

ENGINEERING GRAPHICS

UNIT- 2

Topic: **Projection of Points**

ORTHOGRAPHIC PROJECTIONS:

IT IS A TECHNICAL DRAWING IN WHICH DIFFERENT VIEWS OF AN OBJECT ARE
PROJECTED ON DIFFERENT REFERENCE PLANES
OBSERVING PERPENDICULAR TO RESPECTIVE REFERENCE PLANE

Different Reference planes are

**Horizontal Plane (HP),
Vertical Frontal Plane (VP)
Side Or Profile Plane (PP)**

And

Different Views are Front View (FV), Top View (TV) and Side View (SV)

FV is a view projected on VP

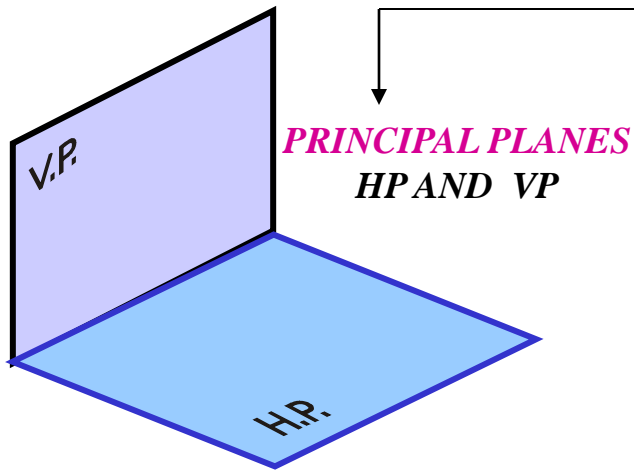
TV is a view projected on HP

SV is a view projected on PP

IMPORTANT TERMS OF ORTHOGRAPHIC PROJECTIONS:

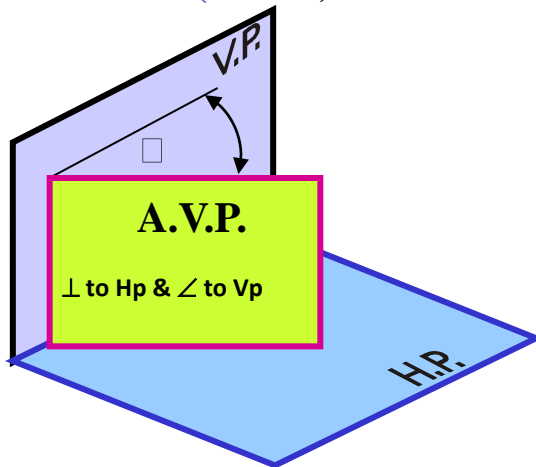
- 1** Planes.
- 2** Pattern of planes & Pattern of views
- 3** Methods of drawing Orthographic Projections

PLANES

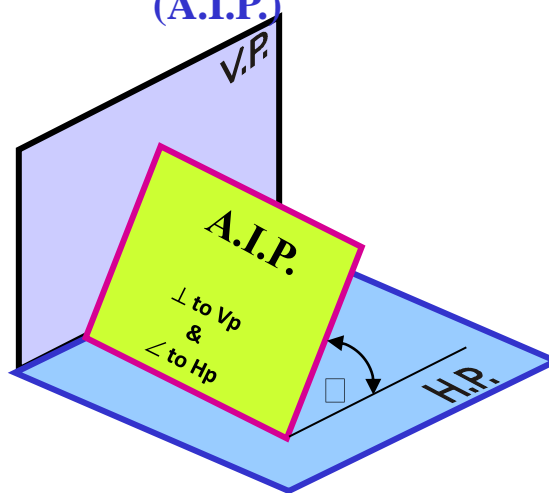


AUXILIARY PLANES

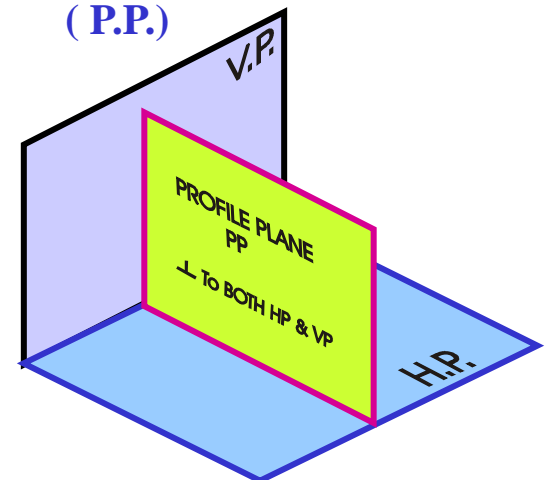
Auxiliary Vertical Plane (A.V.P.)



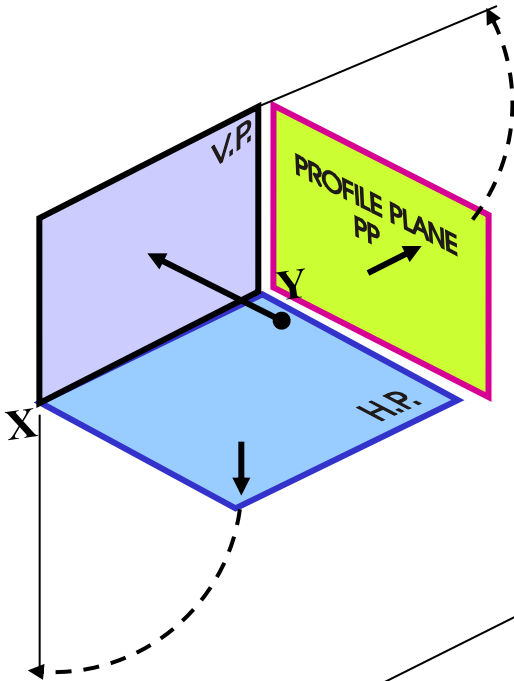
Auxiliary Inclined Plane (A.I.P.)



Profile Plane (P.P.)



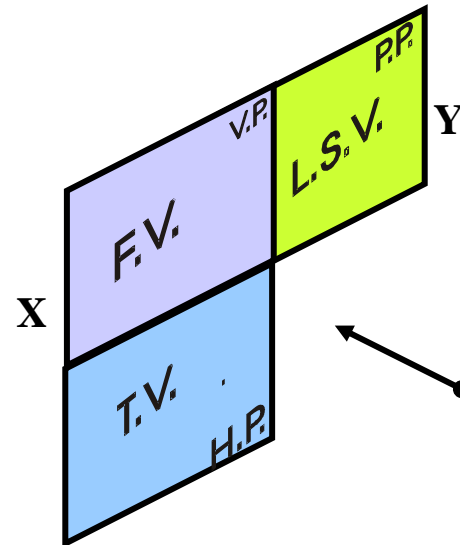
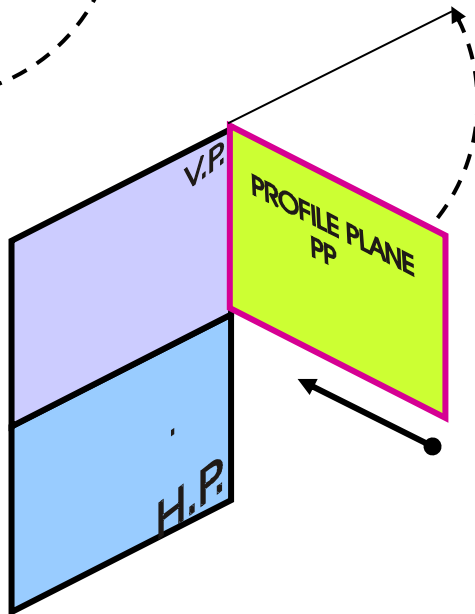
PATTERN OF PLANES & VIEWS (First Angle Method)



THIS IS A PICTORIAL SET-UP OF ALL THREE PLANES. ARROW DIRECTION IS A NORMAL WAY OF OBSERVING THE OBJECT. BUT IN THIS DIRECTION ONLY VP AND A VIEW ON IT (FV) CAN BE SEEN. THE OTHER PLANES AND VIEWS ON THOSE CAN NOT BE SEEN.

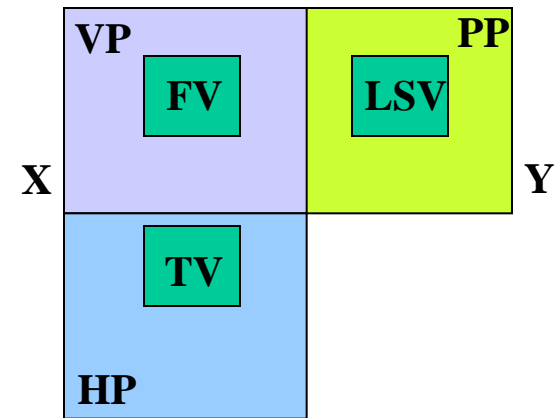
PROCEDURE TO SOLVE ABOVE PROBLEM:-

TO MAKE THOSE PLANES ALSO VISIBLE FROM THE ARROW DIRECTION,
 A) HP IS ROTATED 90° DOWNWARD
 B) PP, 90° IN RIGHT SIDE DIRECTION.
 THIS WAY BOTH PLANES ARE BROUGHT IN THE SAME PLANE CONTAINING VP.



HP IS ROTATED DOWNWARD 90°
AND
BROUGHT IN THE PLANE OF VP.

PP IS ROTATED IN RIGHT SIDE 90°
AND
BROUGHT IN THE PLANE OF VP.



ACTUAL PATTERN OF PLANES & VIEWS
OF ORTHOGRAPHIC PROJECTIONS
DRAWN IN
FIRST ANGLE METHOD OF PROJECTIONS

Projection of Points

- A “Point” may be situated, in space, in any one of the “four quadrants” formed by the “two reference/ principal planes” or a point may lie in any one or both of them,
- The projections of a “Point” are obtained by extending projectors perpendicular to the reference/ principal planes,
- One of the reference/ principal planes is then rotated so that the first and third quadrants are opened out,
- The projections of point are shown on a flat surface in their respective positions either above or below or in xy line.

Projection of Points

The position of a **point** in engineering drawing is defined with respect to its distance from the three principle planes i.e., with respect to the VP, HP, & PP.

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

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

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

PROJECTIONS OF POINTS

TO DRAW PROJECTIONS OF ANY OBJECT (Eg. POINT), ONE MUST HAVE FOLLOWING INFORMATION

- A) **OBJECT (POINT)**
{ WITH IT'S DESCRIPTION, WELL DEFINED }
- B) **OBSERVER**
{ ALWAYS OBSERVING PERPENDICULAR TO RESP. REF. PLANE }
- C) **LOCATION OF OBJECT**
{ MEANS IT'S POSITION WITH REFERENCE TO H.P. & V.P. }

TERMS '**ABOVE**' & '**BELOW**' WITH RESPECTIVE TO H.P.
AND TERMS '**INFRONT**' & '**BEHIND**' WITH RESPECTIVE TO V.P
FORM 4 QUADRANTS.

OBJECTS CAN BE PLACED IN ANY ONE OF THESE 4 QUADRANTS.

IT IS INTERESTING TO LEARN THE EFFECT ON THE POSITIONS OF VIEWS (FV, TV)
OF THE OBJECT WITH RESP. TO X-Y LINE, WHEN PLACED IN DIFFERENT QUADRANTS.

TO MAKE IT EASY, HERE A POINT **A** IS TAKEN AS AN OBJECT. BECAUSE IT'S ALL VIEWS ARE JUST POINTS.

Types of Views

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

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

Side View: The projection on the side from the object is called the side views.

Side views is classified in to

1.Left side view and (LSV)

2. Right side view(RSV)

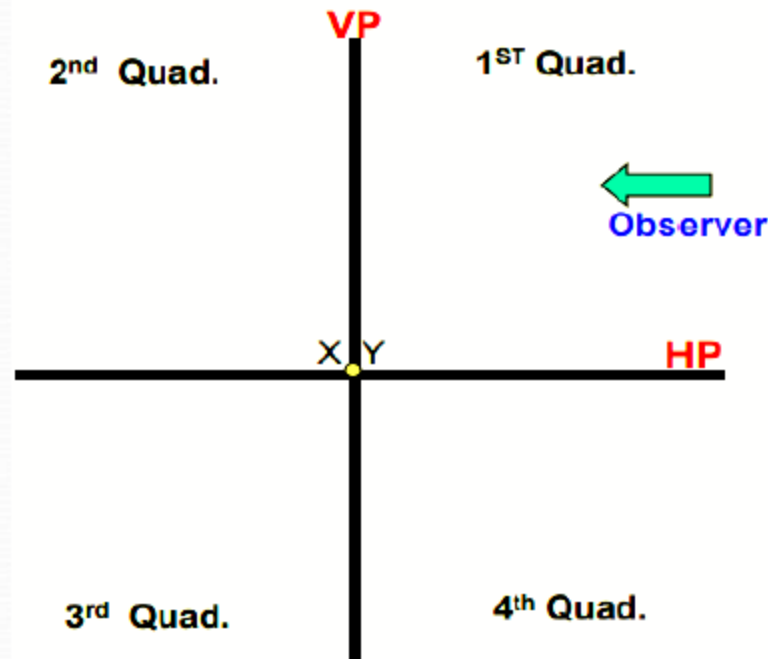
Positions of Points

First quadrant -- Above HP & in front of VP

Second quadrant -- Above HP & behind VP

Third quadrant -- Below HP & behind VP

Fourth quadrant -- Below HP & in front of VP

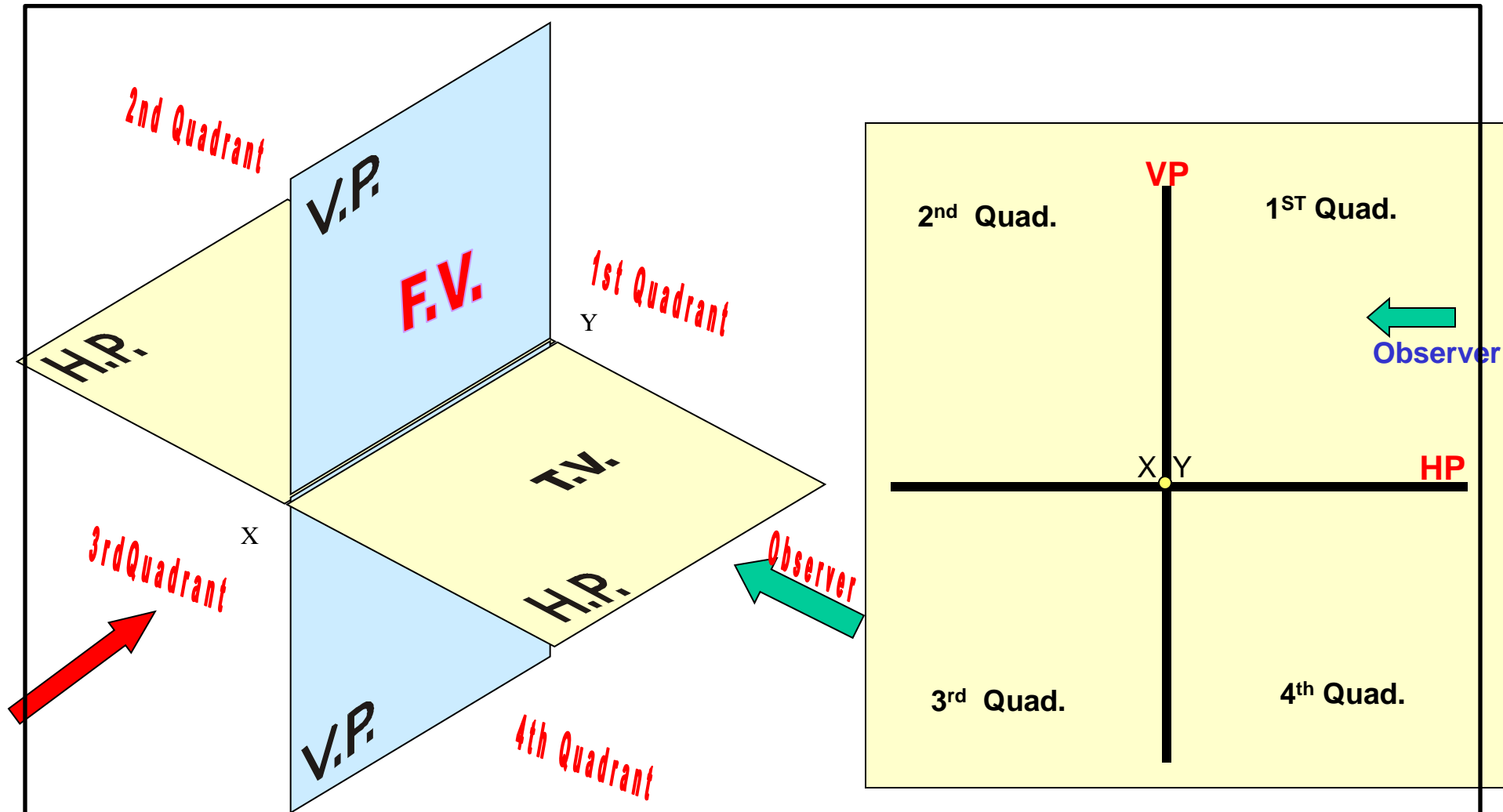


NOTATIONS

FOLLOWING NOTATIONS SHOULD BE FOLLOWED WHILE NAMEING DIFFERENT VIEWS IN ORTHOGRAPHIC PROJECTIONS.

OBJECT	POINT A	LINE AB
IT'S TOP VIEW	a	a b
IT'S FRONT VIEW	a'	a' b'
IT'S SIDE VIEW	a''	a'' b''

***SAME SYSTEM OF NOTATIONS SHOULD BE FOLLOWED
INCASE NUMBERS, LIKE 1, 2, 3 – ARE USED.***



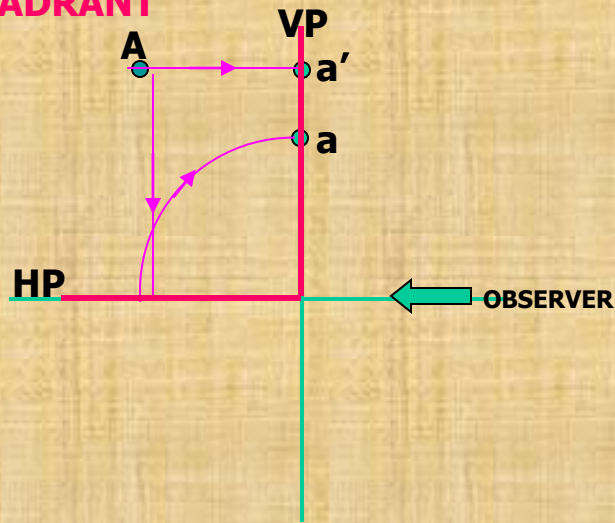
THIS QUADRANT PATTERN,
IF OBSERVED ALONG X-Y LINE (IN **RED** ARROW DIRECTION)
WILL EXACTLY APPEAR AS SHOWN ON RIGHT SIDE AND HENCE,
IT IS FURTHER USED TO UNDERSTAND ILLUSTRATION PROPERLLY.

Point A is Placed In different quadrants and it's Fv & Tv are brought in same plane for Observer to see clearly.

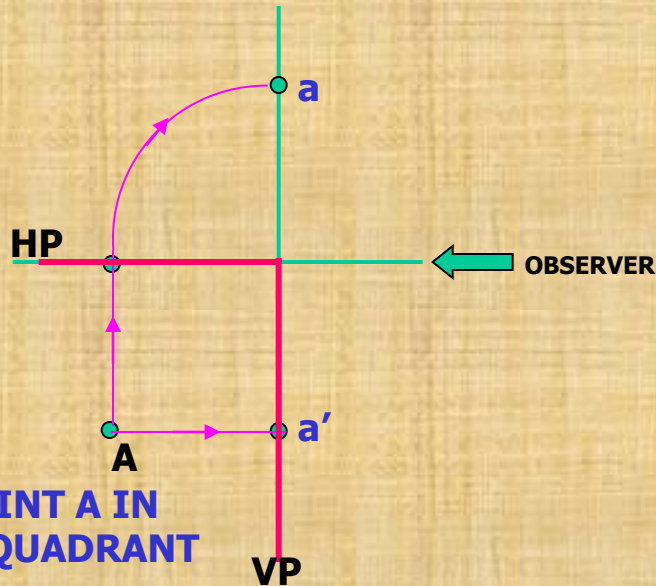
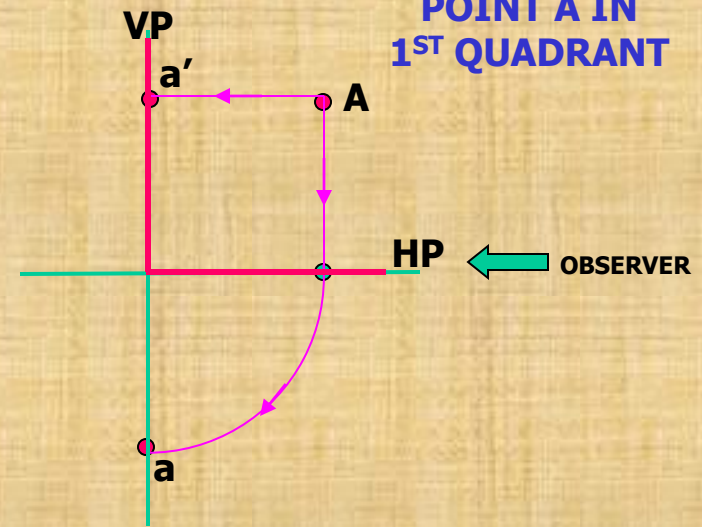
Fv is visible as it is a view on VP. But as Tv is is a view on Hp, it is rotated downward 90° , In clockwise direction. The In front part of Hp comes below xy line and the part behind Vp comes above.

Observe and note the process.

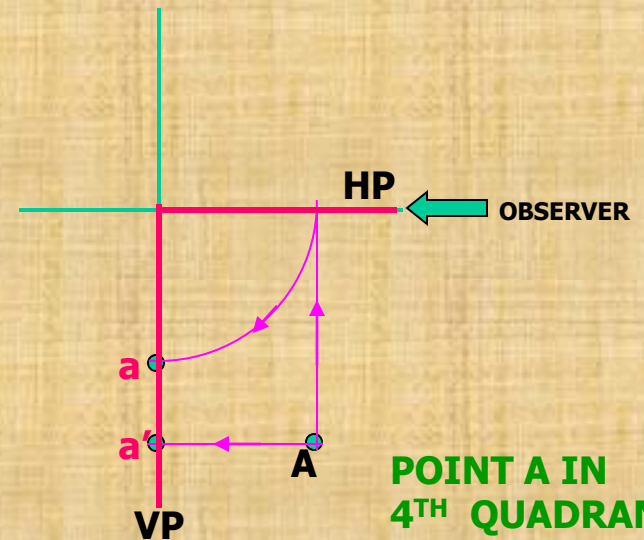
POINT A IN 2ND QUADRANT



POINT A IN 1ST QUADRANT



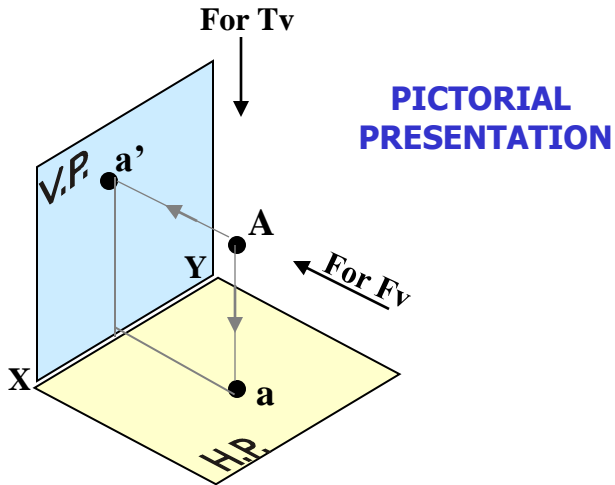
POINT A IN 3RD QUADRANT



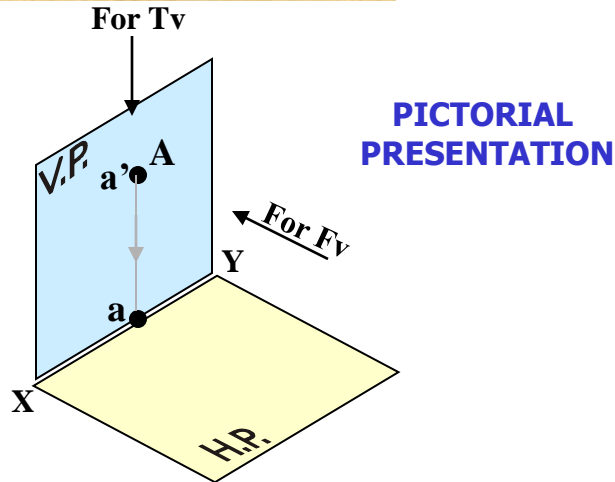
POINT A IN 4TH QUADRANT

PROJECTIONS OF A POINT IN FIRST QUADRANT.

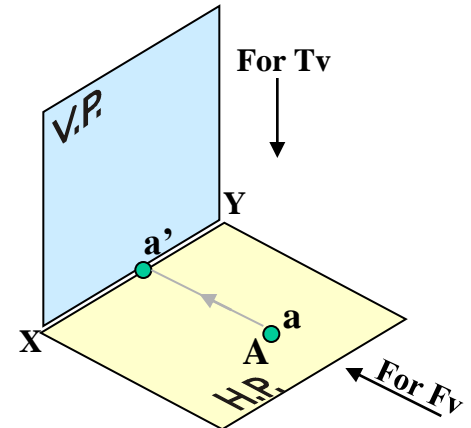
POINT **A** ABOVE HP
& IN FRONT OF VP



POINT **A** ABOVE HP
& IN VP

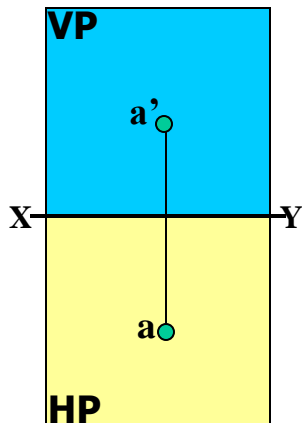


POINT **A** IN HP
& IN FRONT OF VP

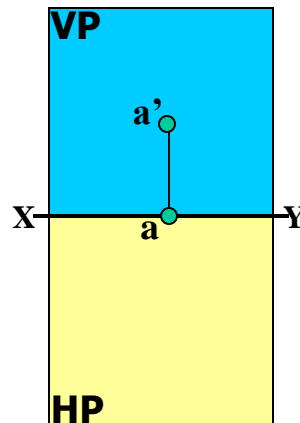


ORTHOGRAPHIC PRESENTATIONS
OF ALL ABOVE CASES.

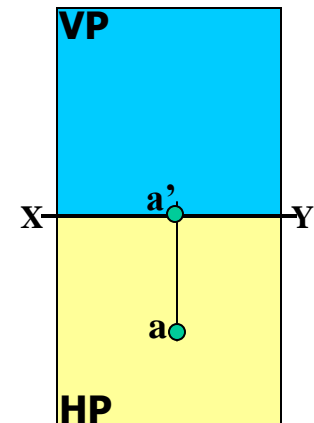
*Fv above xy,
Tv below xy.*



*Fv above xy,
Tv on xy.*

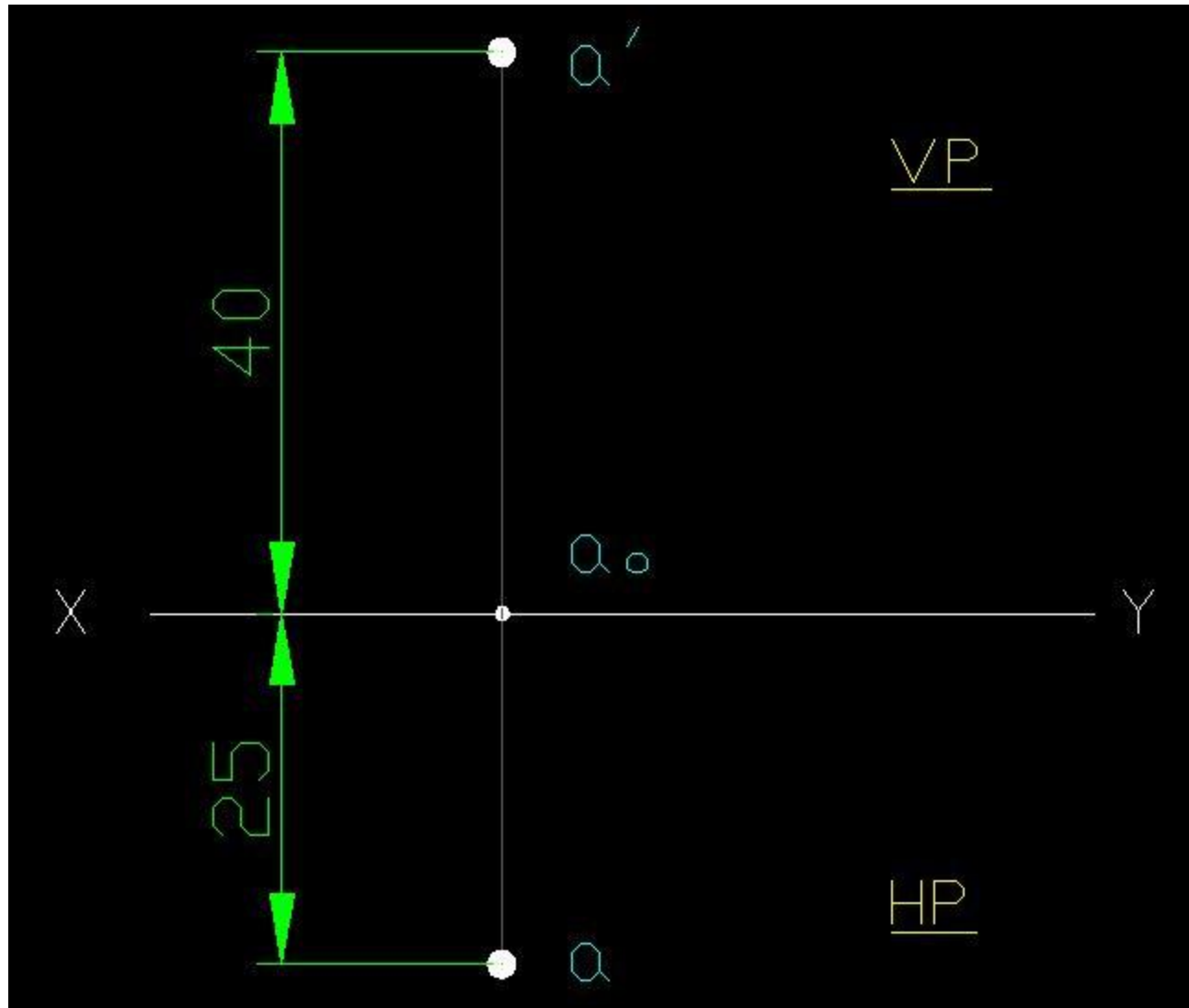


*Fv on xy,
Tv below xy.*



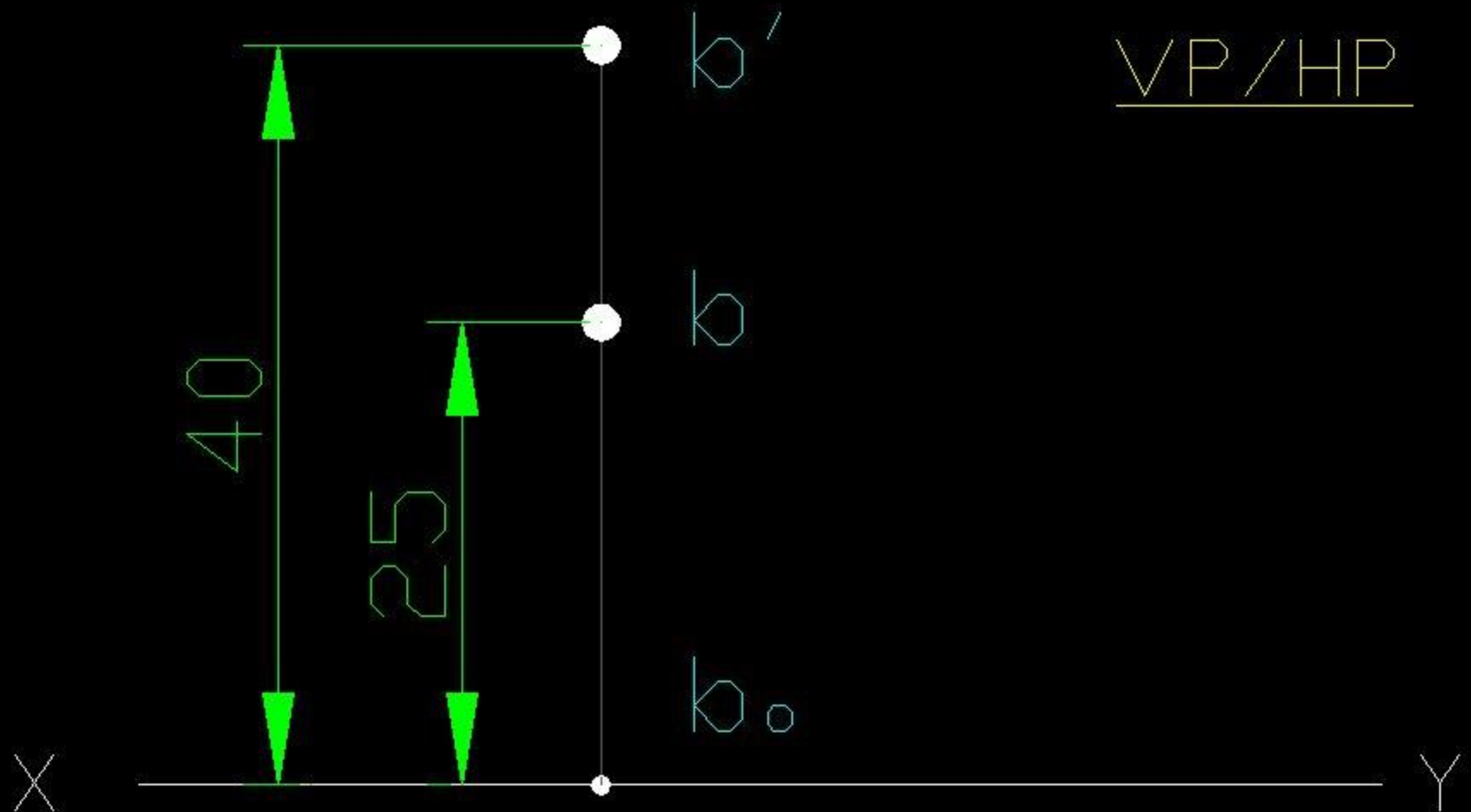
CASE 1: Point A is 40 mm above HP & 25 mm in front of VP. Draw Projections.

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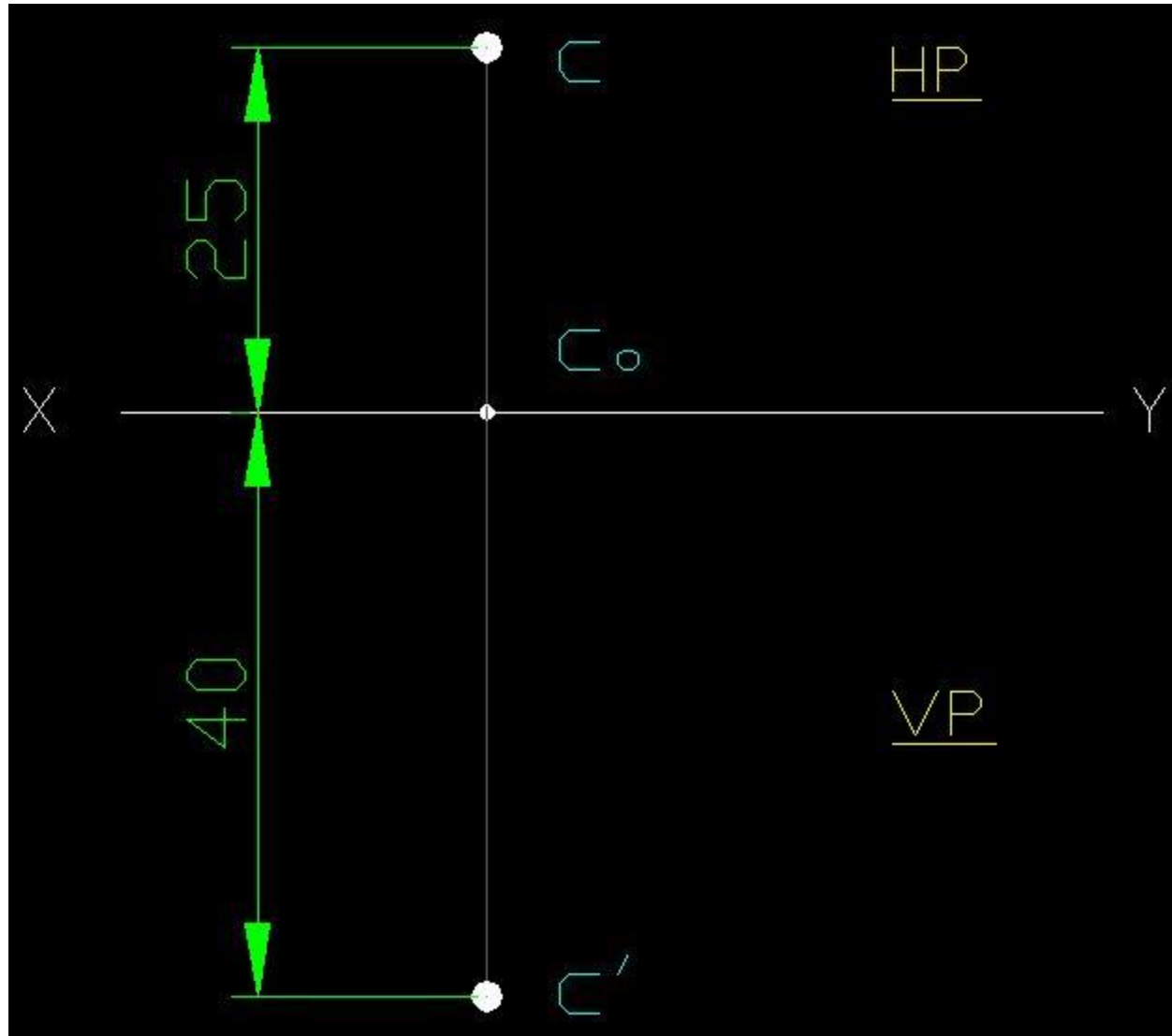
CASE 2: Point B is 40 mm above HP & 25 mm behind VP. Draw Projections.

CASE 2: Point B is 40 mm above HP & 25 mm behind VP. Draw Projections.



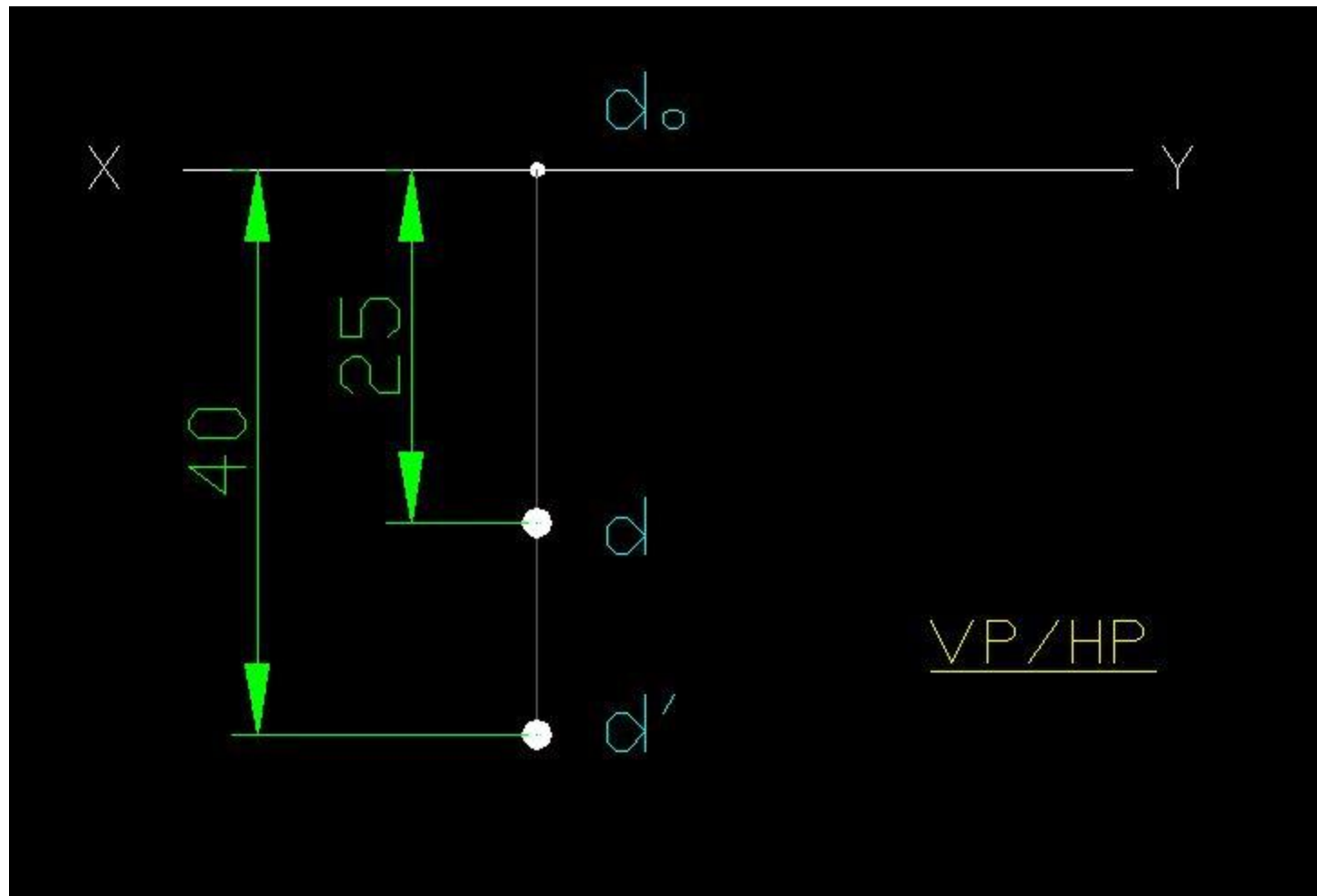
CASE 3: Point C is 40 mm below HP & 25 mm behind VP. Draw Projections.

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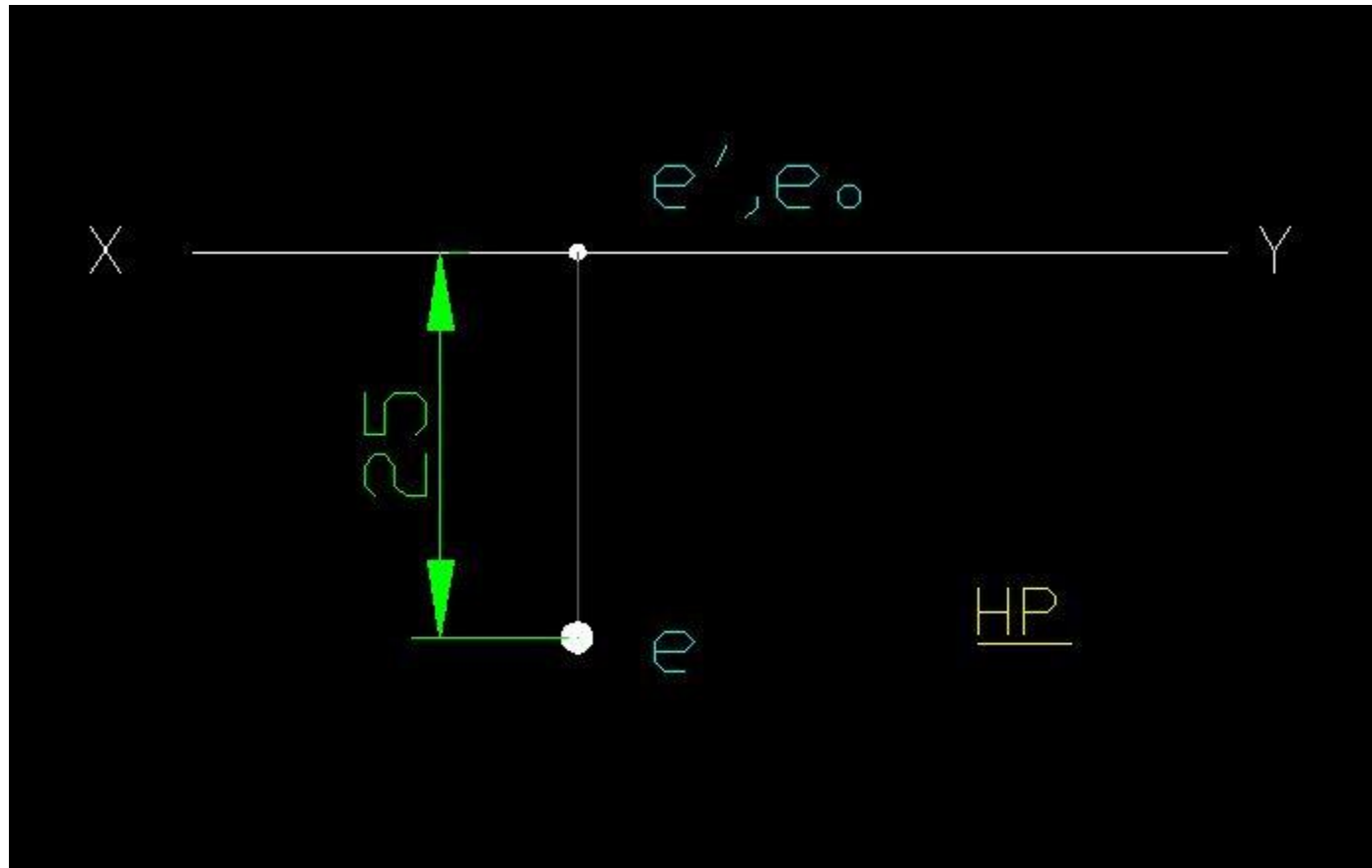
CASE 4: Point D is 40 mm below HP & 25 mm in front of VP. Draw Projections.

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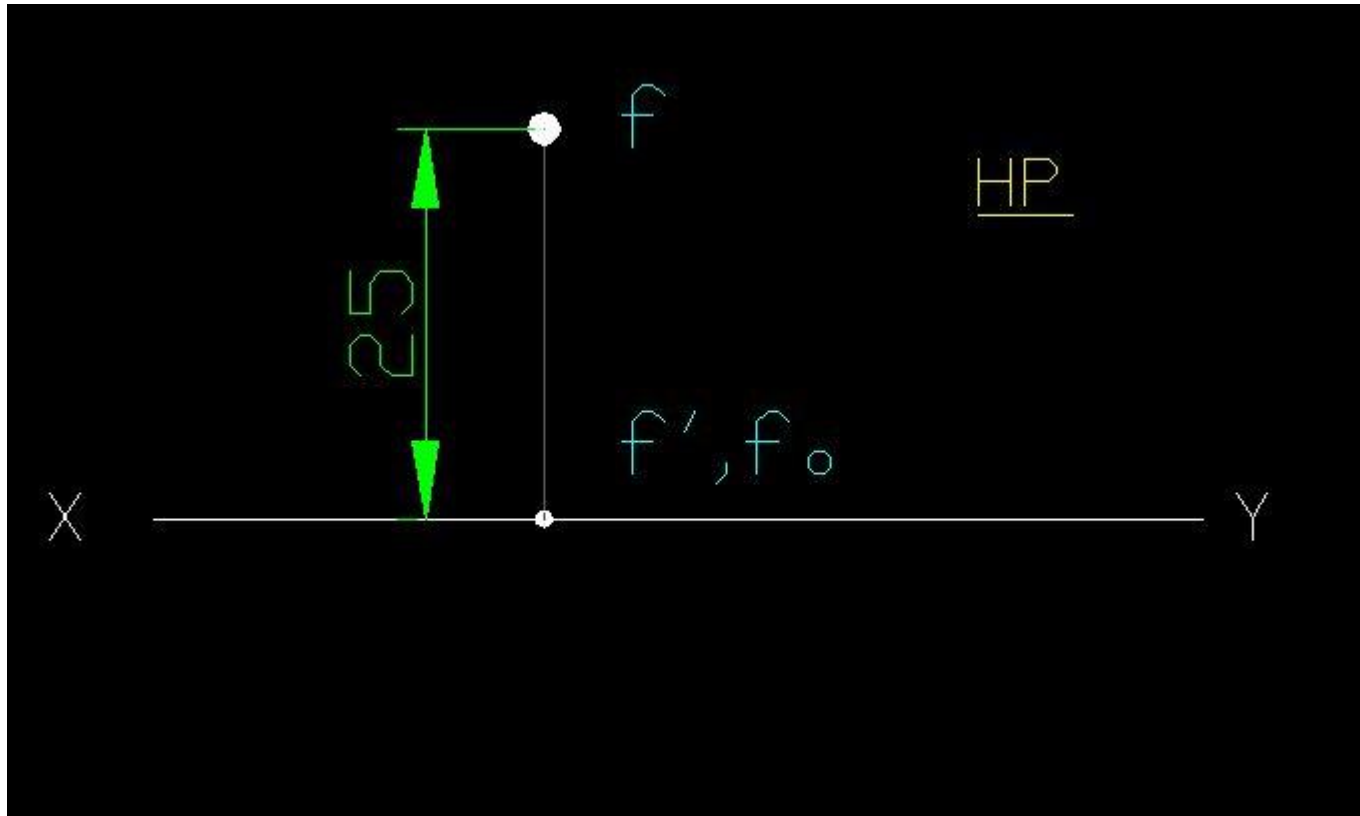
CASE 5: Point E is in HP & 25 mm in front of VP. Draw Projections.

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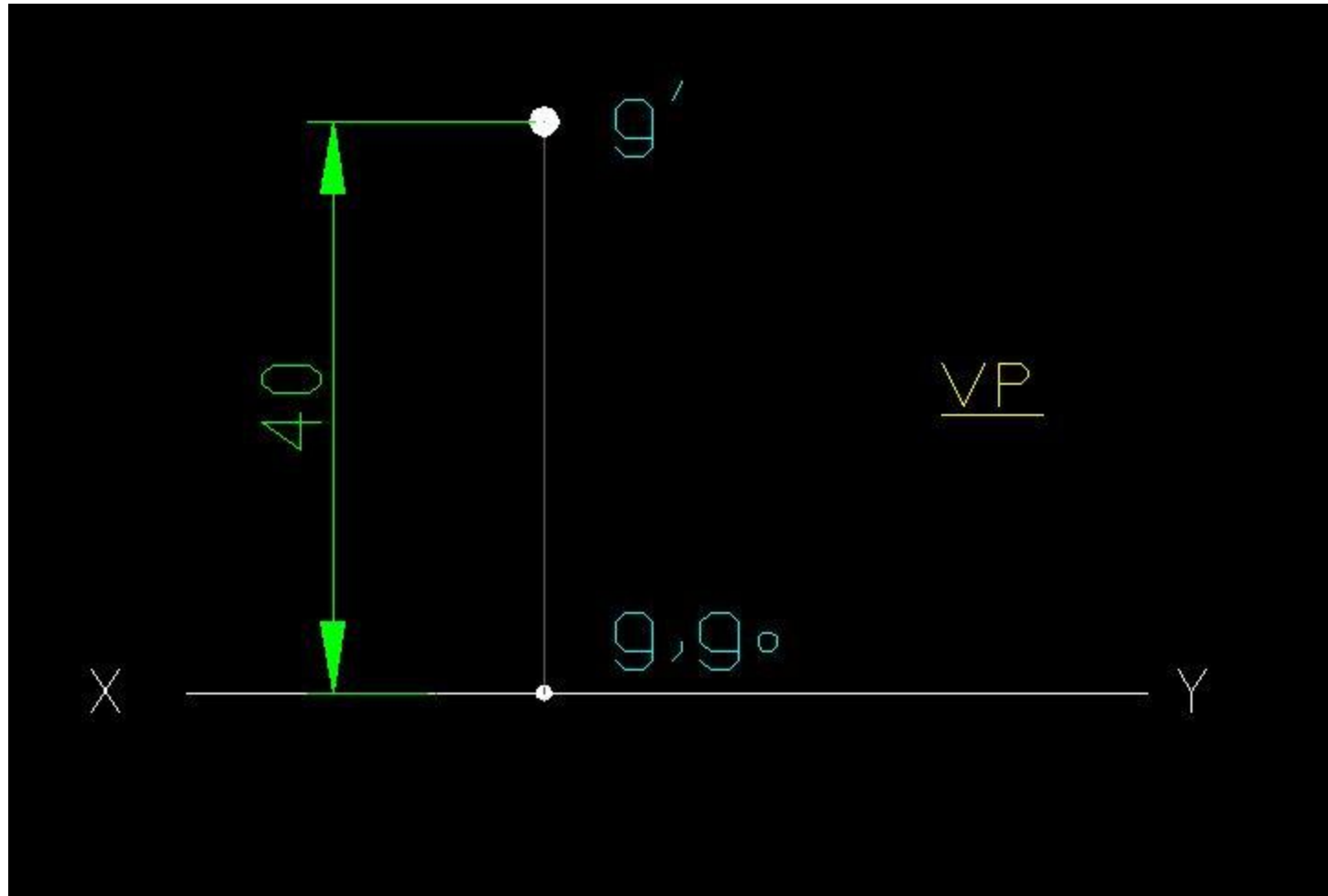
CASE 6: Point F is in HP & 25 mm behind VP. Draw Projections.

CASE 6: Point F is in HP & 25 mm behind VP. Draw Projections.



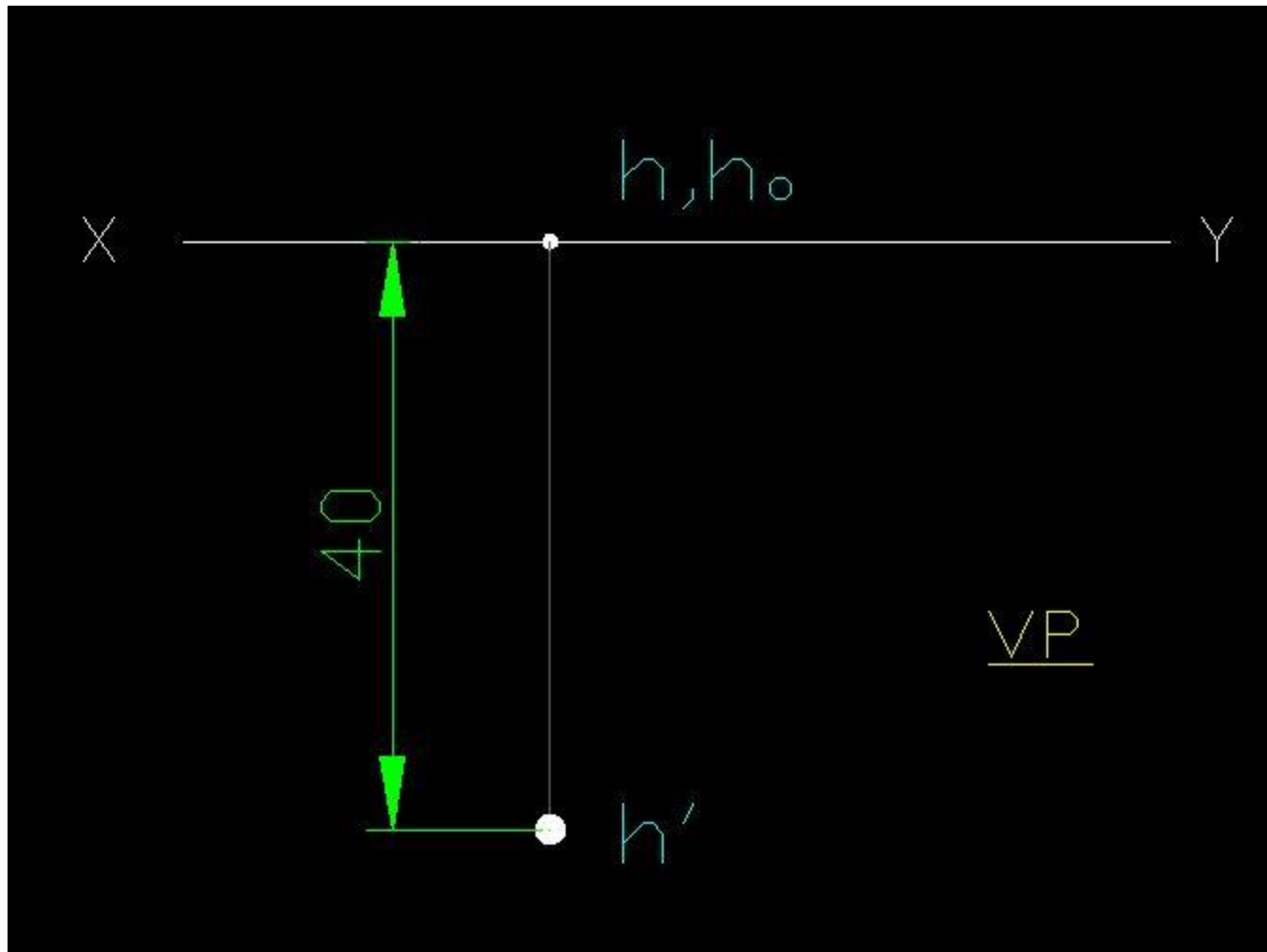
CASE 7: Point G is 40 mm above HP & in VP. Draw Projections.

CASE 7: Point G is 40 mm above HP & in VP. Draw Projections.



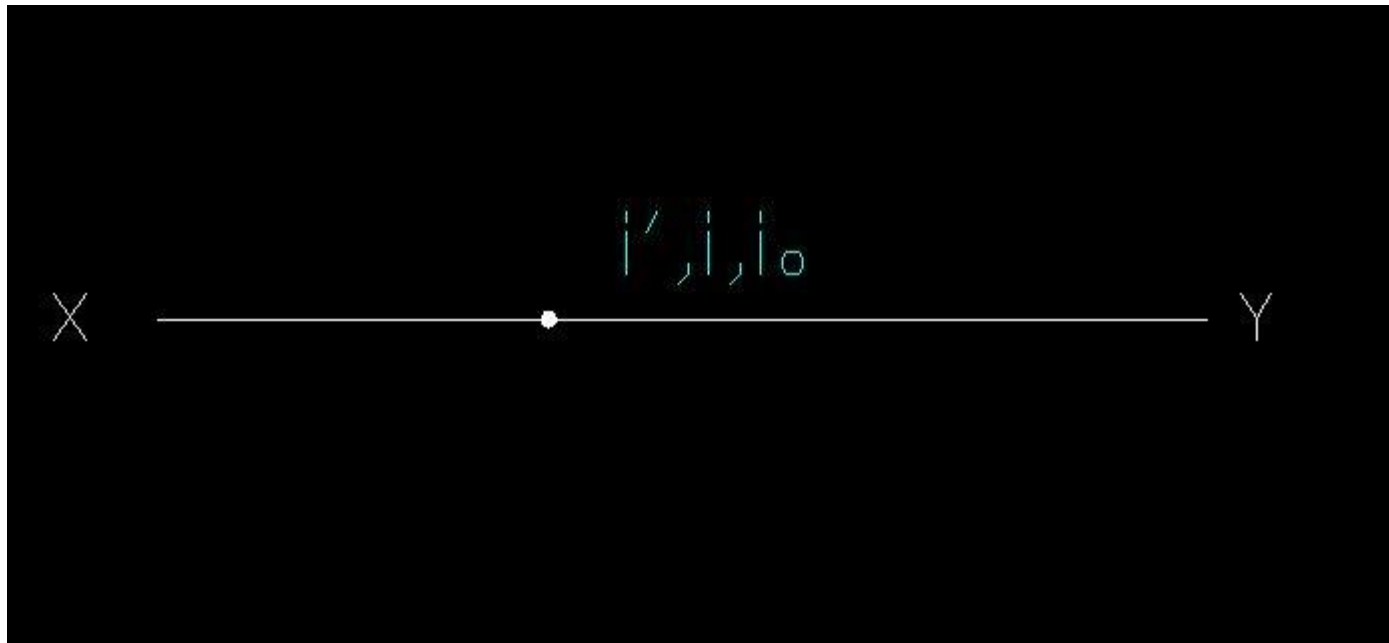
CASE 8: Point H is 40 mm below HP & in VP. Draw Projections.

CASE 8: Point H is 40 mm below HP & in VP. Draw Projections.



CASE 9: Point I is in HP & in VP. Draw Projections.

CASE 9: Point I is in HP & in VP. Draw Projections.



THANKS