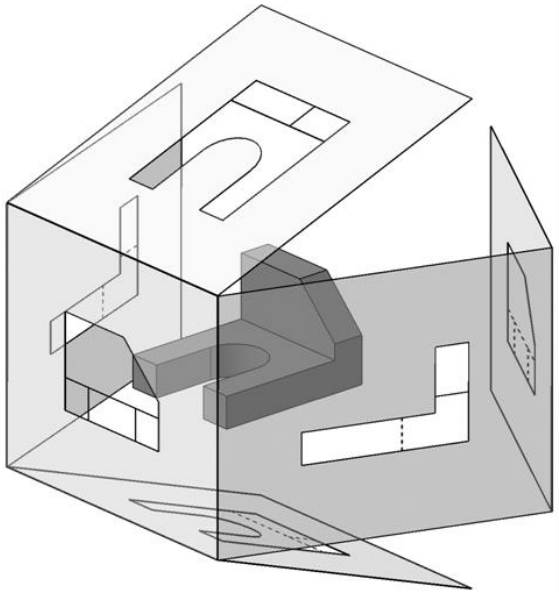
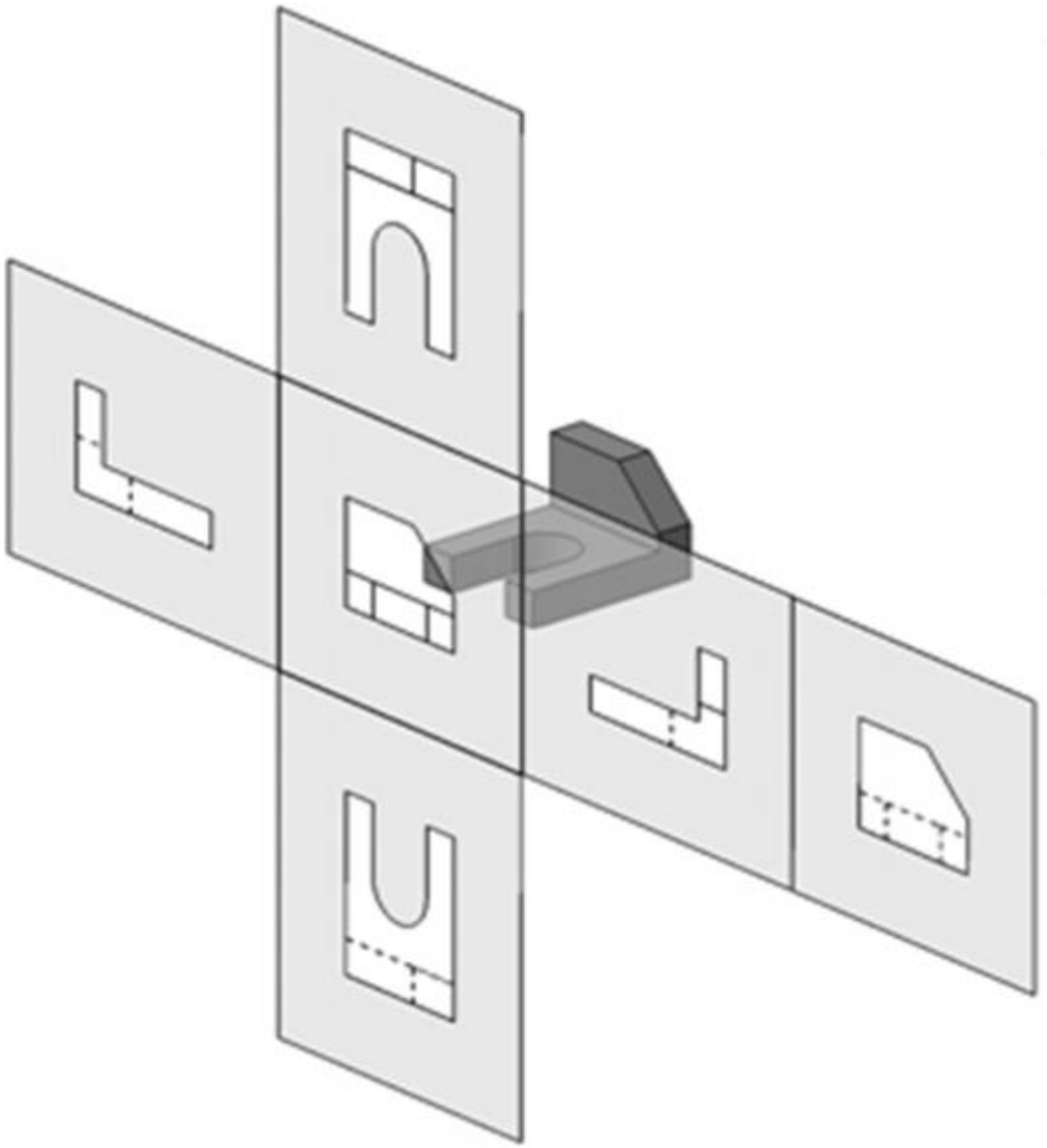
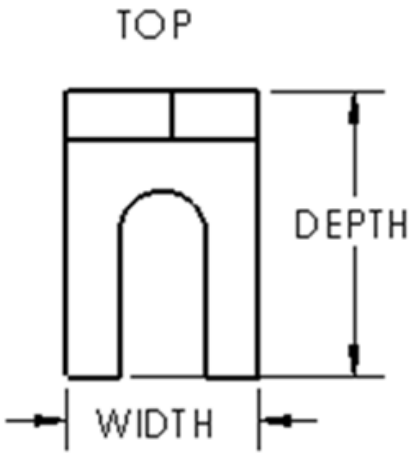


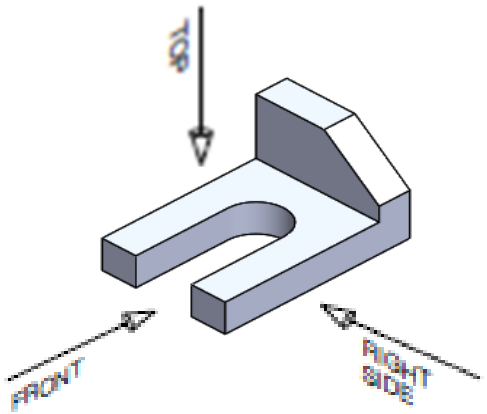
Multiview Drawing

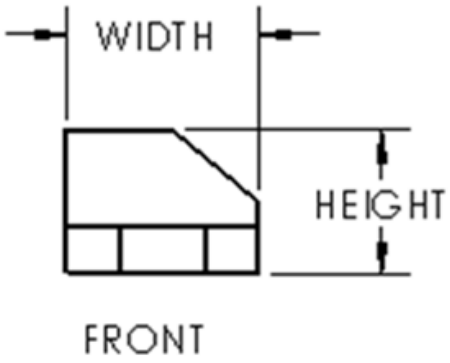


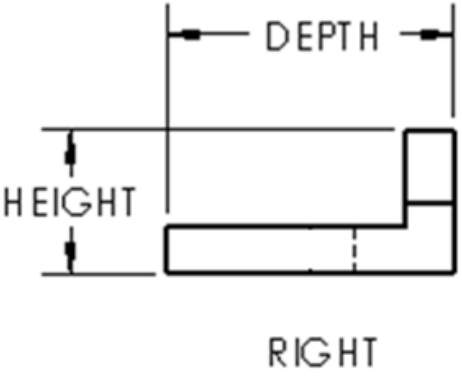
Multiview drawing

- A **collection of 2D views** that work together to provide an accurate representation of the overall model.
- Each view only shows 2 of the three spacial dimensions of height, width, and depth.
- The views together convey all three spacial dimensions with optimal clarity.
- These views together with dimensions and annotations are sufficient to manufacture the part.



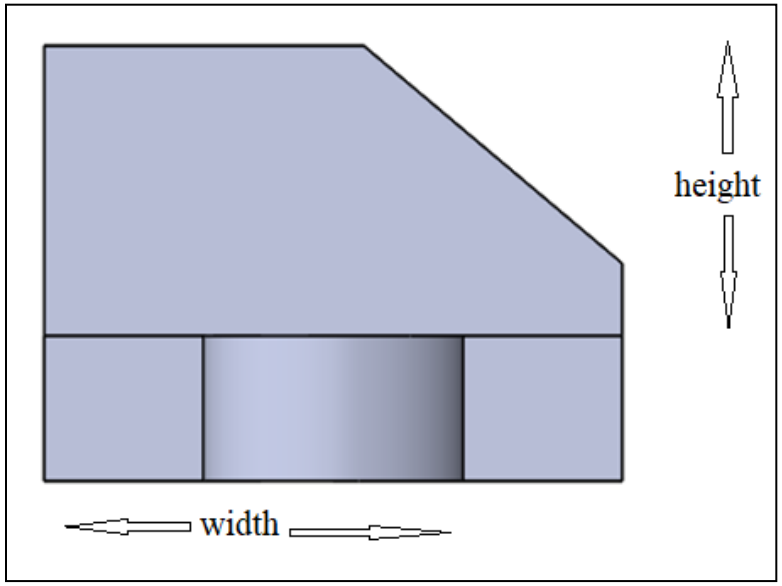


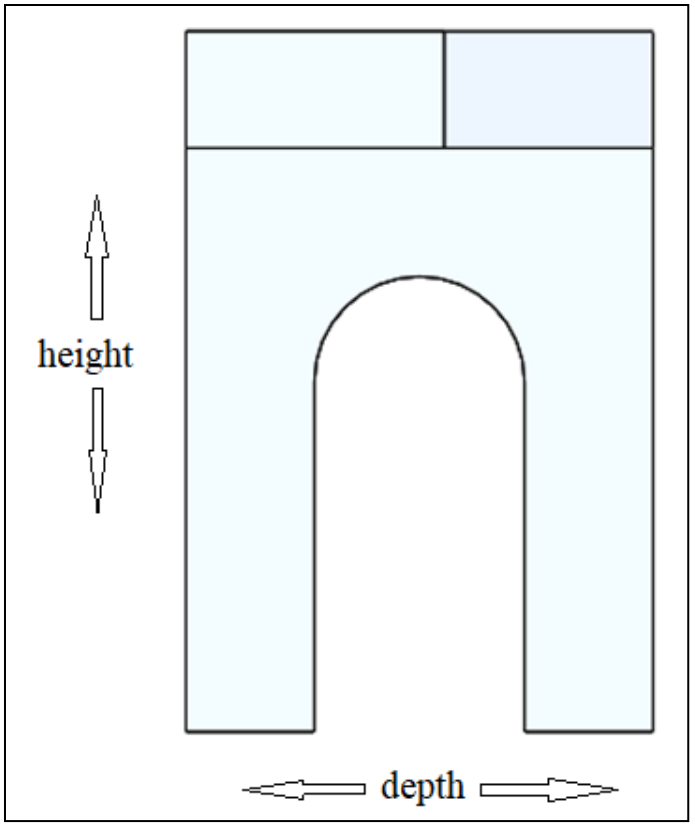




Single view drawing

A single view only gives information about two of the three dimensions of space (**height, width, & depth)**

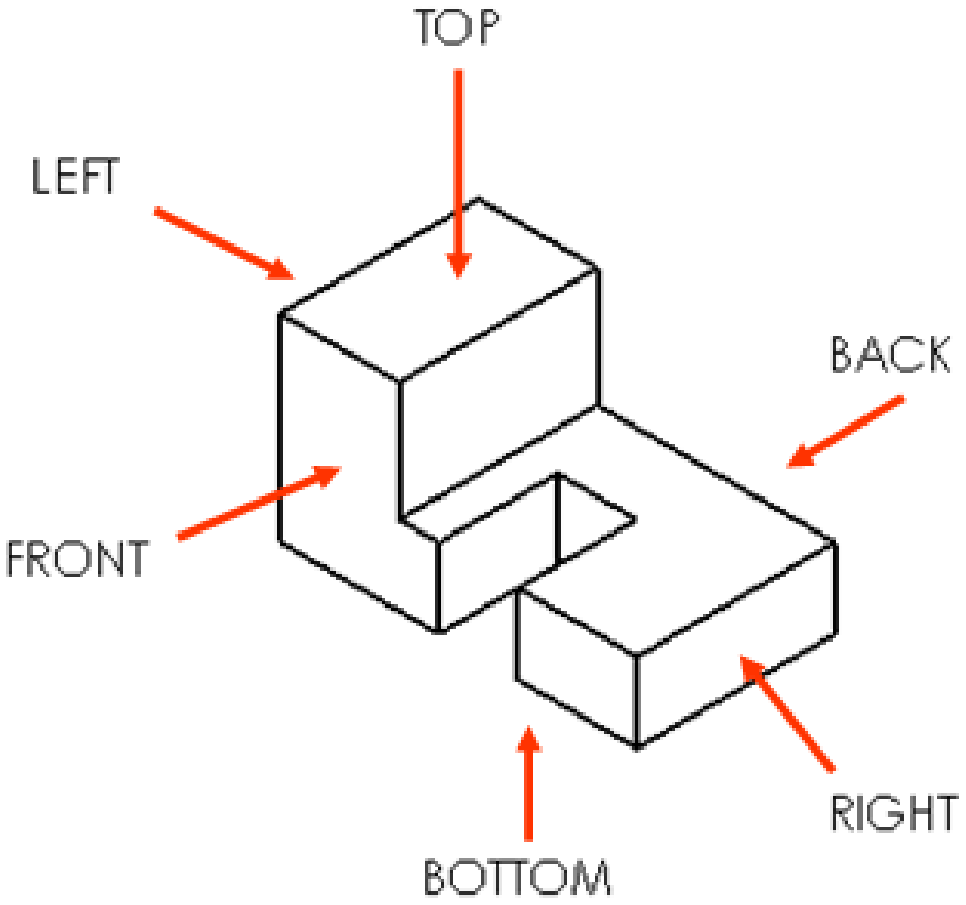




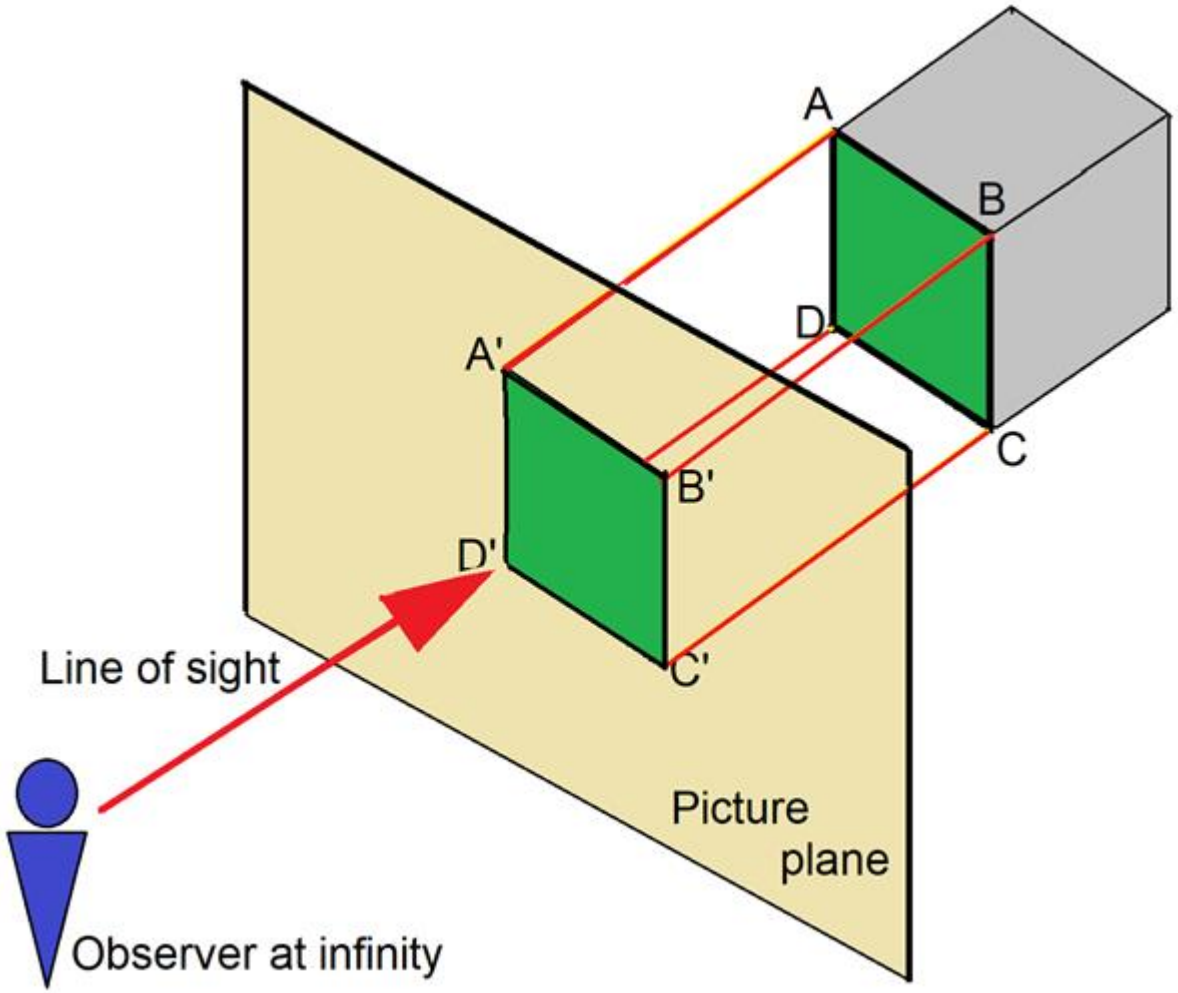
Are these enough to fully define the object?

Multiview drawing

- The **six principle views** are created by looking at the object in the indicated directions.
- The views are created using orthographic projection.
- Orthographic projection? Imagine:
  - A person (observer) standing at an infinite distance from the object
  - A plane between the person and the object
  - The plane is perpendicular to the persons line of sight.



Orthographic Projection



Lines of sight are the lines from the observer to the points on the **object**.

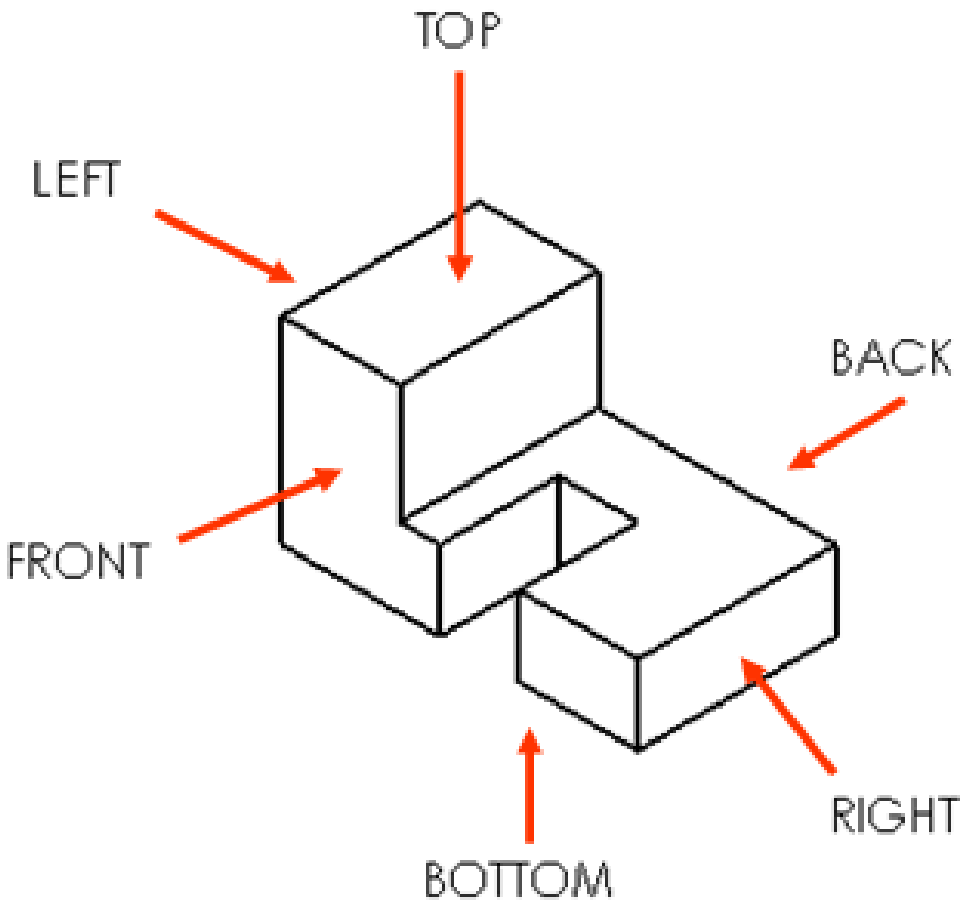
In **Orthographic projection** the lines of sight are parallel to each other AND perpendicular to the picture plane.

The intersections of the lines of sight with the picture plane represent points of the object.

This is how a 3-dimensional object is represented on a 2-dimensional medium. (i.e. a piece of paper or a computer screen.)

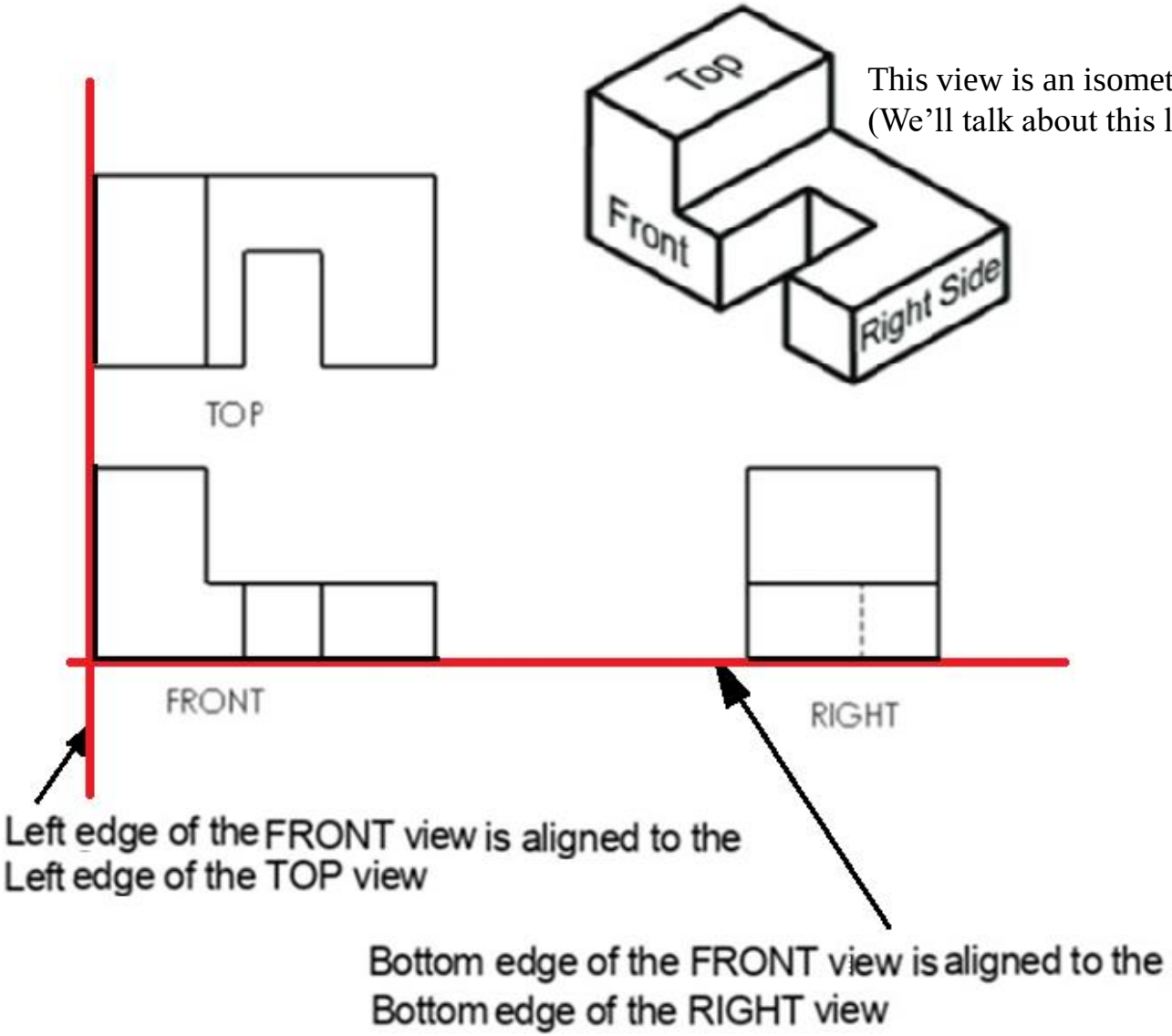
Orthographic Projection

- What would you see if you stood in **front** of this object at an infinite distance away?
- What would you see from the **top**?
- What would you see from the **right** side?



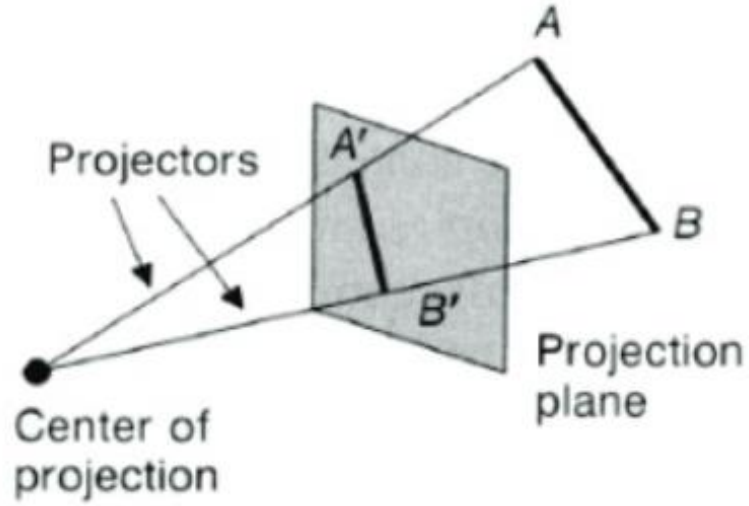
Multiview drawing

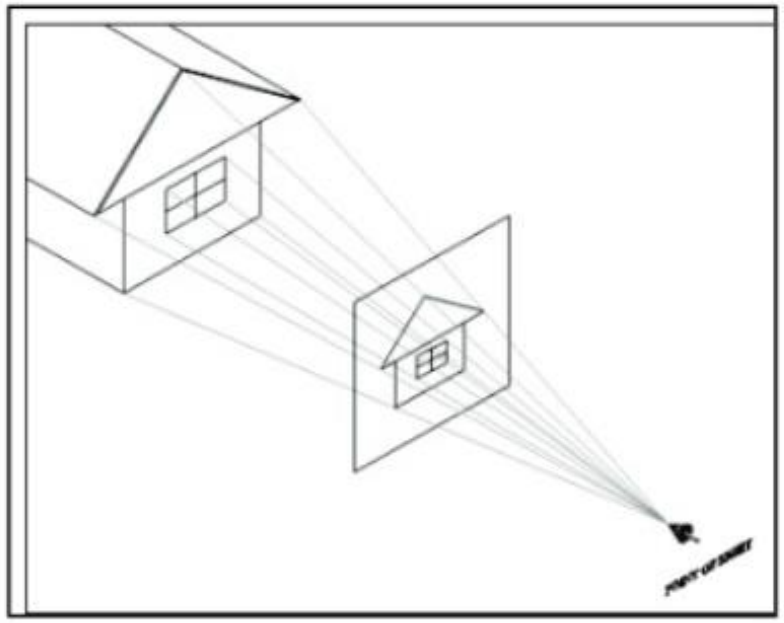
Top, Front and Right views using orthographic projection



Projection Vocabulary

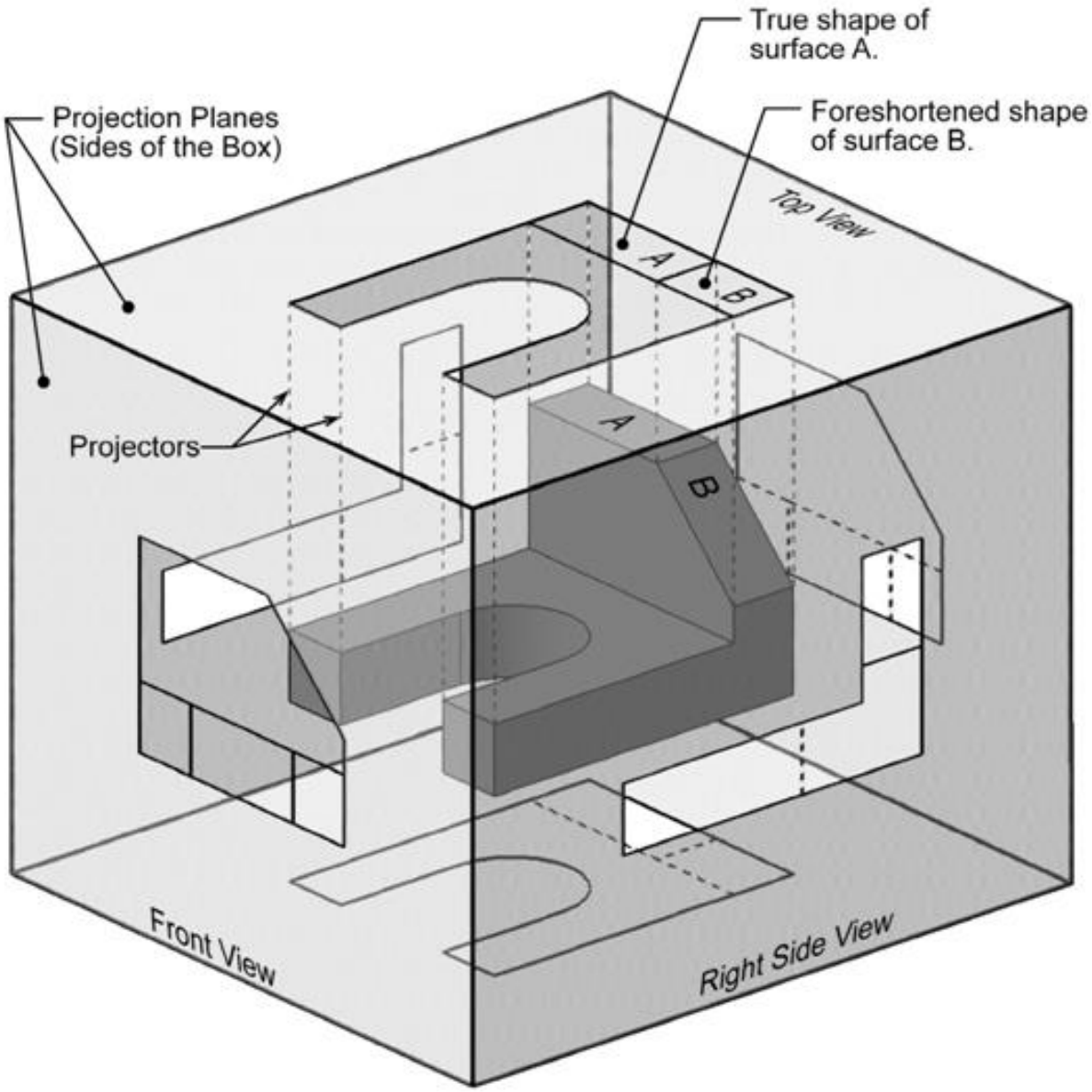
Observer = **Center of projection**
Lines of sight = **Projectors**
Picture plane = **Projection plane** (the 2D drawing media)



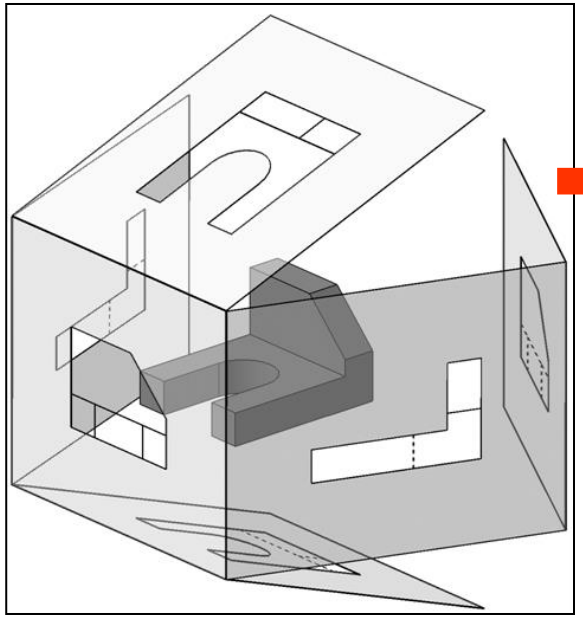


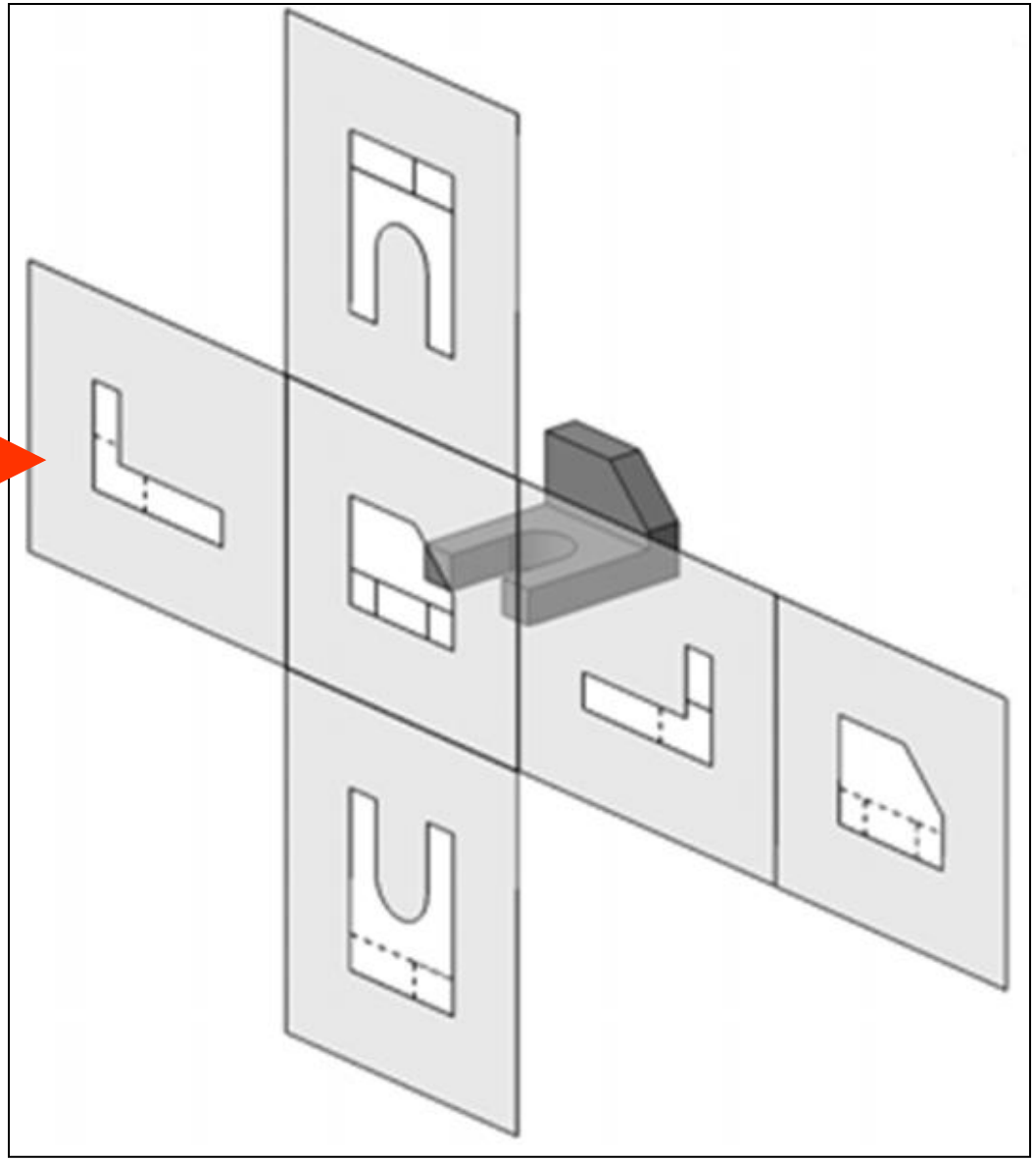
Glass Box Method

A traditional drafting method whereby you imagine placing an object inside an imaginary glass box to view the **six principle views.**



Glass Box Method

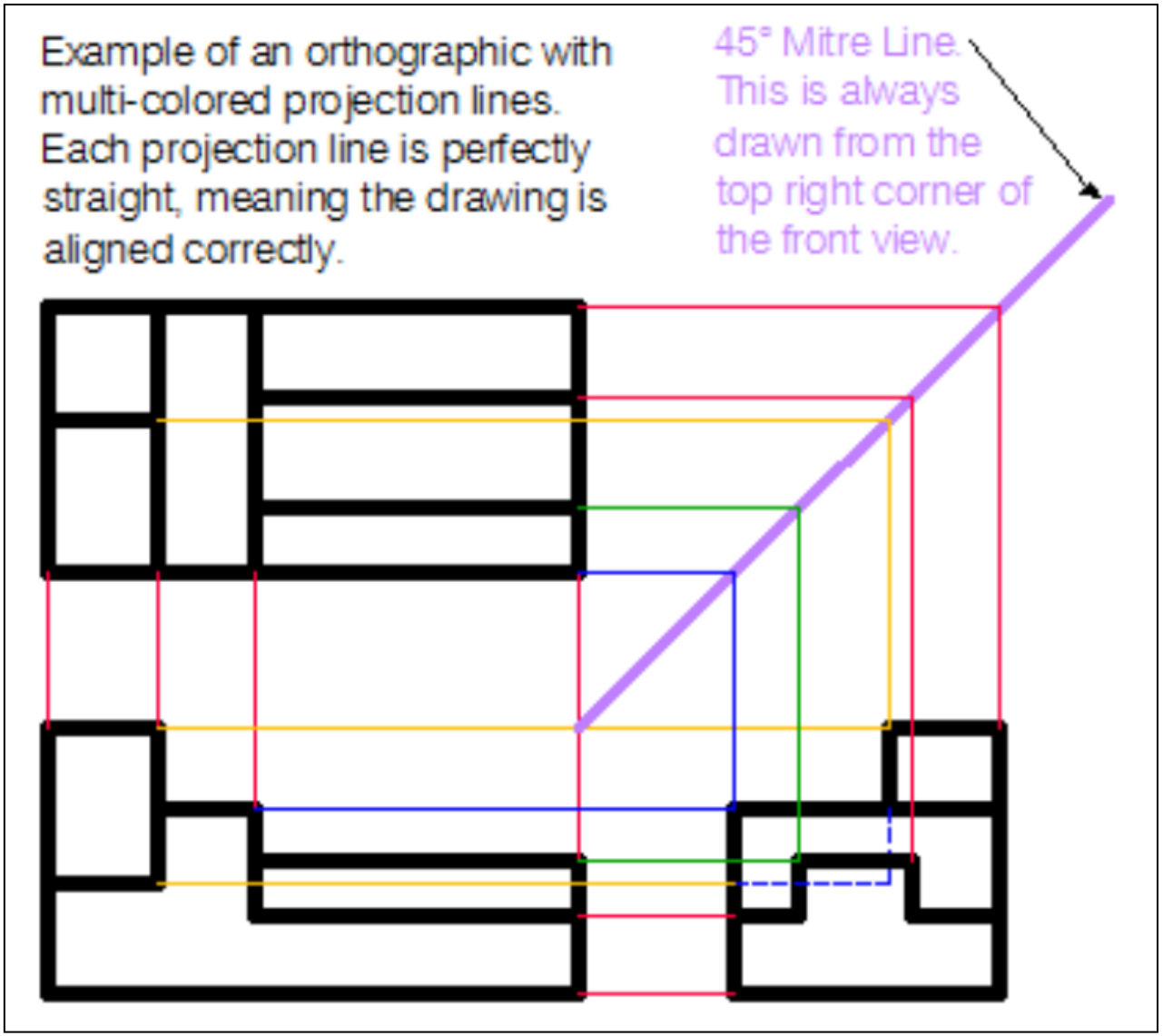




Multiview drawing

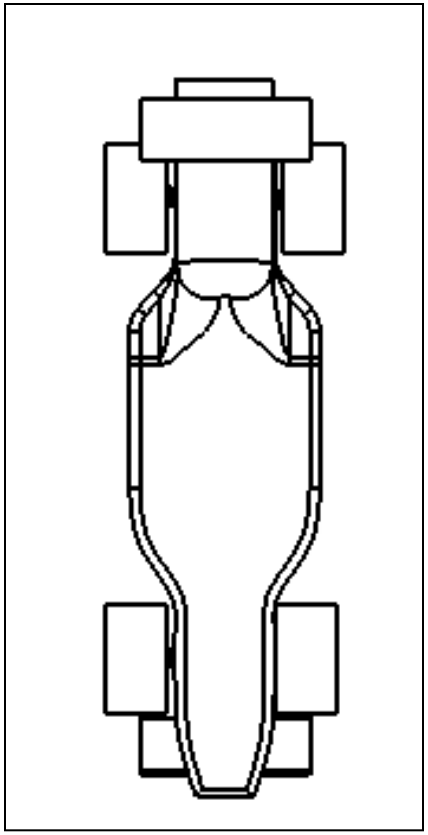
- Uses the **minimum number of views** necessary to describe an object completely. (Usually the front, right side and top.)

- The selection and orientation of the **Front view is a very important** step.

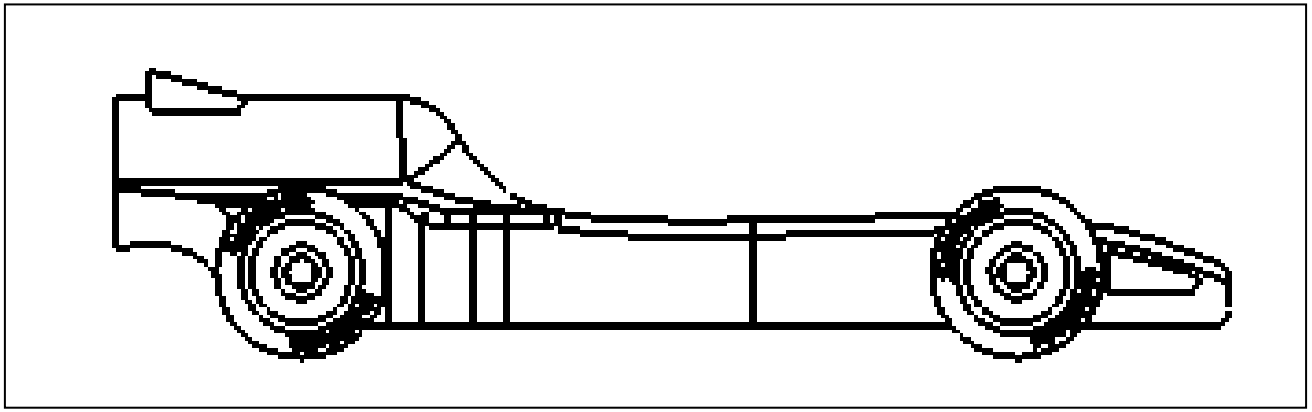


Guidelines for Choosing the Front view

The front view should be chosen such that it is most descriptive and positioned in the most natural orientation.



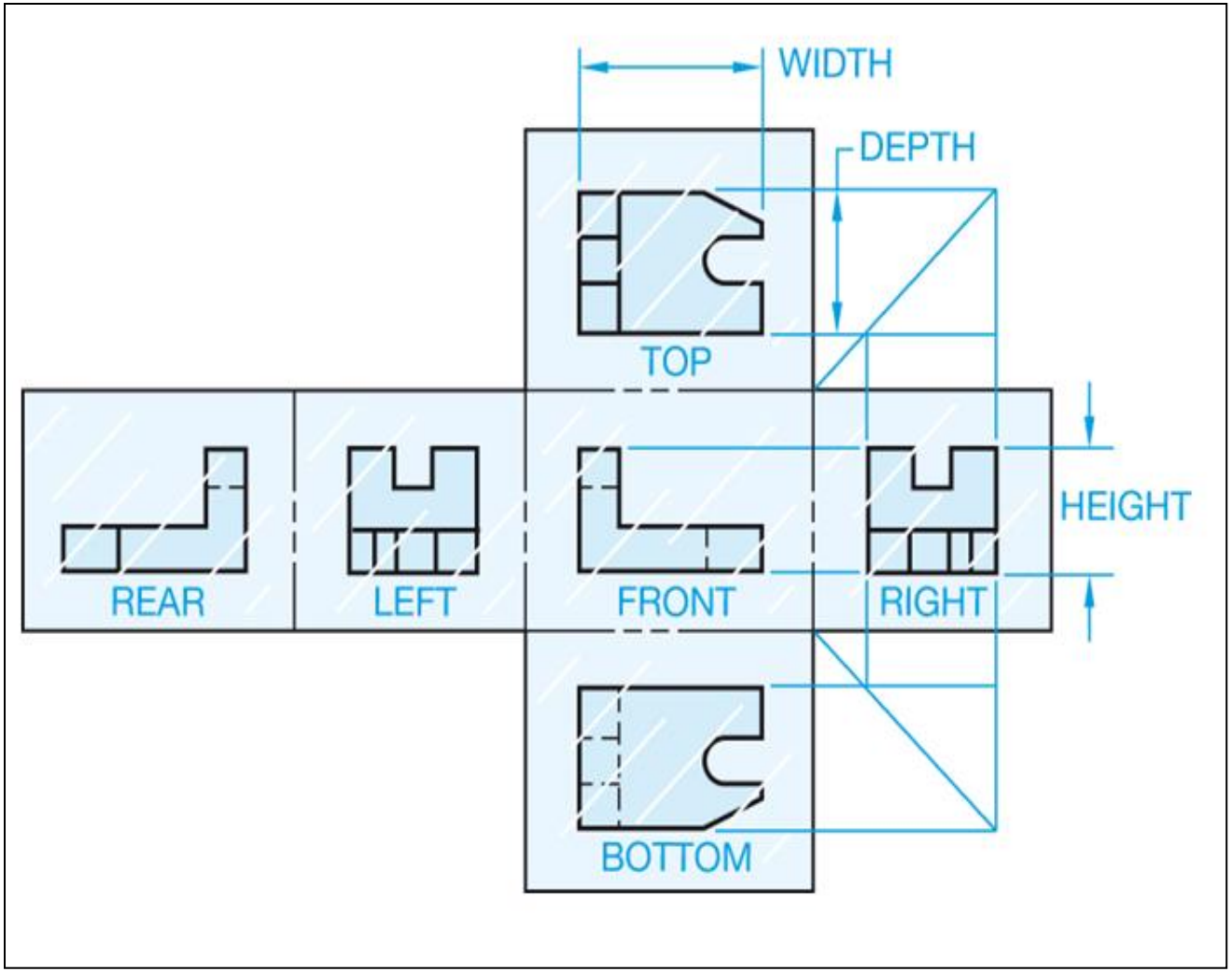
No



Yes

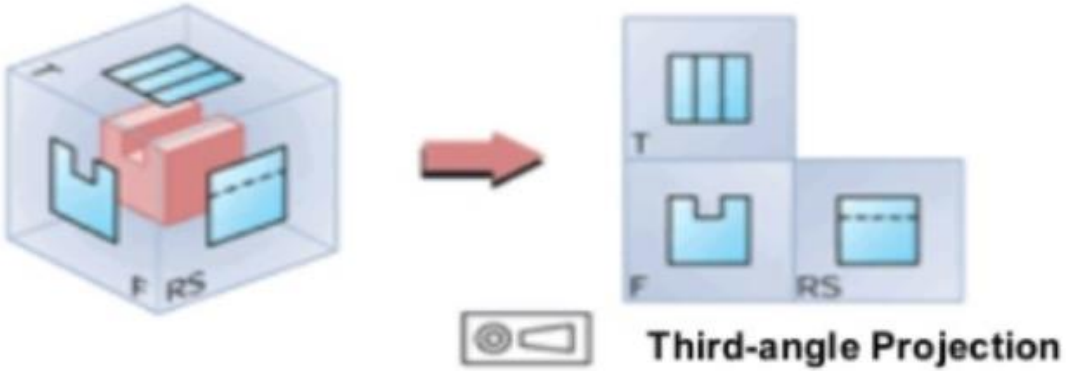
Guidelines for Choosing the Front view

- The Front view establishes other views.
- It should be the **most descriptive** and or **natural** position of the model in the drawing.
- Provides the best shape description or most characteristic contours.
- Has the fewest hidden features.



Third Angle projection vs. First Angle projection

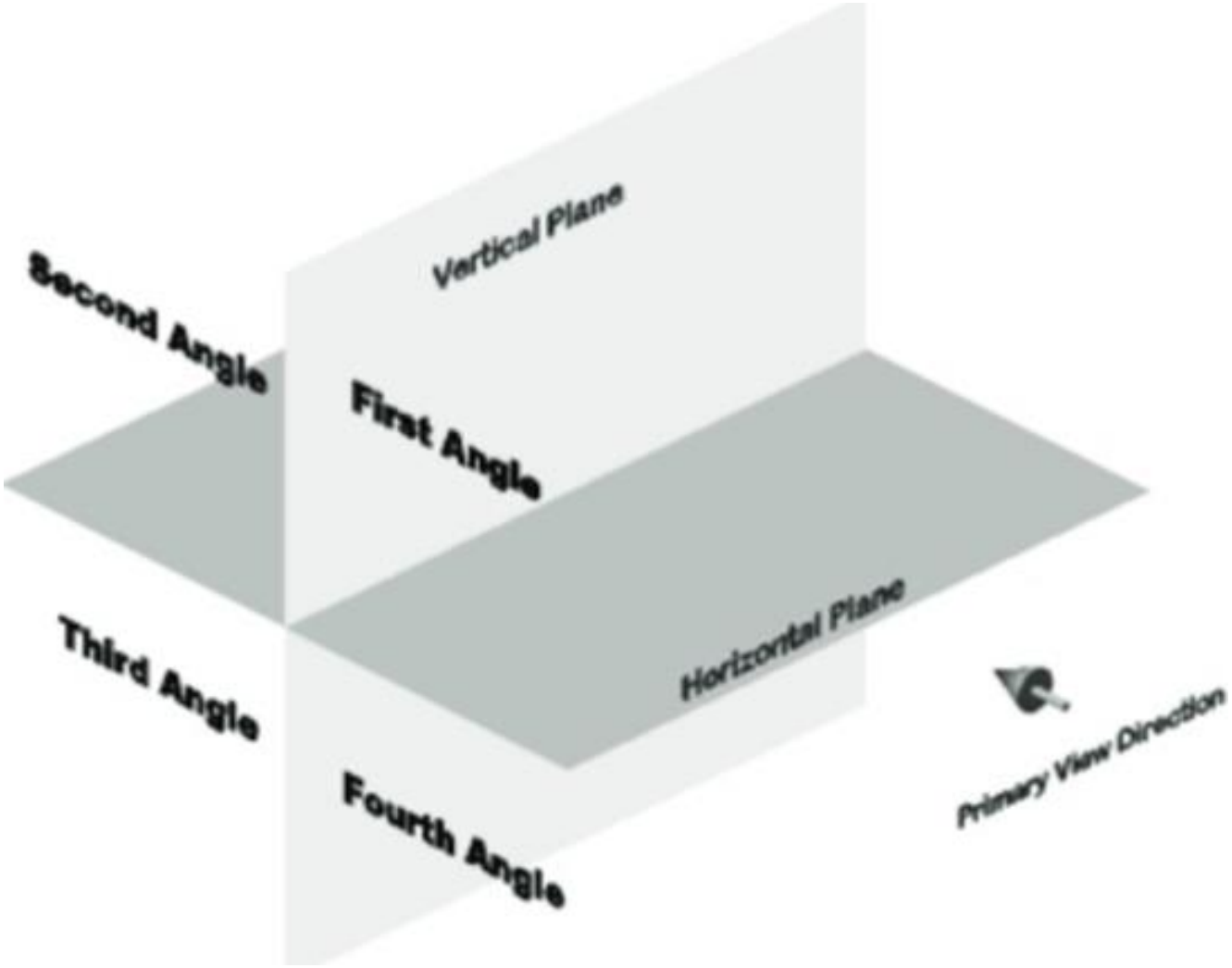
Depends on where you put the glass box and on which surfaces the object is projected

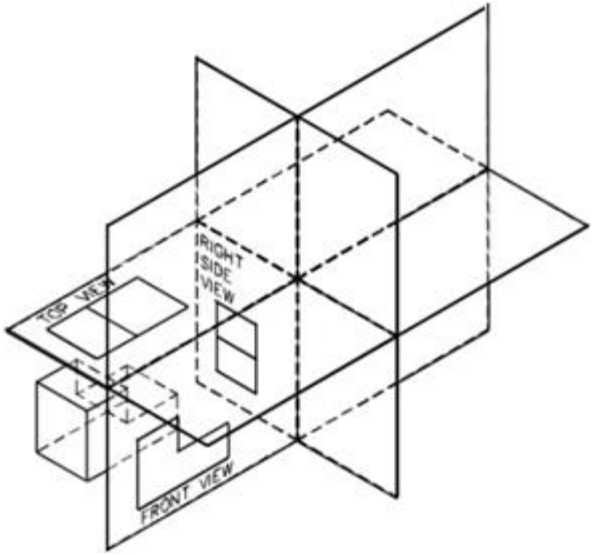


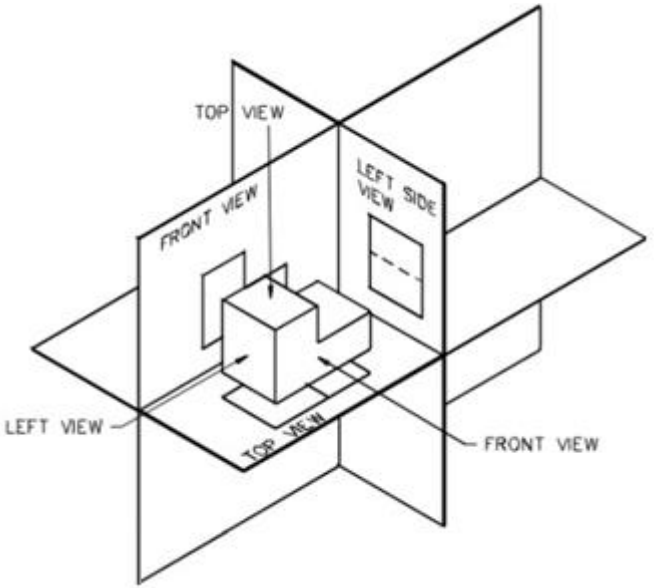
Some Good Videos:

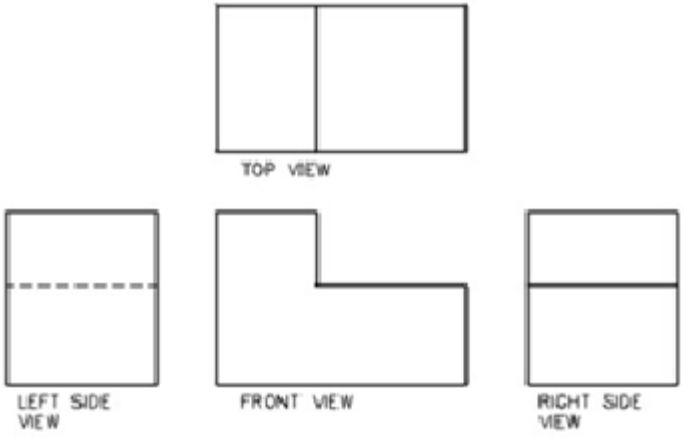
https://www.youtube.com/watch?v=yGjVnXgUpQM

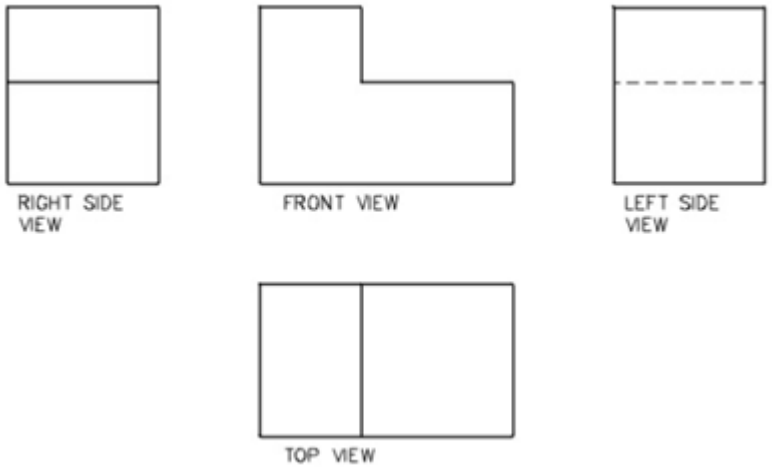
https://www.youtube.com/watch?v=bk2E8P33Ztc&ab_channel=ClanMacCAD


Second Angle
Vertical Plane
First Angle
Third Angle
Horizontal Plane
Fourth Angle
Primary View Direction





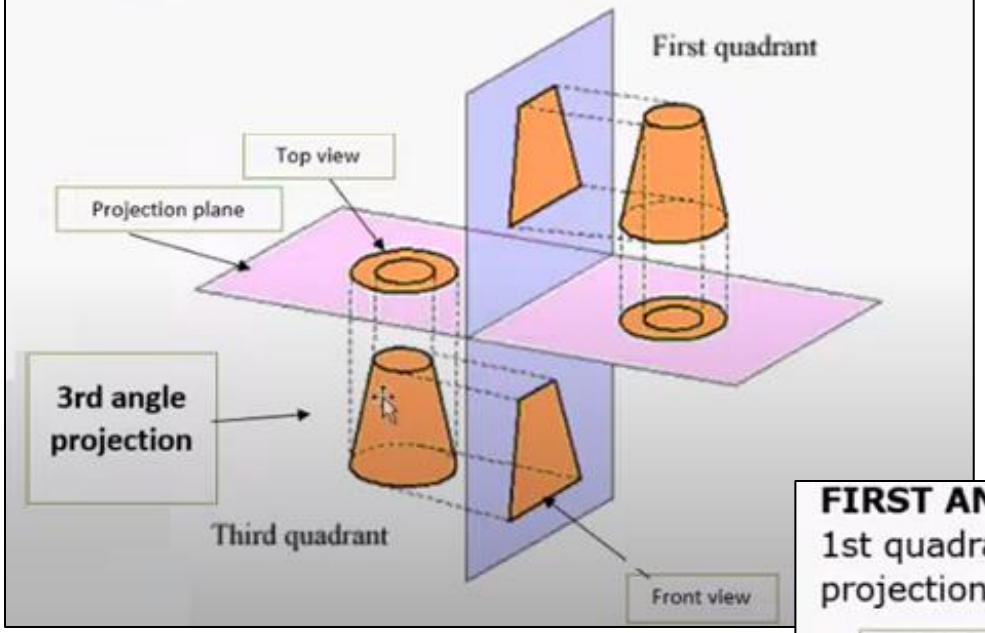




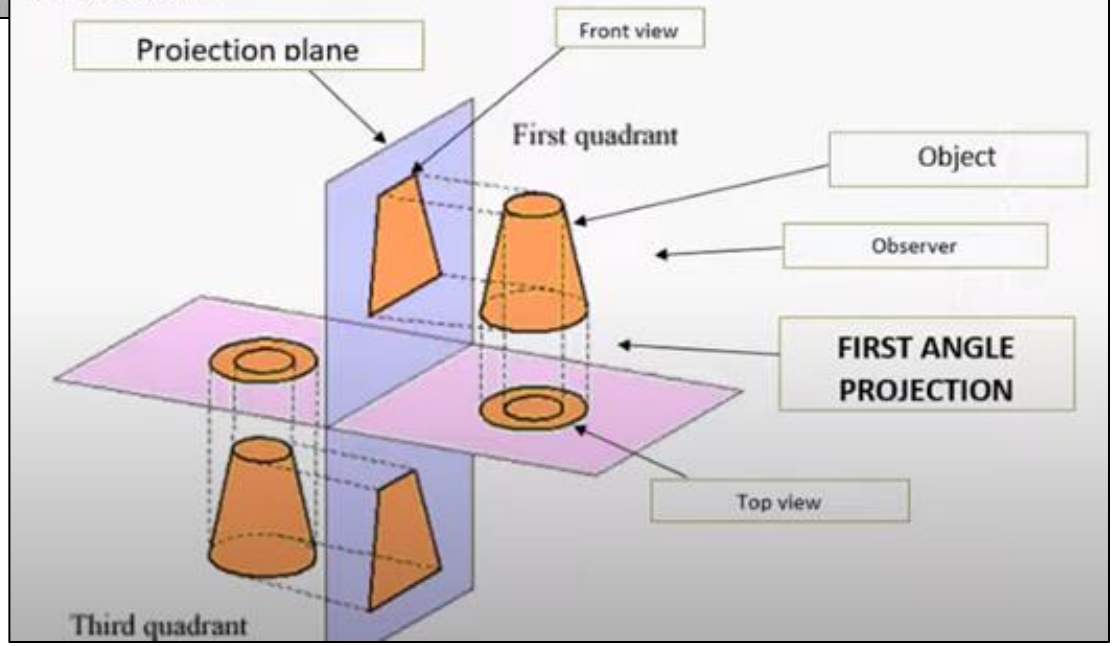
Third Angle Projection

First Angle Projection

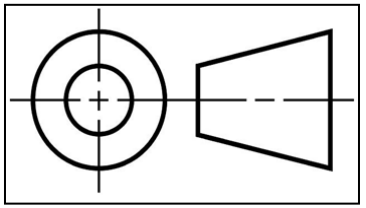
THIRD ANDLE PROJECTION: When object is placed in 3rd quadrant projection plane in-between object and observer.



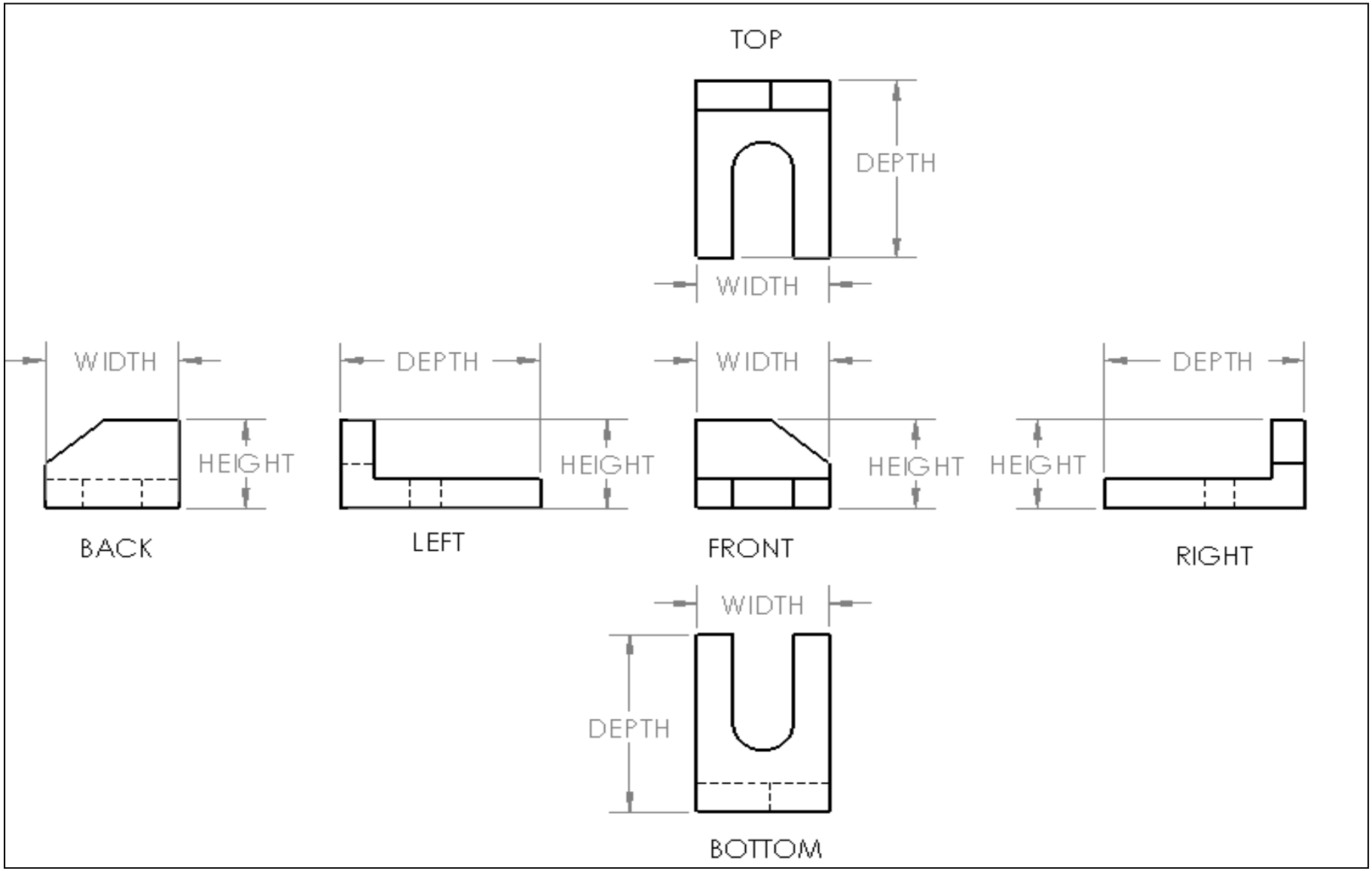
FIRST ANGLE PROJECTION: When object is placed in 1st quadrant object will be in-between observer and projection.



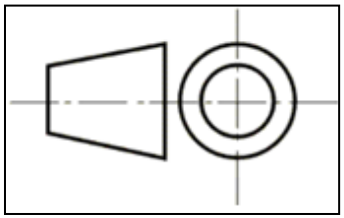
Glass Box Method



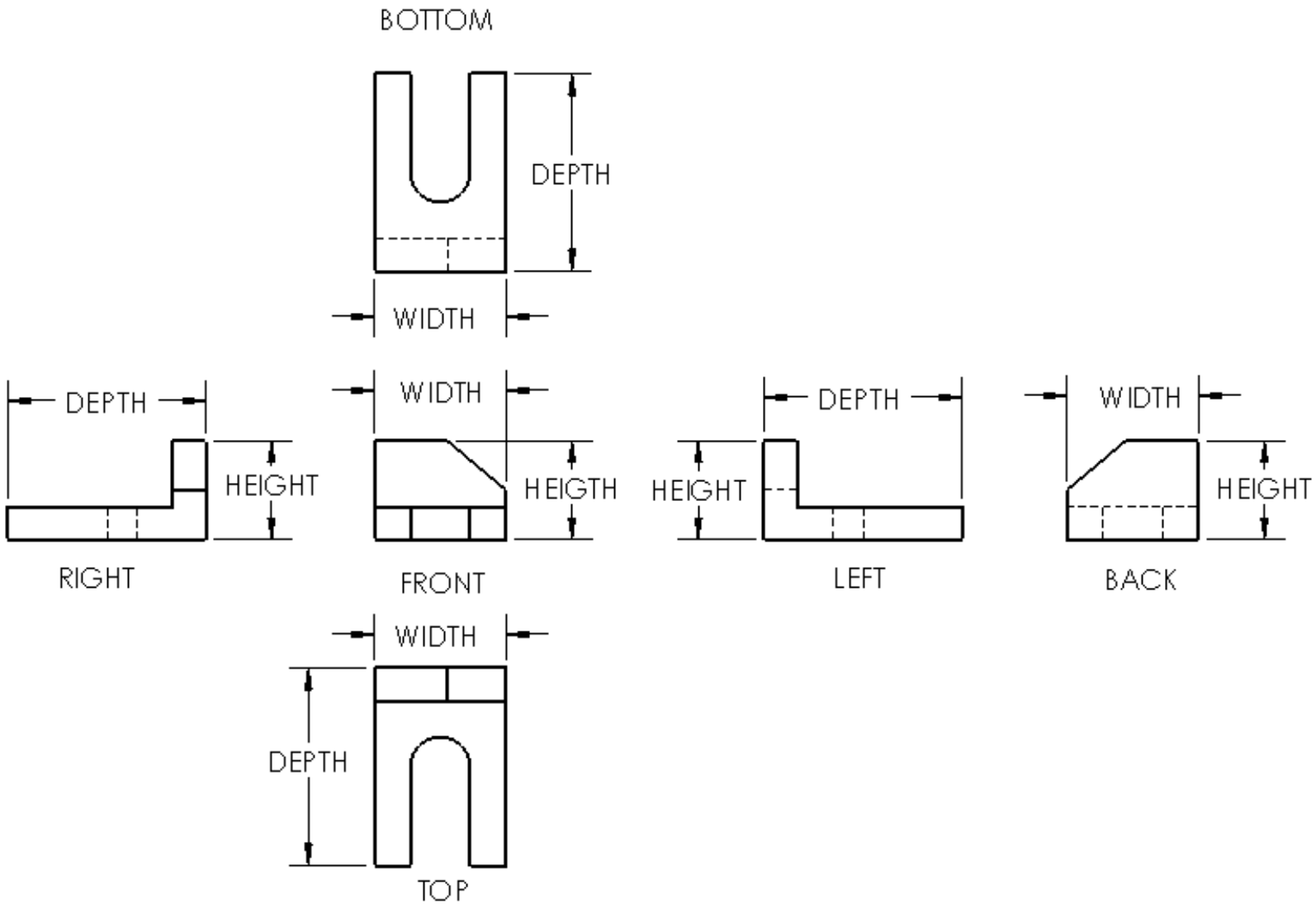
Third angle projection (United States)



Glass Box Method

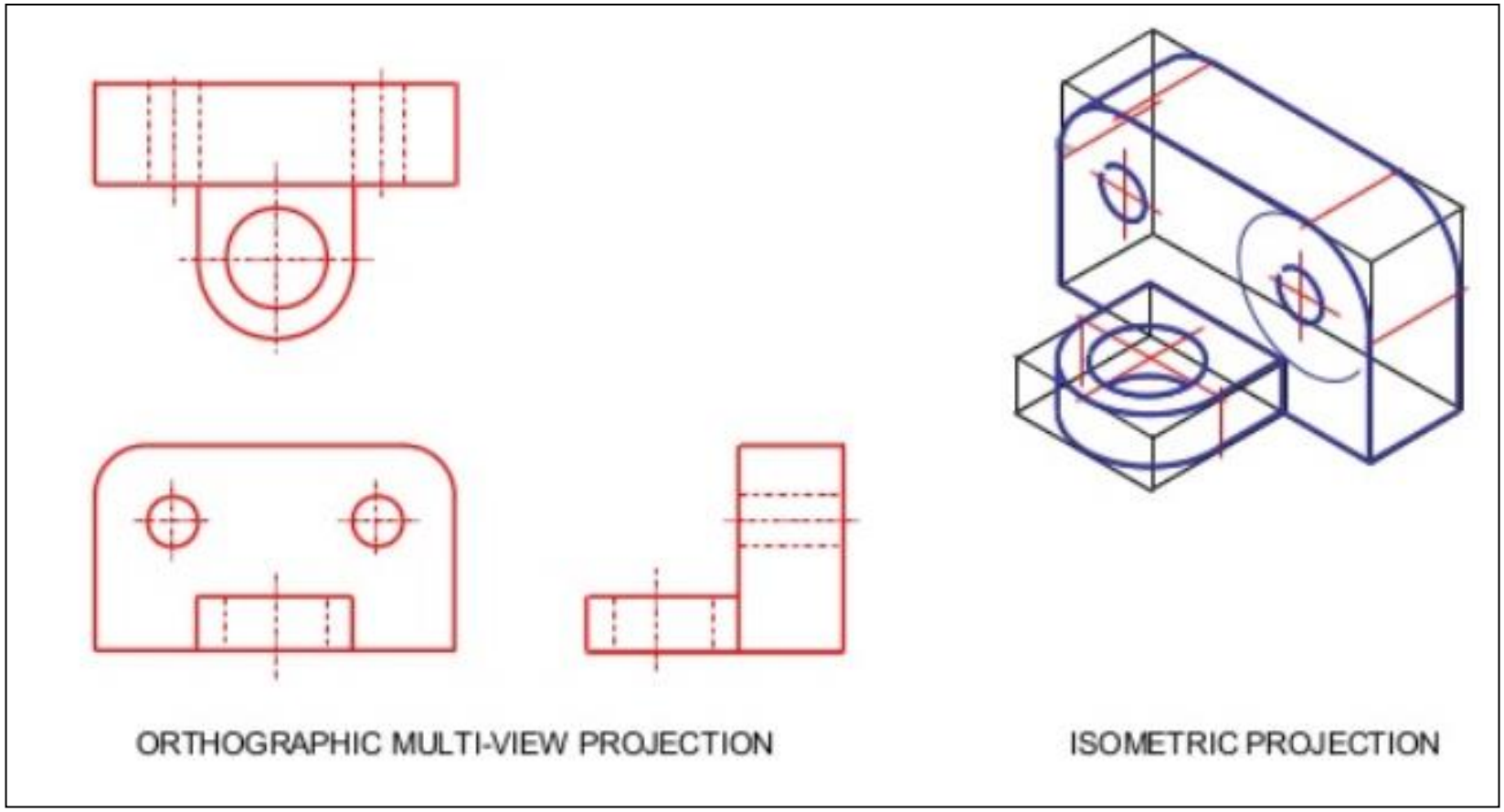


First angle projection (Europe)



How to go from an Isometric projection to a three-view drawing

https://www.youtube.com/watch?v=Zptb2epQoEc

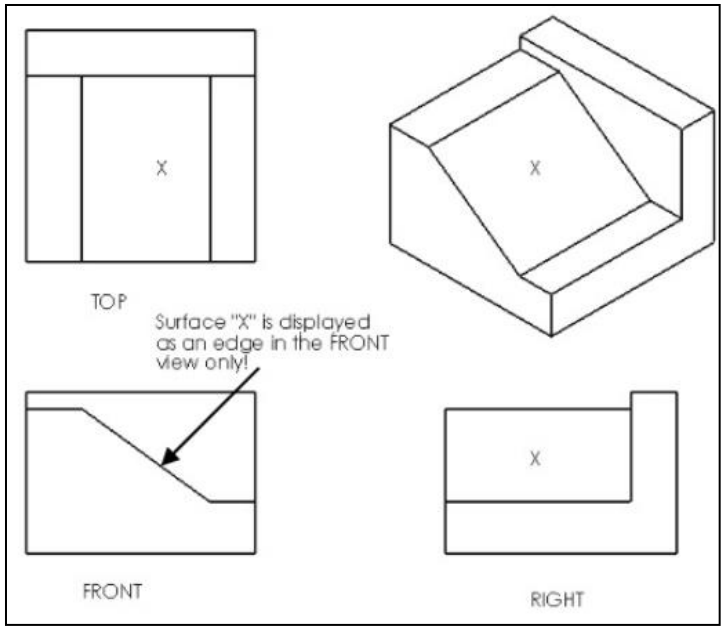


Normal, Inclined, & Oblique Planes

Normal planes

- are parallel to the top, front, or side of the glass box, and perpendicular to the other two.
- appear as an edge in two views and true sized in the remaining view

All the planes shown here are normal planes except X in the top picture and B in the bottom picture.



Inclined Planes

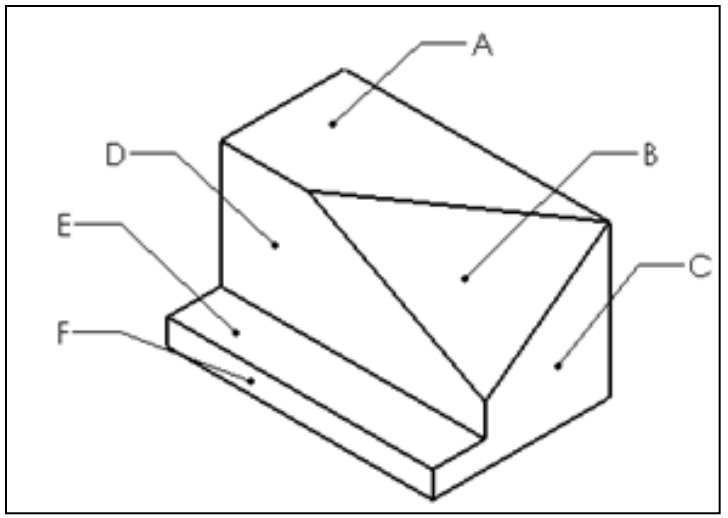
- are perpendicular to the top, front, or side of the glass box and inclined to the other two.
- appear as an edge view in one of the three views and as a rectangular surface in the other two views (albeit foreshortened, i.e. they do not display as true size or shape.)

X is an inclined plane.

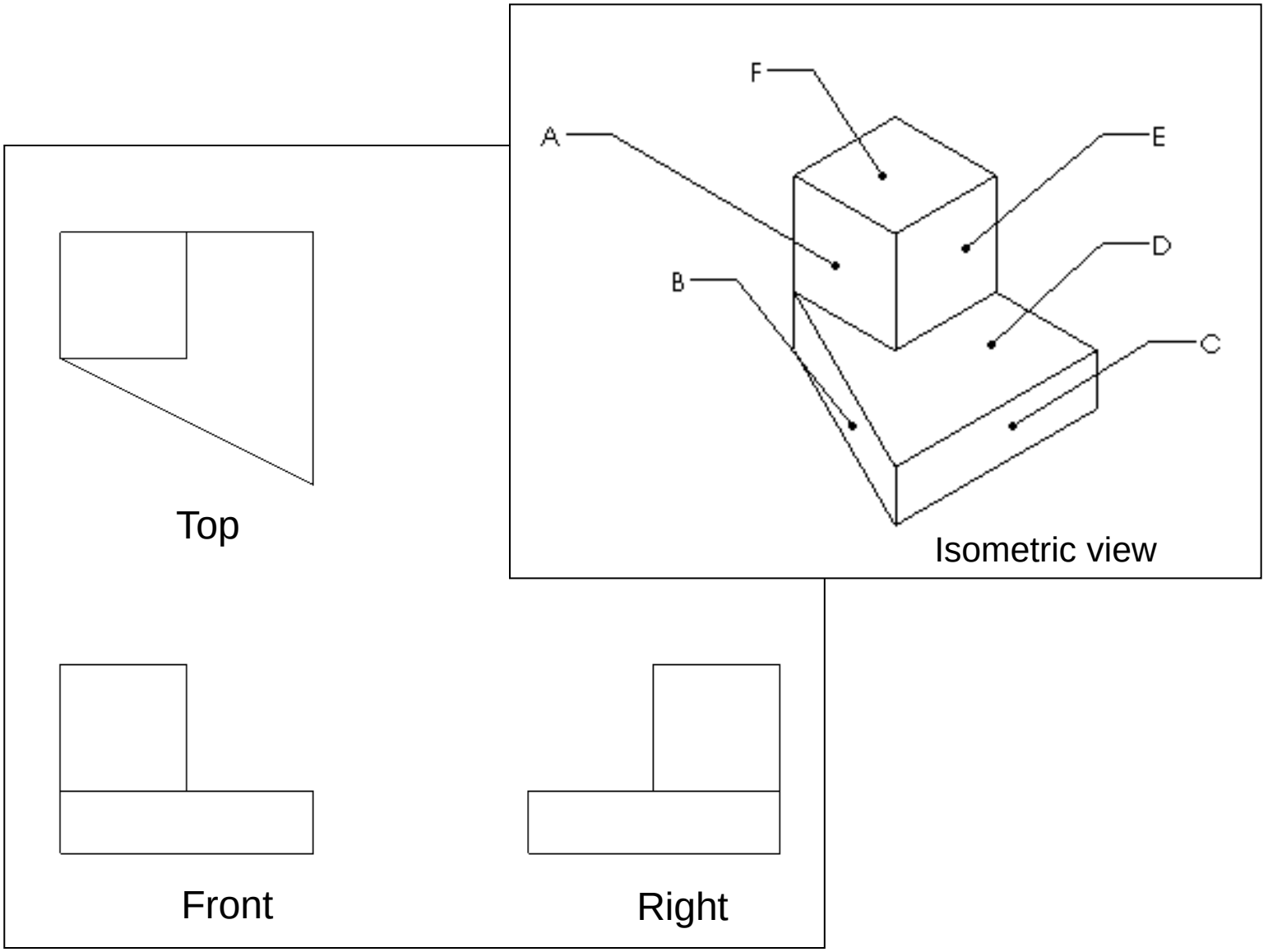
Oblique Planes

- are not parallel or perpendicular to any of the top, front, or side faces of the glass box.
- They do not display as an edge view in any of the six principal orthographic views.

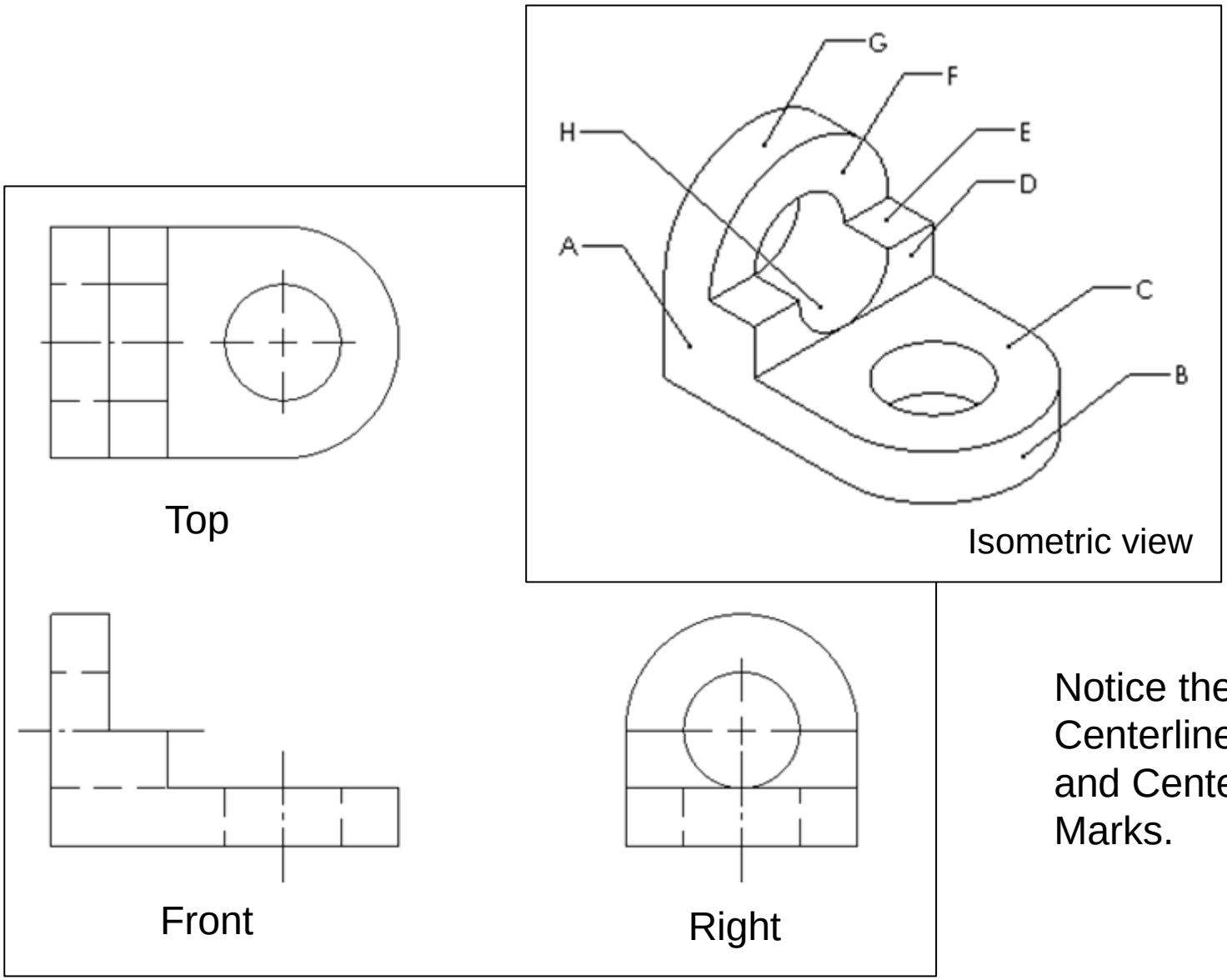
B is an oblique plane.



Visualization - Third Angle Projection



Visualization - Third Angle Projection



Notice the Centerlines and Center Marks.

Visualization - Basic Planes

Identify the surfaces with the appropriate letter that would appear in the FRONT view, TOP view, and RIGHT view.
Third Angle Projection.

FRONT view surfaces:

_____

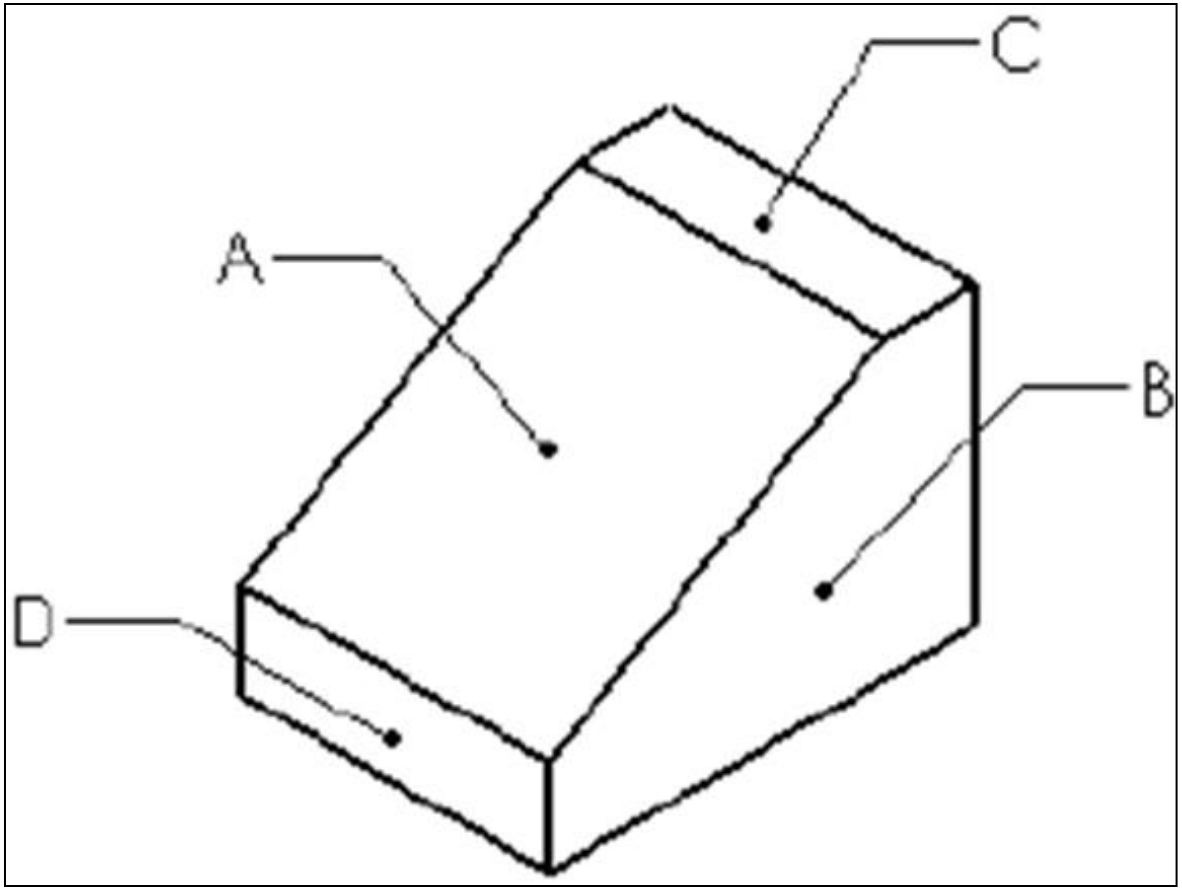
TOP view surfaces:

_____

RIGHT view surfaces:

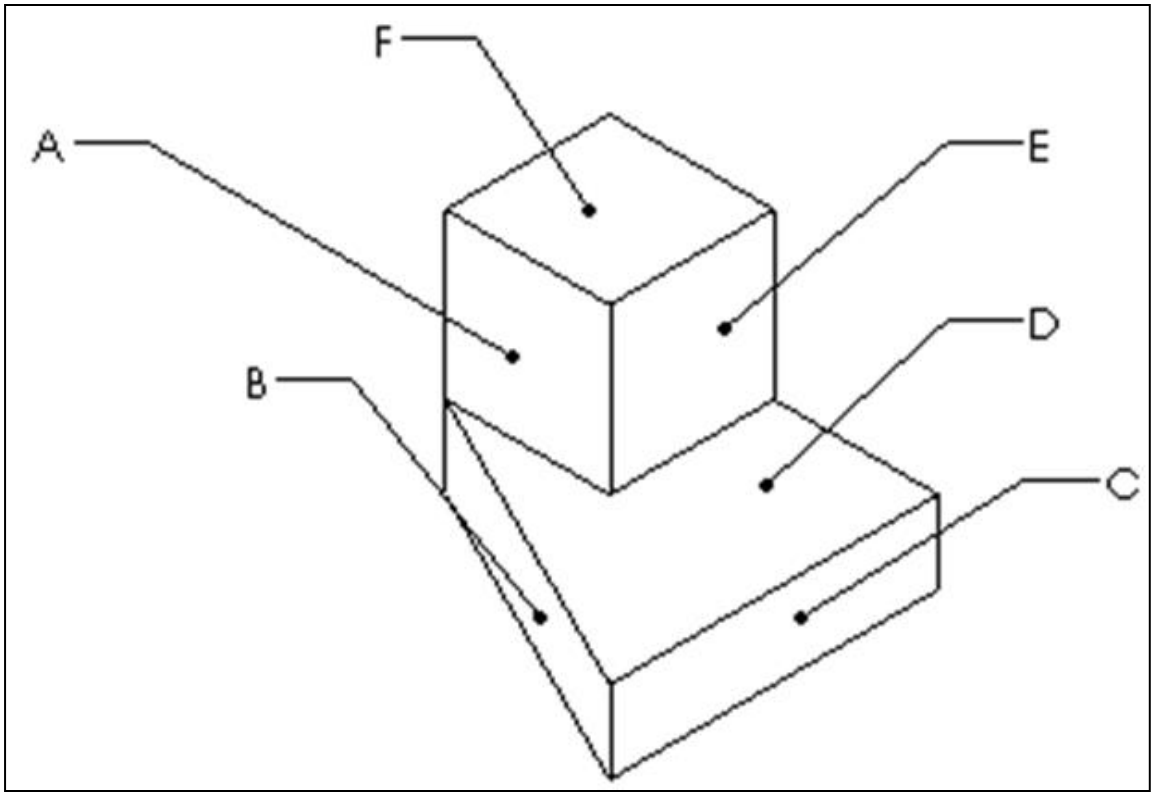
_____

Notice the ANSI standard used here:
a Leader Line of a note is displayed as an arrow
that points to an edge or a dot that points to a face.



Visualization - Basic Planes

Identify the surfaces with the appropriate letter that would appear in the FRONT view, TOP view, and RIGHT view.
Third Angle Projection.



FRONT view surfaces:

_____

TOP view surfaces:

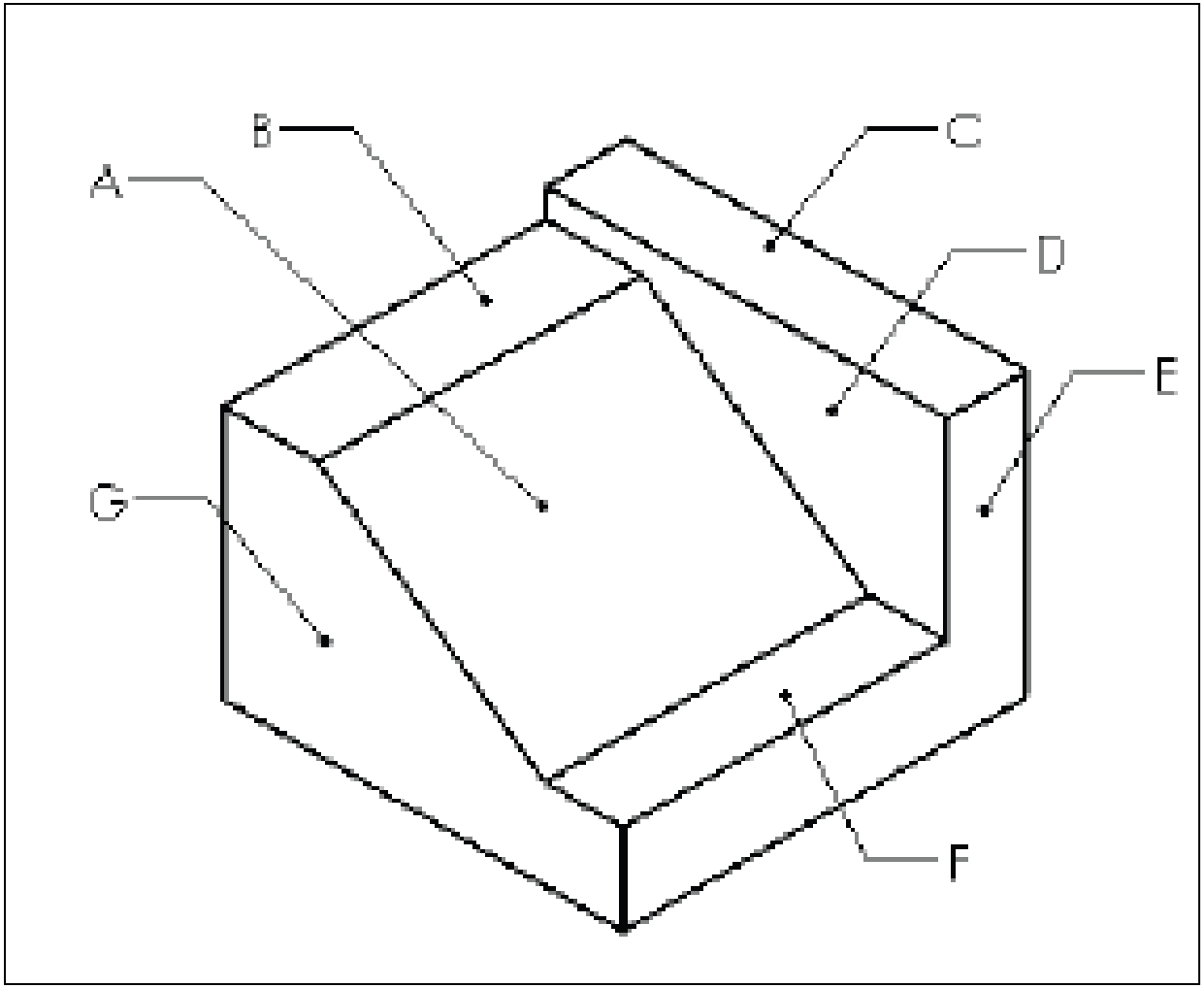
_____

RIGHT view surfaces:

_____

Visualization - Basic Planes

Identify the surfaces with the appropriate letter that would appear in the FRONT view, TOP view, and RIGHT view.
Third Angle Projection.



FRONT view surfaces:

_____

TOP view surfaces:

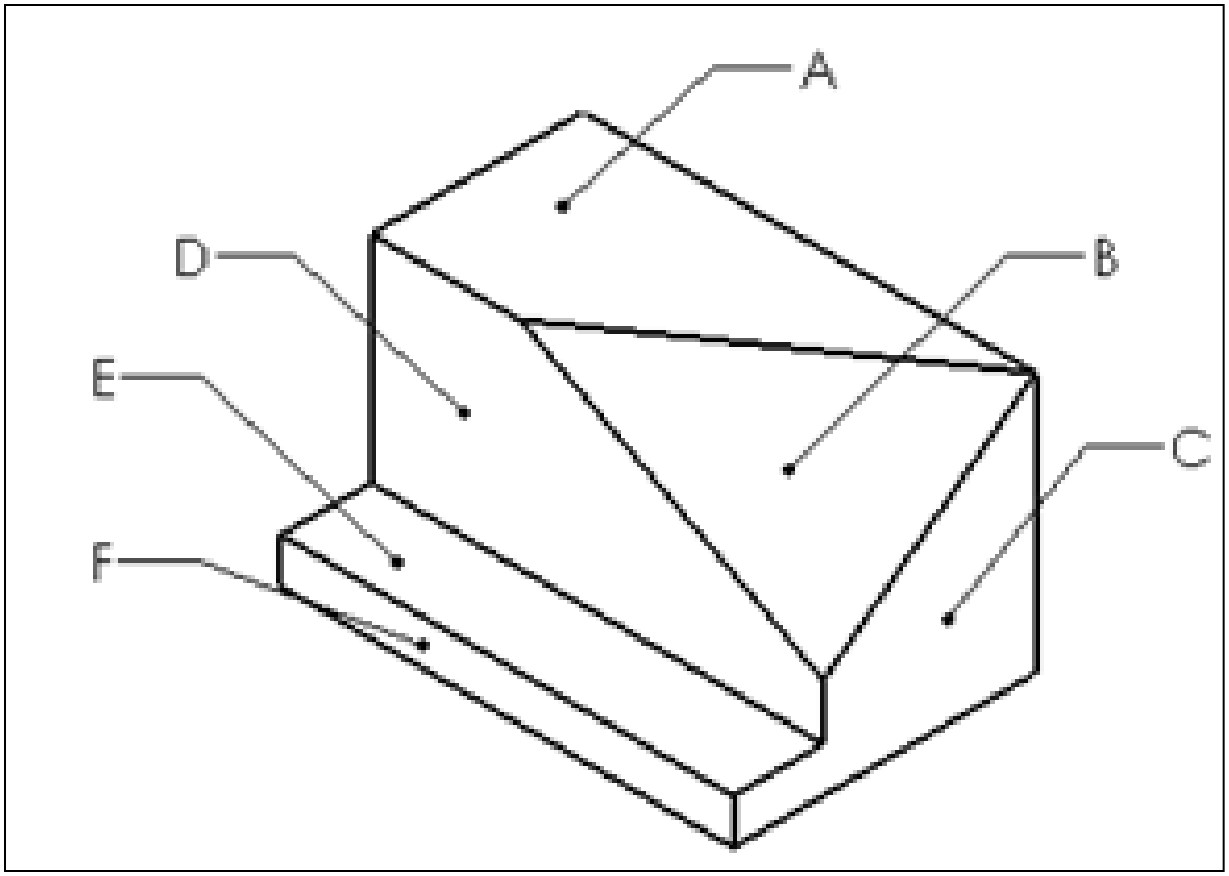
_____

RIGHT view surfaces:

_____

Visualization - Basic Planes

Identify the surfaces with the appropriate letter that would appear in the FRONT view, TOP view, and RIGHT view.
Third Angle Projection.



FRONT view surfaces:

_____

TOP view surfaces:

_____

RIGHT view surfaces:

_____

Visualization - Basic Planes

Identify the surfaces with the appropriate letter that would appear in the FRONT view, TOP view, and RIGHT view.
Third Angle Projection.

FRONT view surfaces:

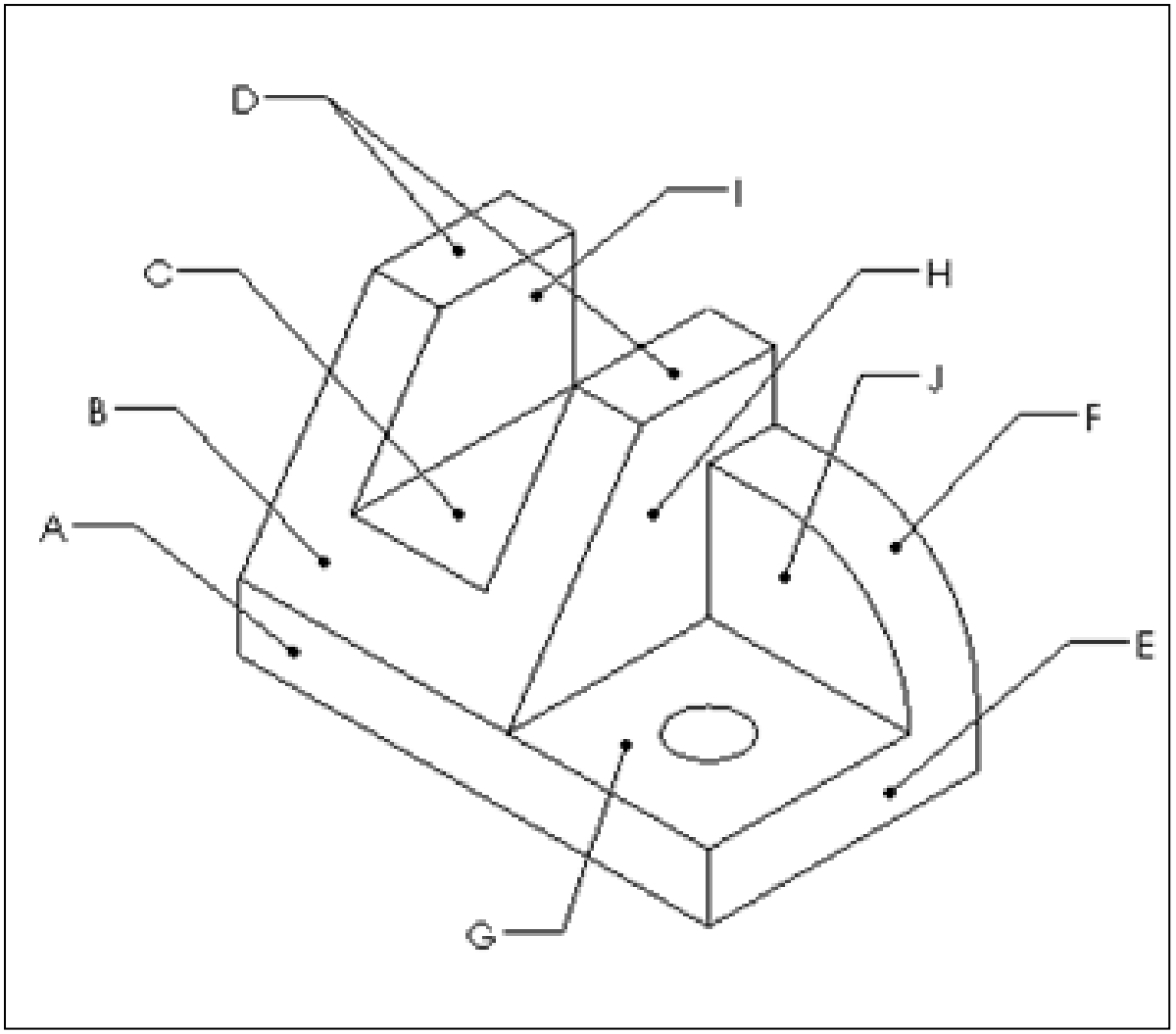
_____

TOP view surfaces:

_____

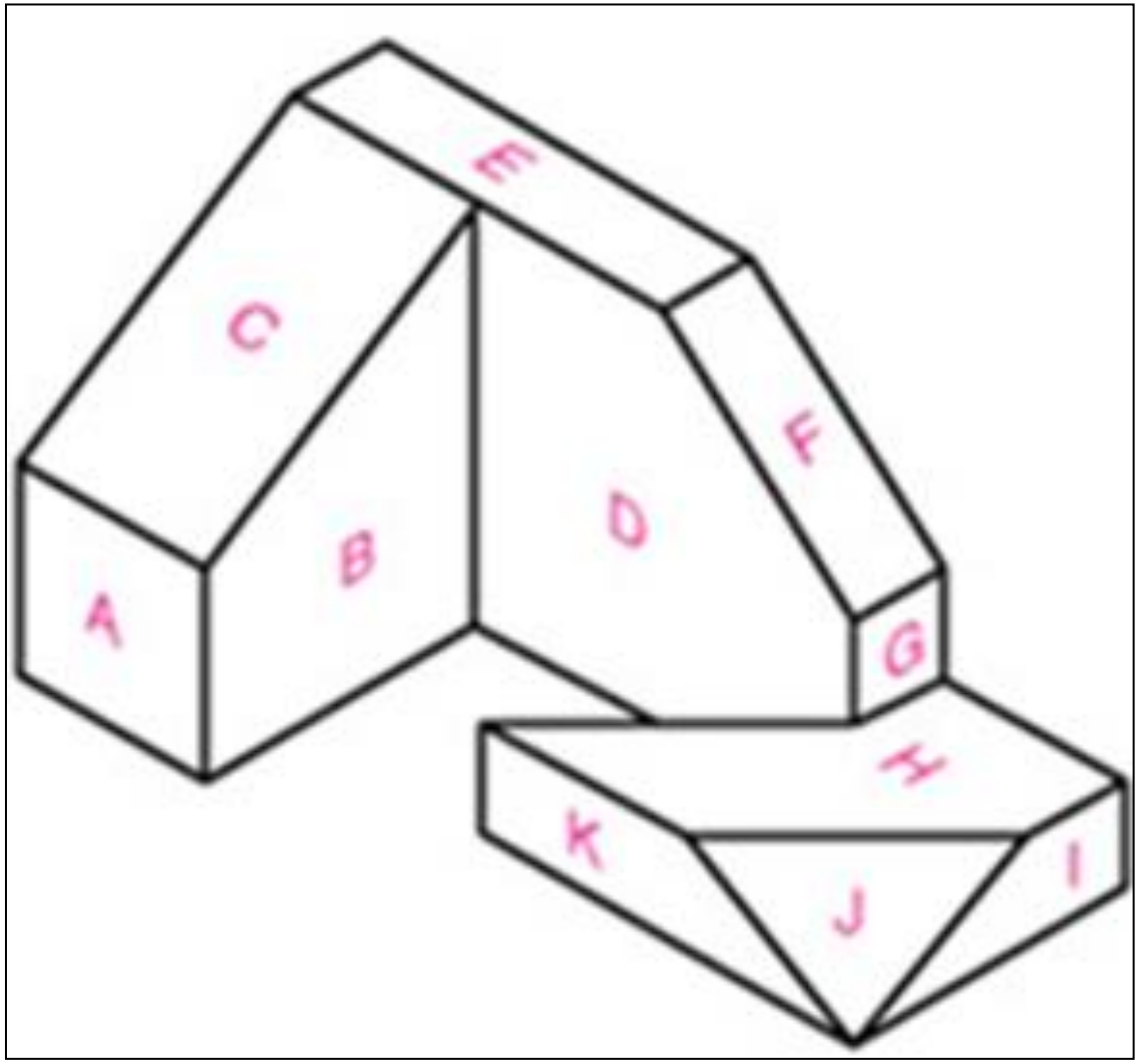
RIGHT view surfaces:

_____



Visualization - Basic Planes

Identify the surfaces with the appropriate letter that would appear in the FRONT view, TOP view, and RIGHT view.
Third Angle Projection.



FRONT view surfaces:

_____

TOP view surfaces:

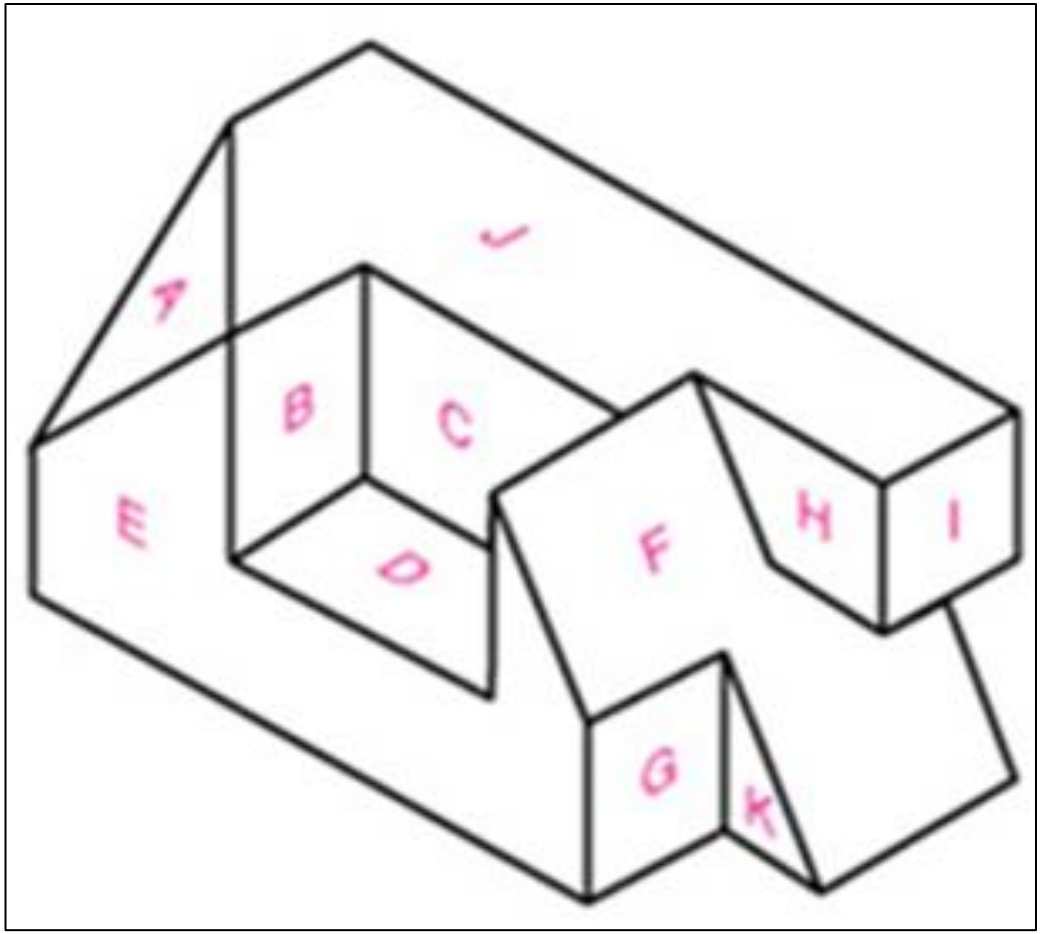
_____

RIGHT view surfaces:

_____

Visualization - Basic Planes

Identify the surfaces with the appropriate letter that would appear in the FRONT view, TOP view, and RIGHT view.
Third Angle Projection.



FRONT view surfaces:

_____

TOP view surfaces:

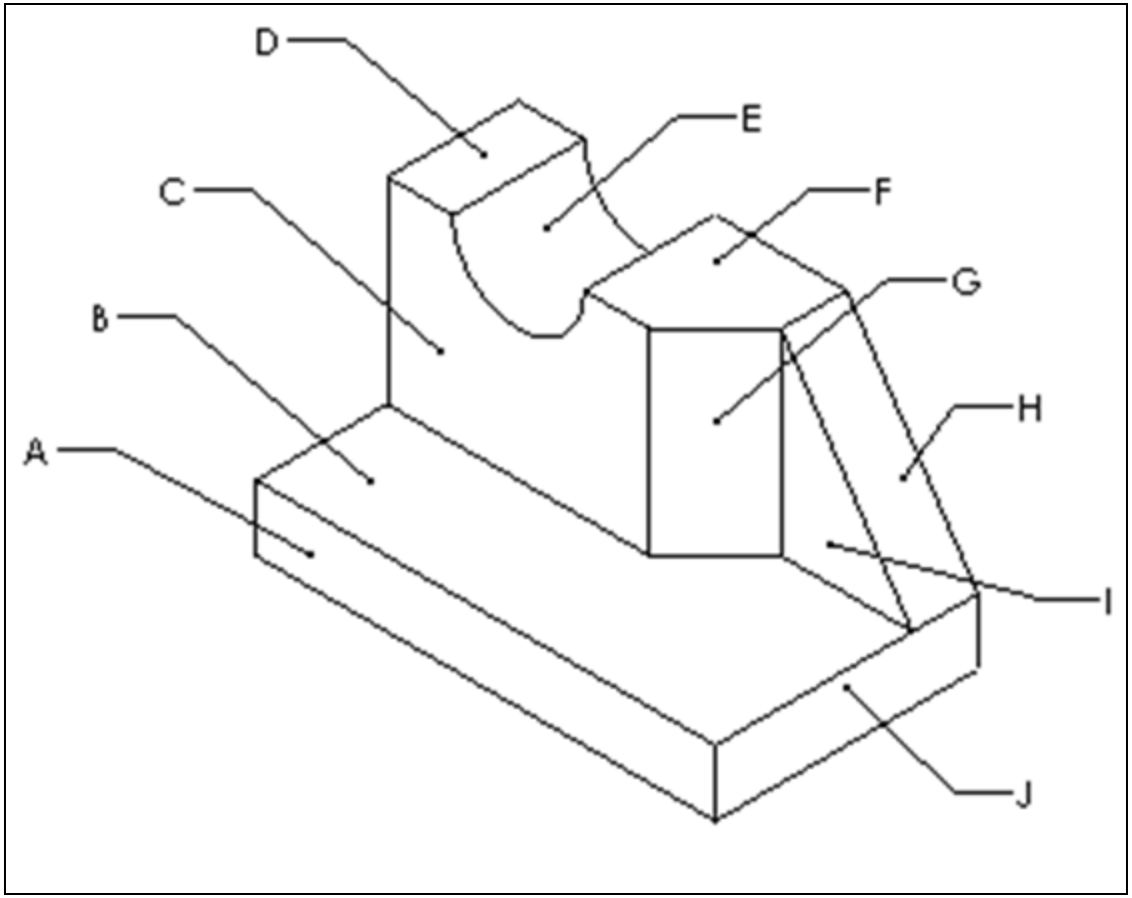
_____

RIGHT view surfaces:

_____

Visualization - Basic Planes

Identify the surfaces with the appropriate letter that would appear in the FRONT view, TOP view, and RIGHT view.
Third Angle Projection.



FRONT view surfaces:

_____

TOP view surfaces:

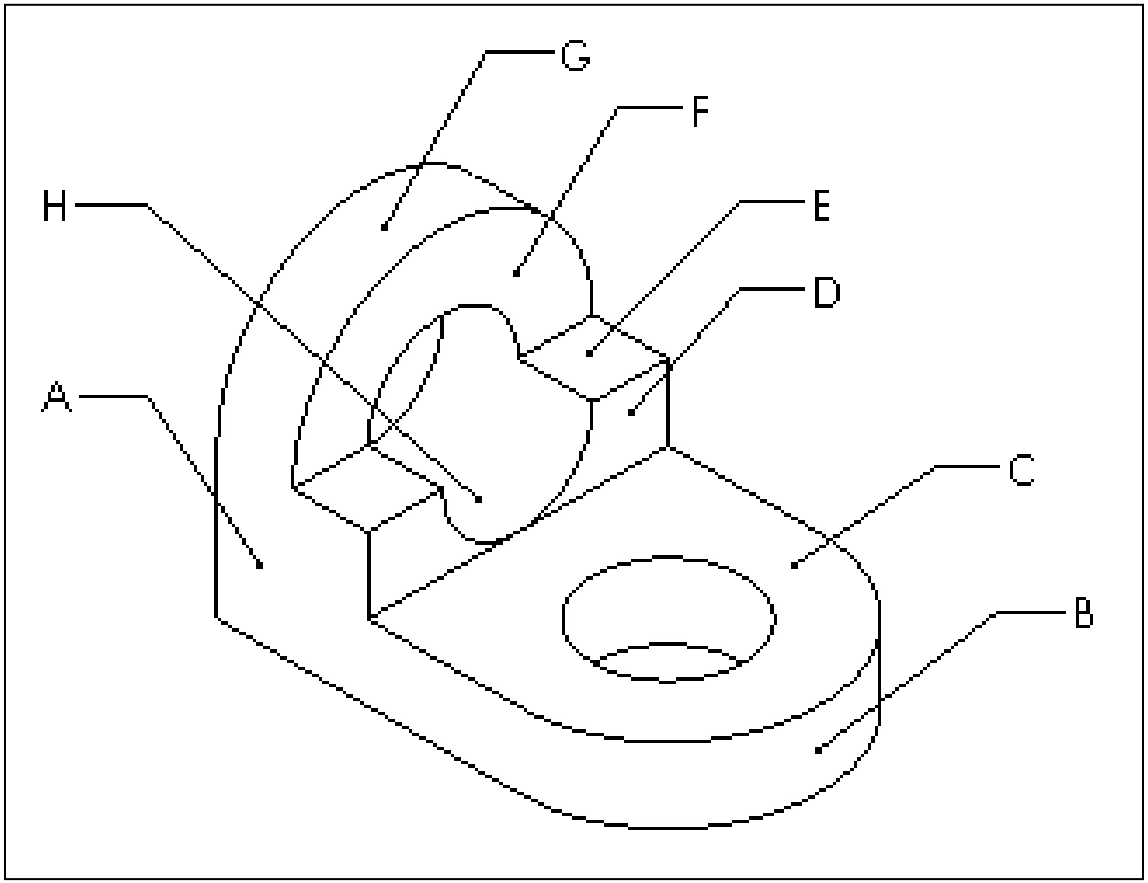
_____

RIGHT view surfaces:

_____

Visualization - Basic Planes

Identify the surfaces with the appropriate letter that would appear in the FRONT view, TOP view, and RIGHT view.
Third Angle Projection.



FRONT view surfaces:

_____

TOP view surfaces:

_____

RIGHT view surfaces:

_____

What Sketch Plane would you start this model? (Top, Front or Right)
What would the Base Sketch look like? Keep the Base Sketch simple!