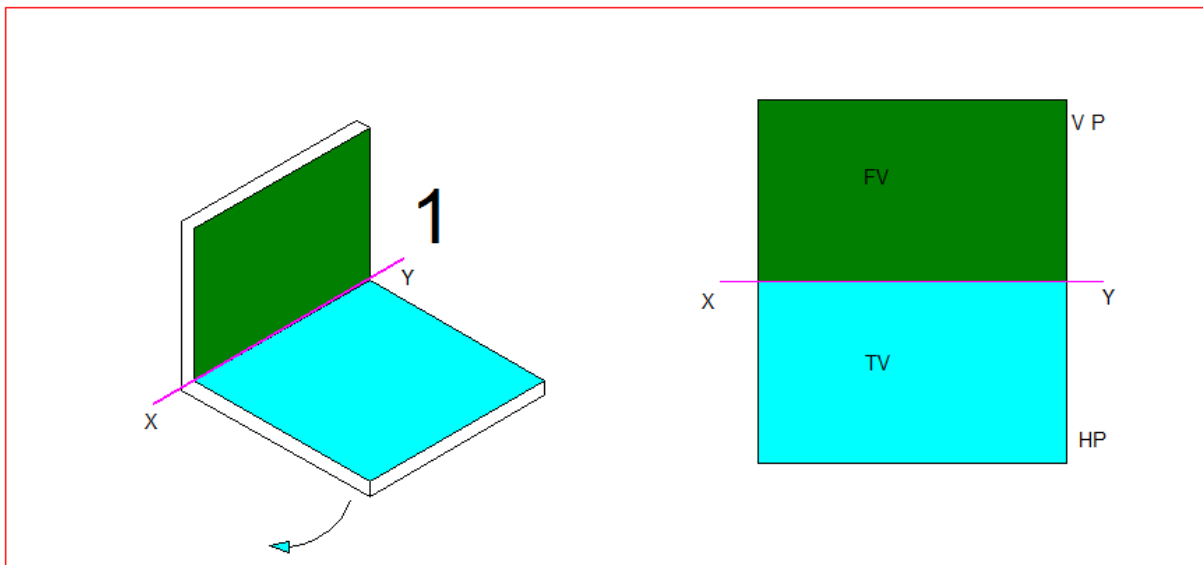
First quadrant --- Above HP and in front of VP

Second quadrant --- Above HP and behind VP

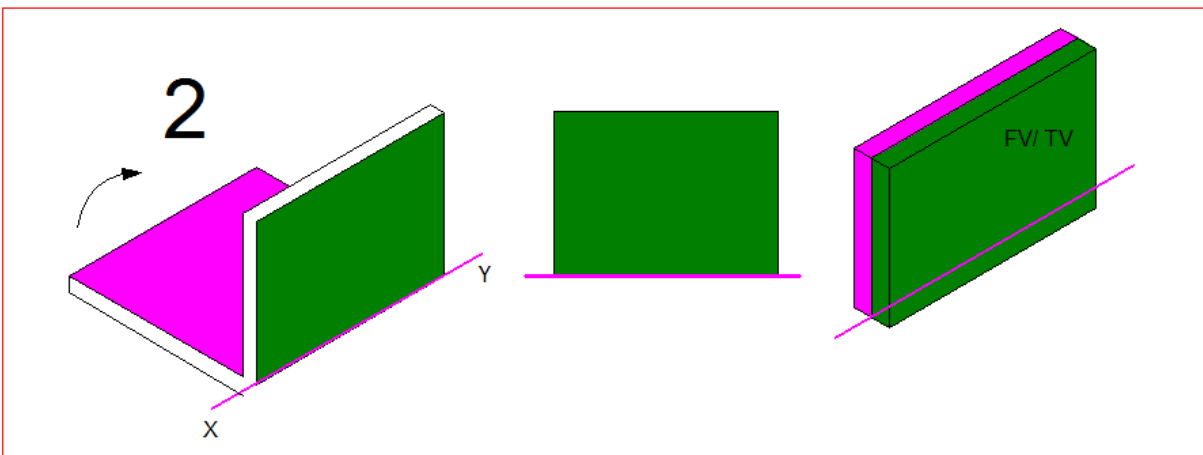
Third quadrant --- Below HP and behind VP

Fourth quadrant --- Below HP and in front of VP

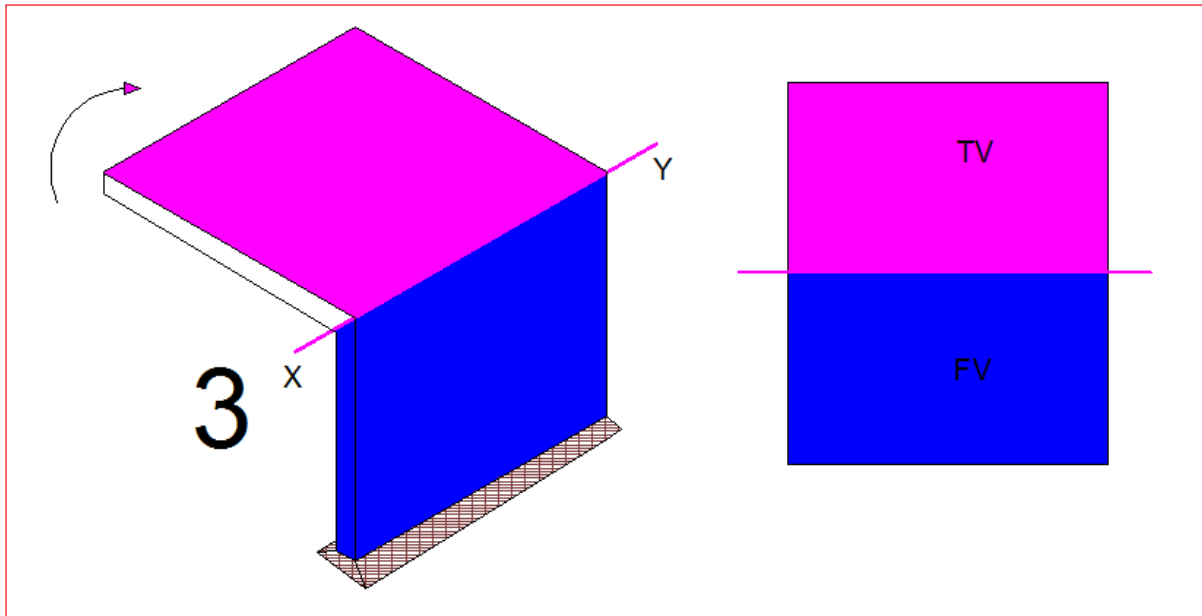
1ST QUADRANT:



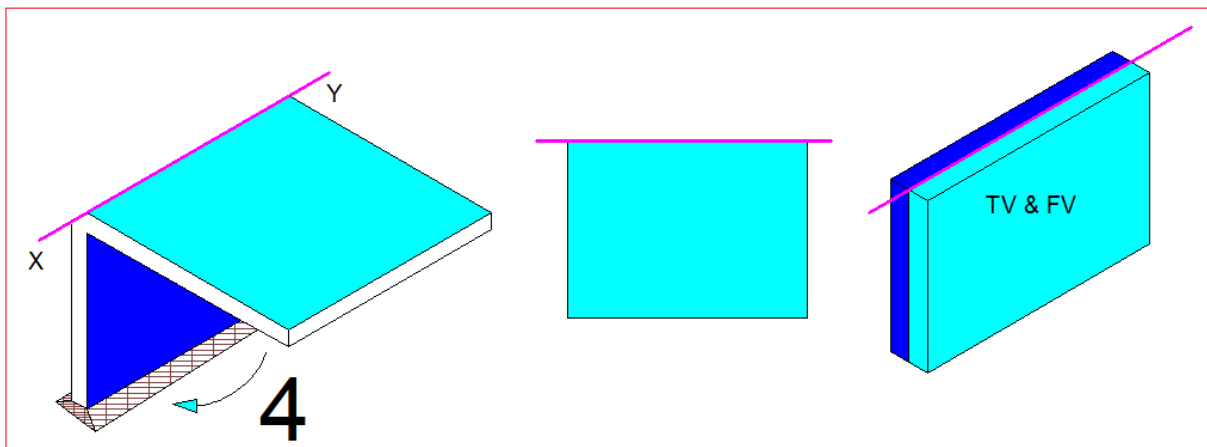
2ND QUADRANT:



3rd QUADRANT:



4th QUADRANT:

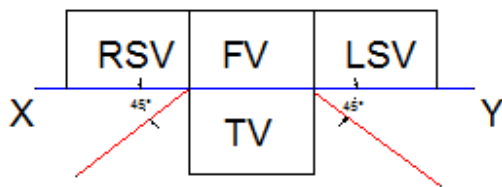


Note:

1. From all the four Quadrants – FV is on VP and TV is on HP.

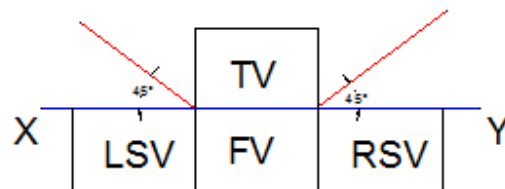
First - angle projection

- Object is placed in the first Quadrant
- If not mention the method, by default follow this method
- Symbol



Third - angle projection

- Object is placed in the third Quadrant
- This projection method is mentioned in the Problem
- Symbol



Note: The Side views are always beside Front view only.



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