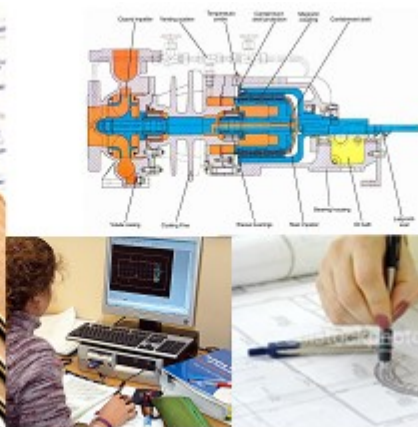


Chapter 3

Orthographic Projection



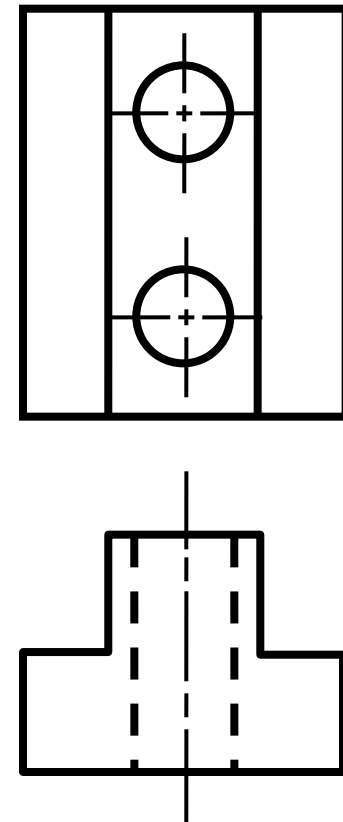
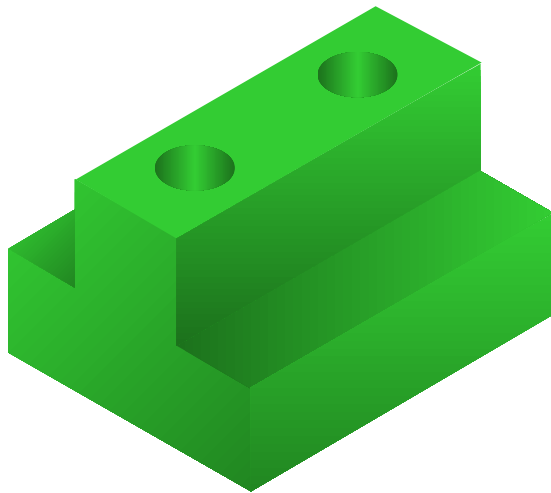
TOPICS

- Object representation
- Multiview projection
- Glass box concept
- Orthographic projection of point, line, plane, surface and object.
- Line convention

OBJECT REPRESENTATION

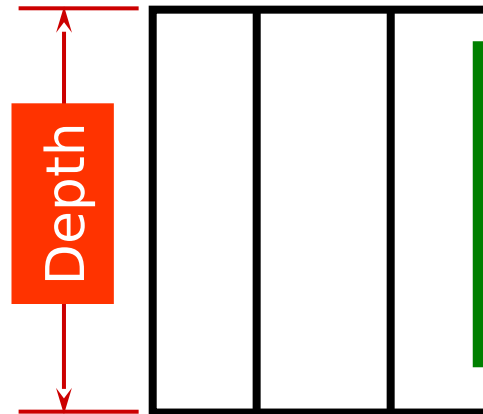
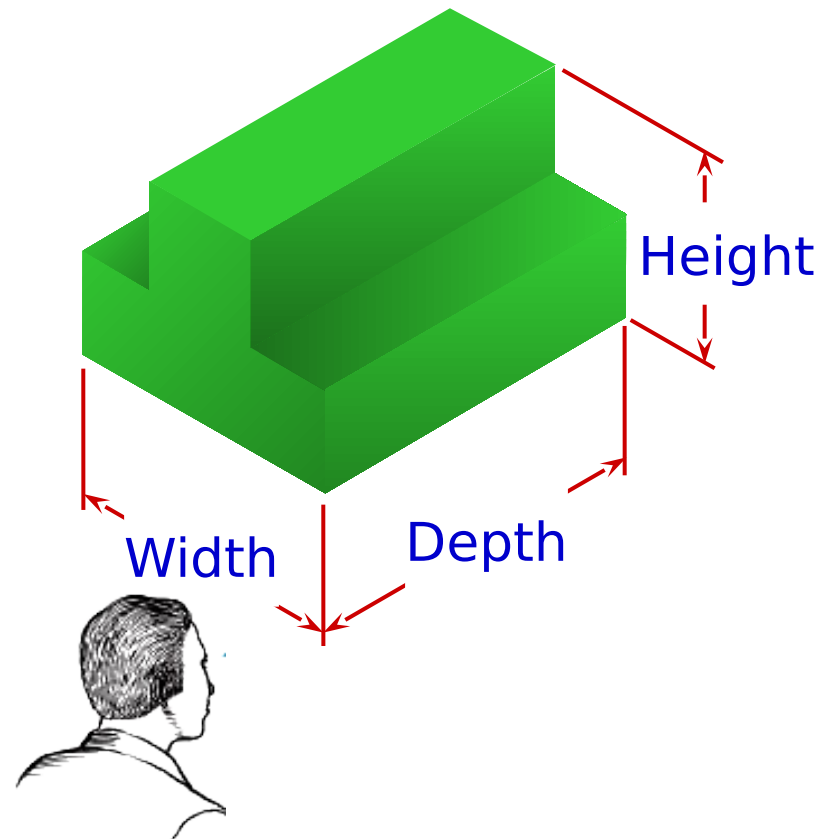
■ axonometric projection

■ multiview projection

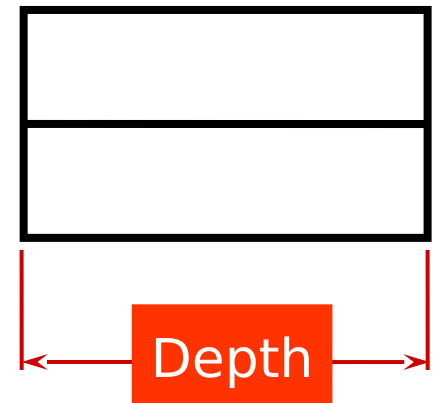
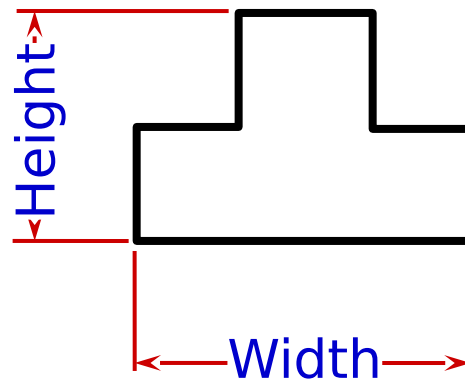


MULTIVIEW PROJECTION

Three principle dimensions. can be presented only two in each view.



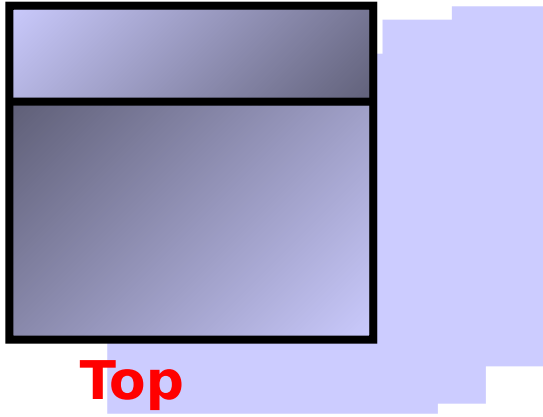
**Adjacent view(s)
is needed to
fulfill the size
description.**



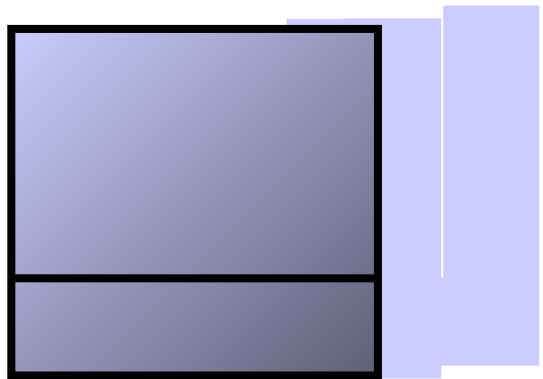
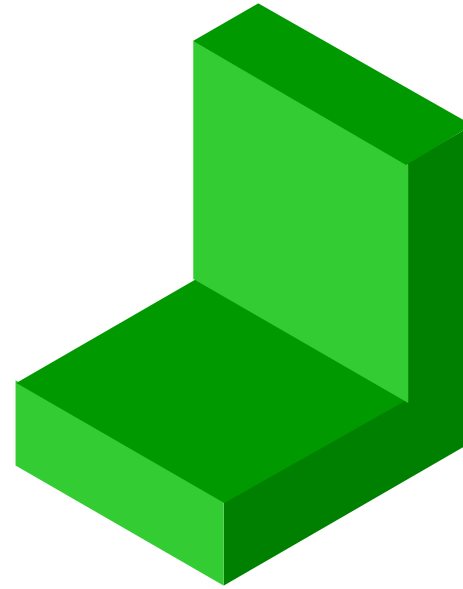
TO OBTAIN MULTIVIEW REPRESENTATION OF AN OBJECT

1. Revolve the **object** with respect to **observer**.
2. The **observer** move around the **object**.

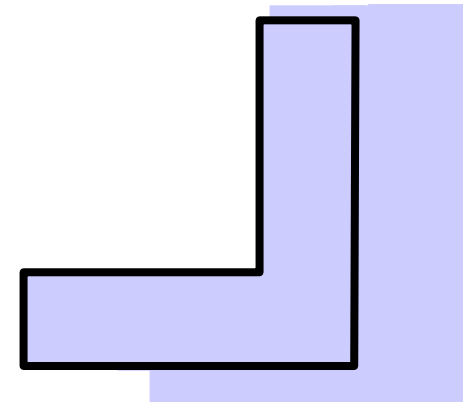
REVOLVE THE OBJECT



**Top
view**

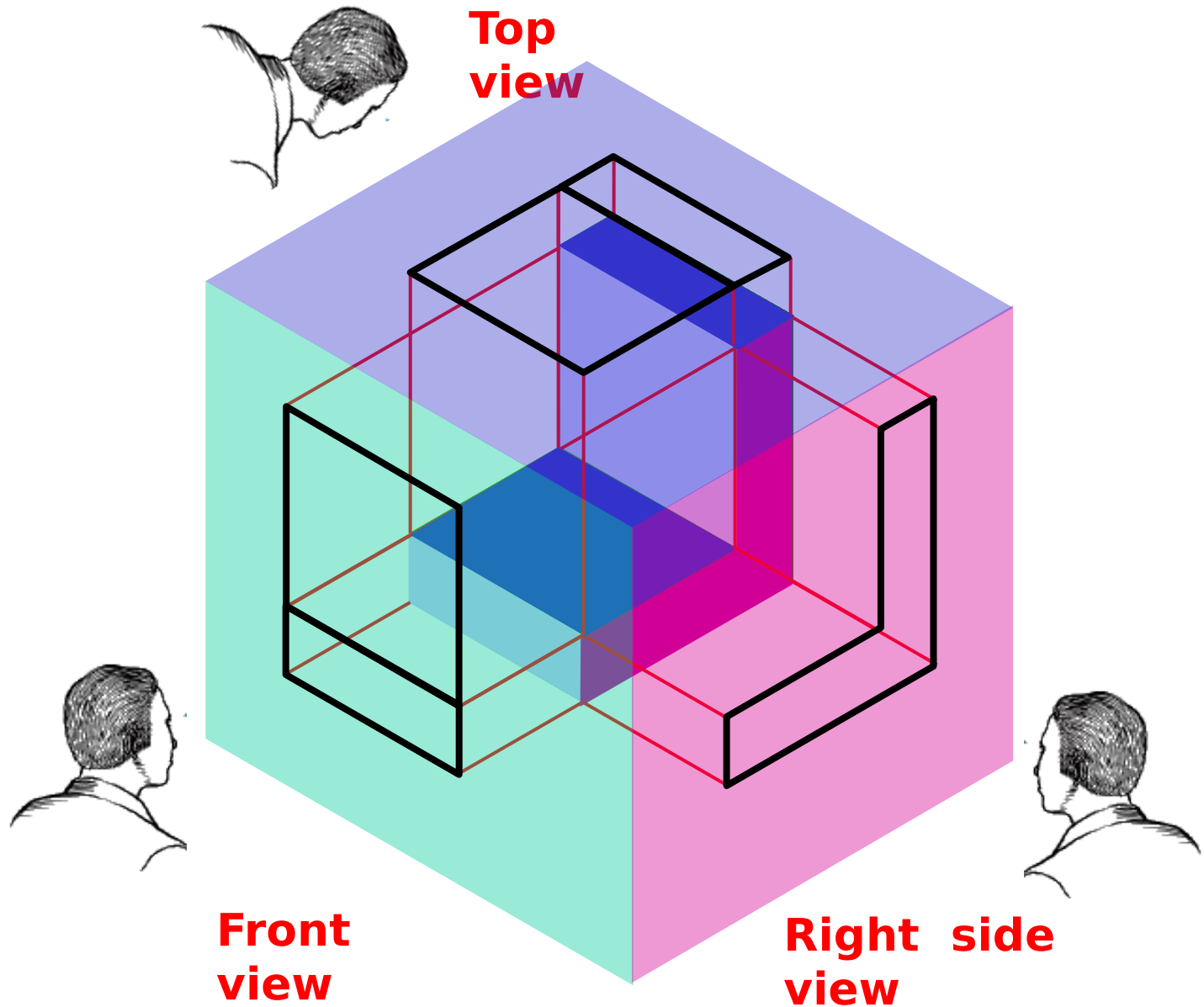


**Front
view**

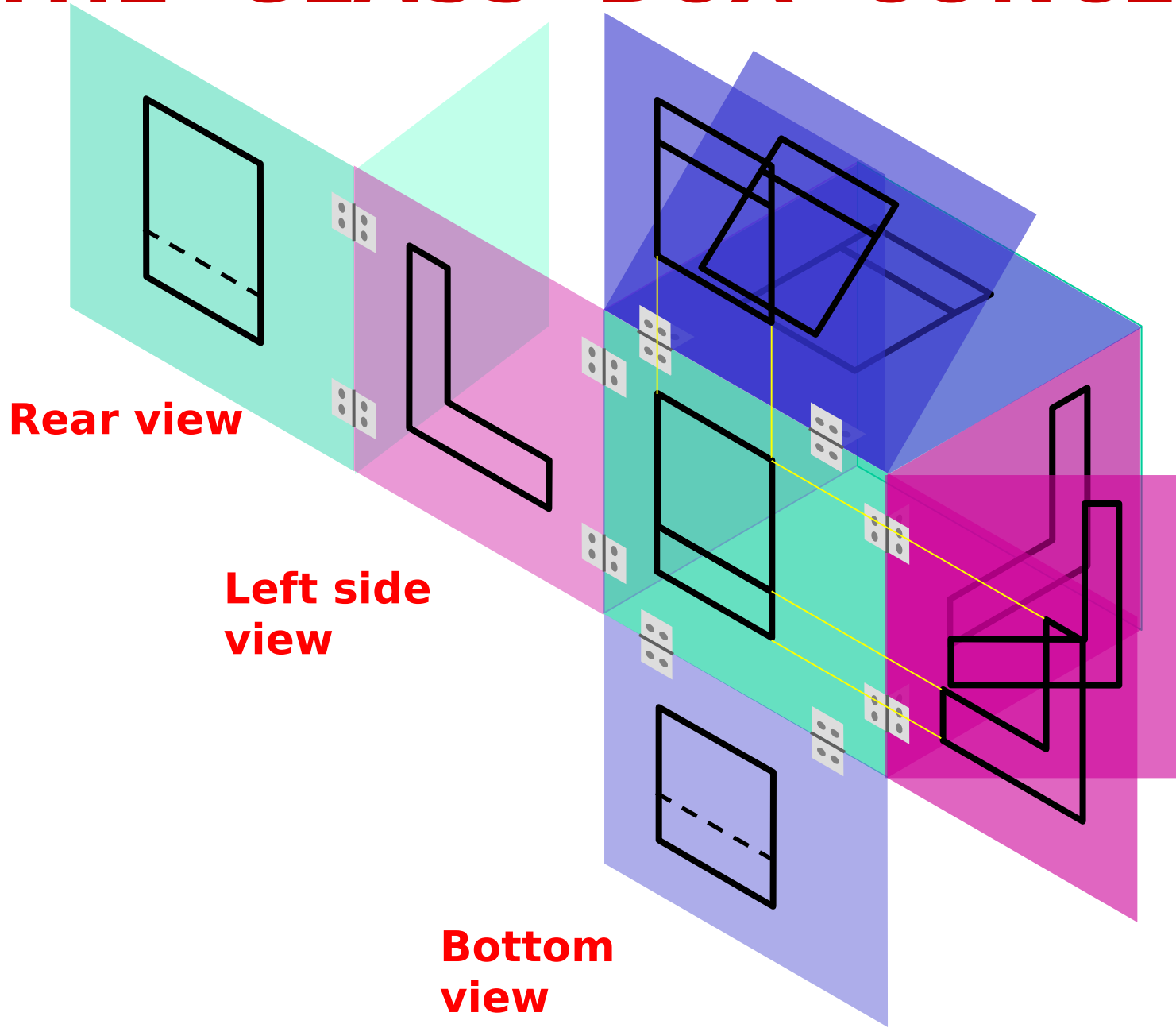


**Right side
view**

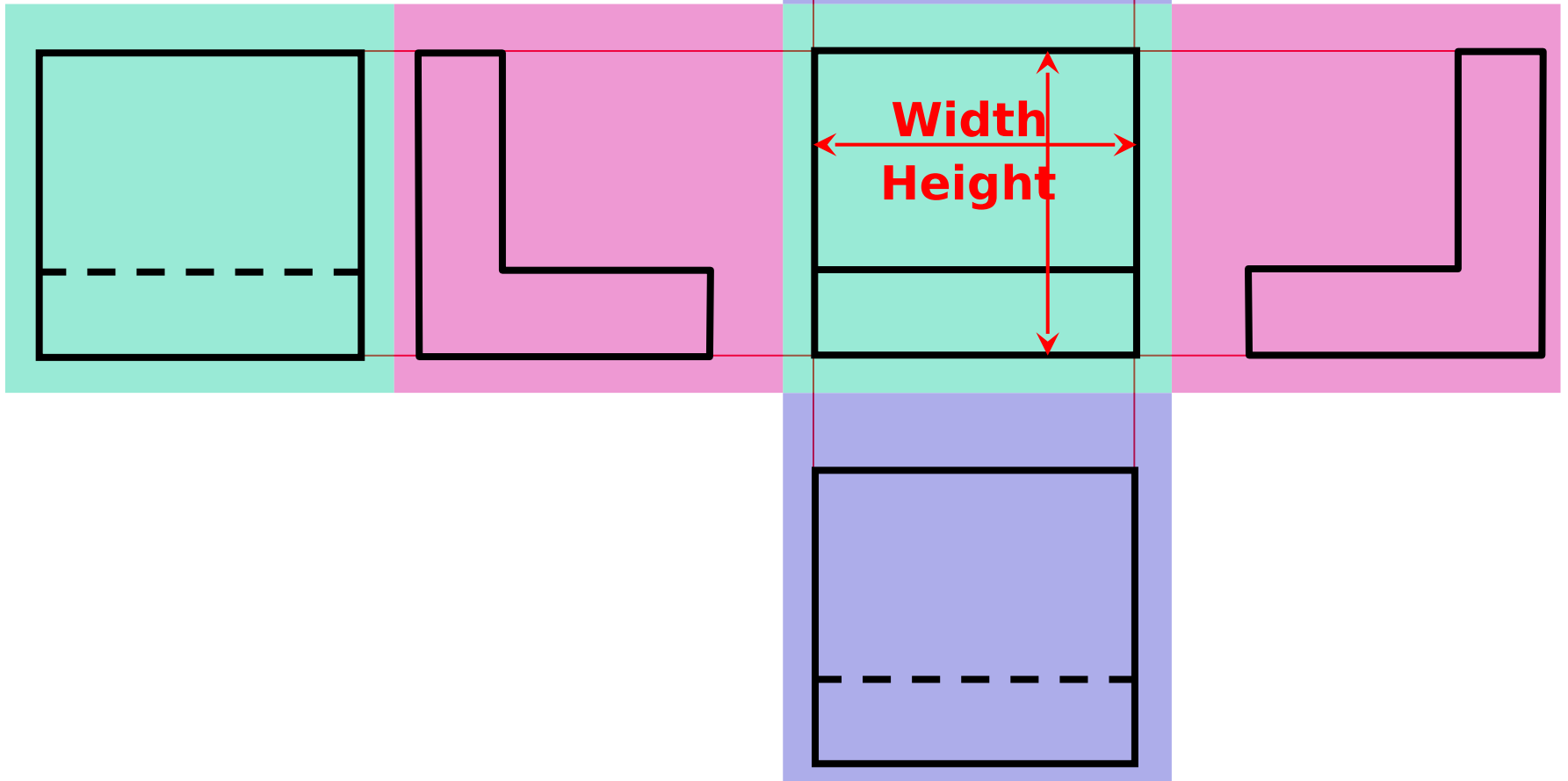
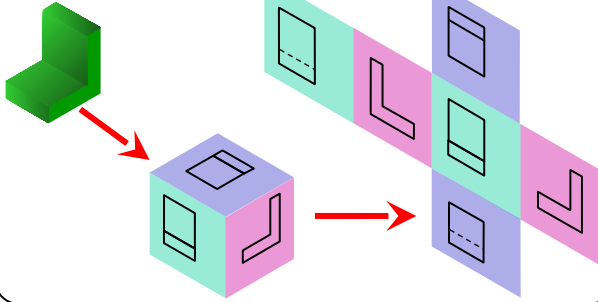
OBSERVER MOVE AROUND



THE GLASS BOX CONCEPT



History



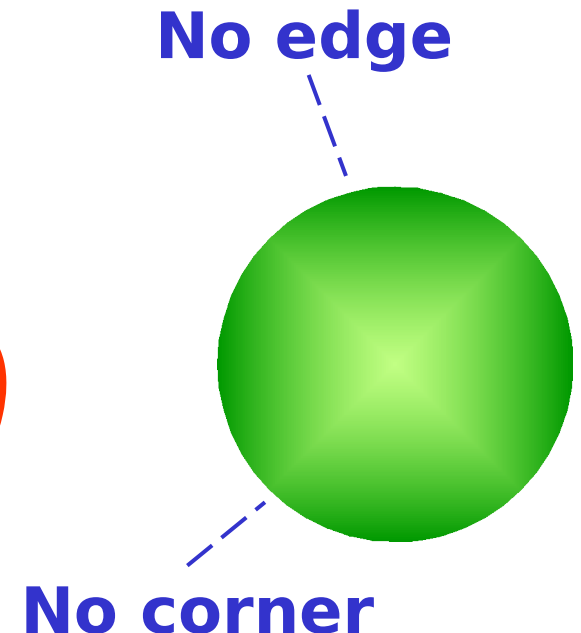
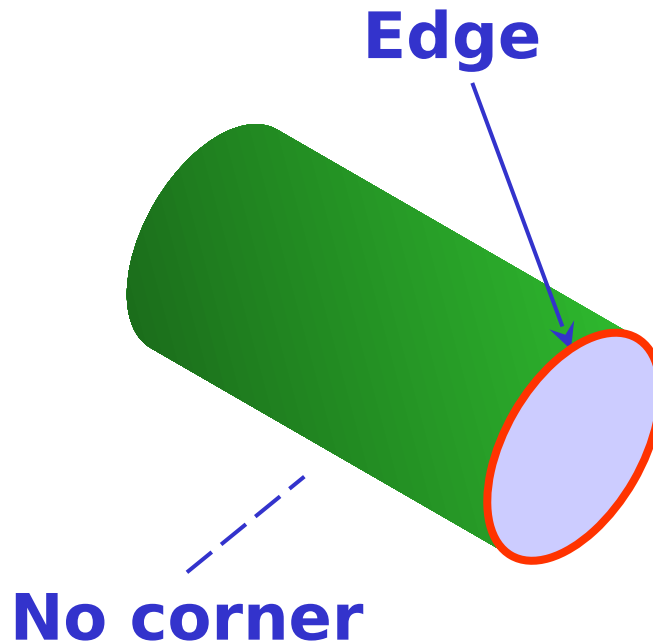
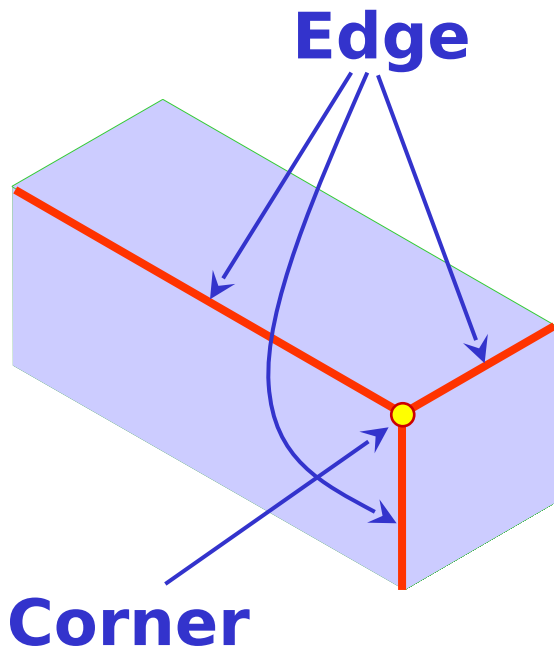
Orthographic Projection of Object Features



OBJECT FEATURES

Edges are lines that represent the boundary between two faces.

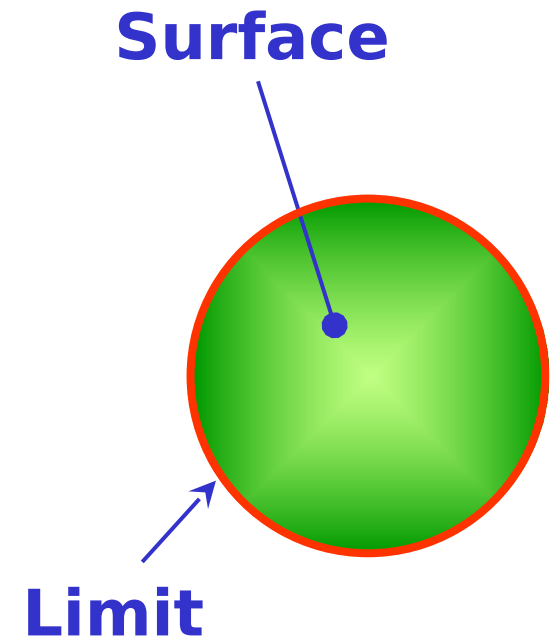
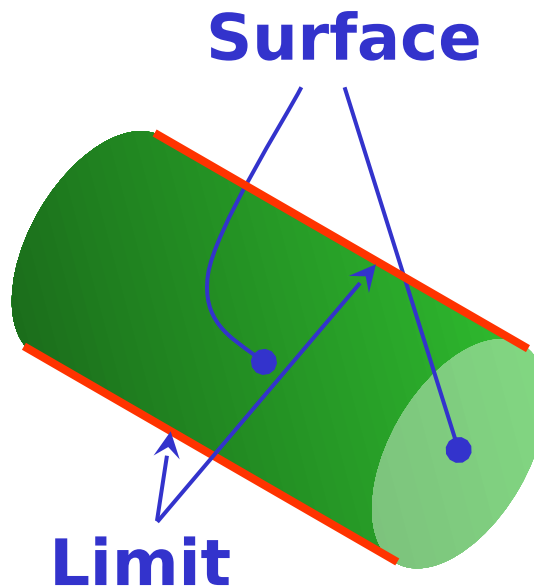
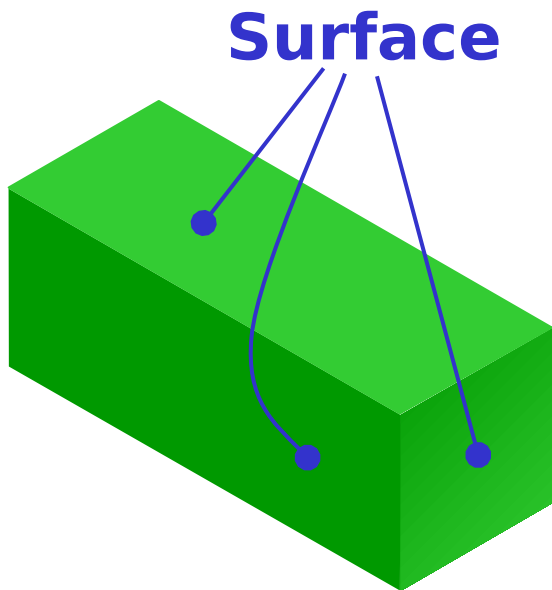
Corners Represent the intersection of two or more edges.



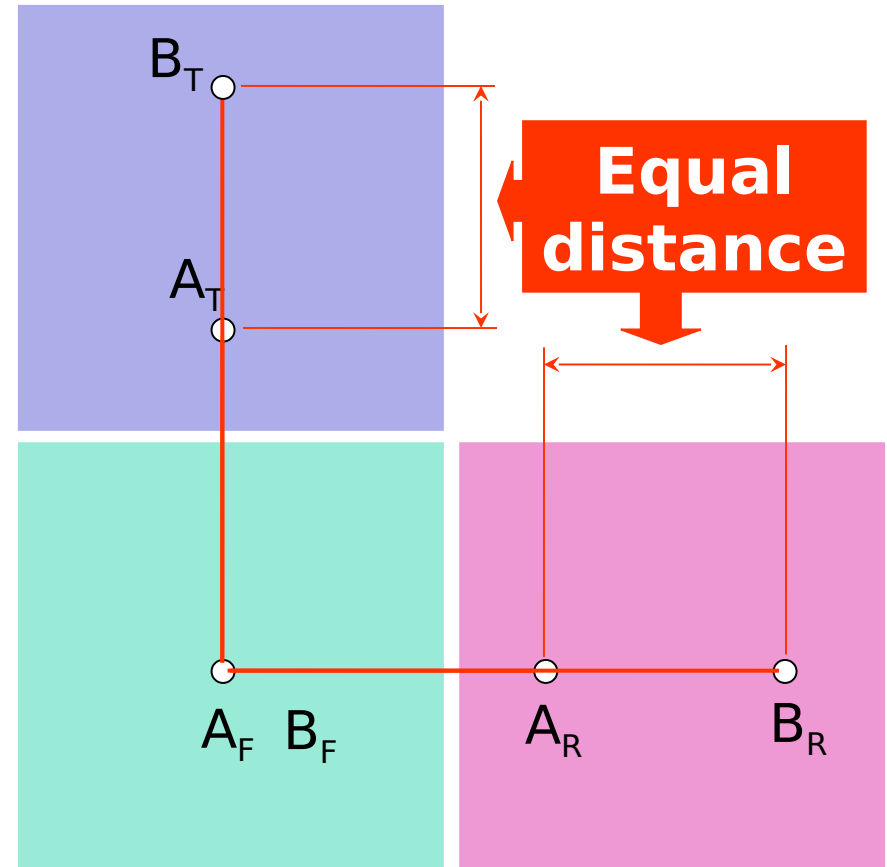
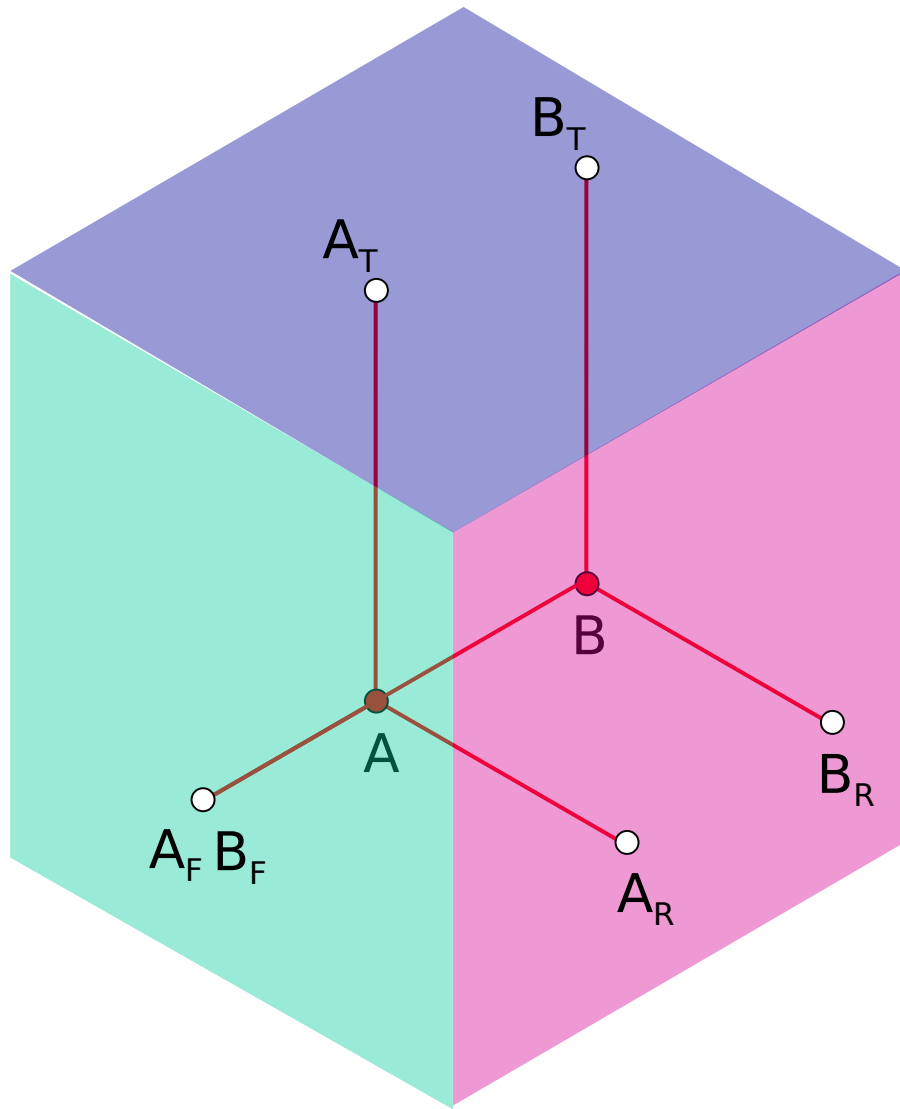
OBJECT FEATURES

Surface are areas that are bounded by edges or limiting element.

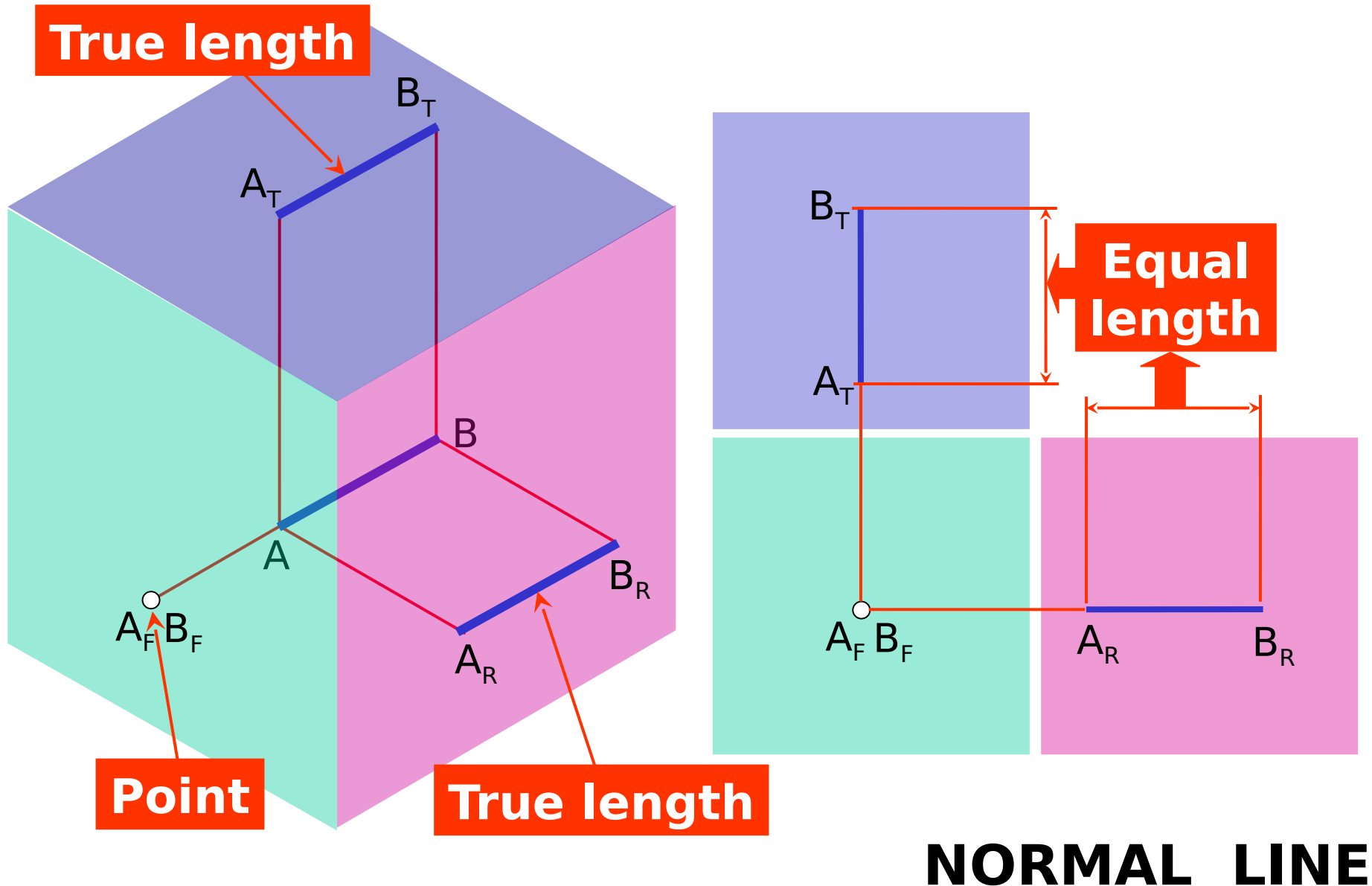
Limiting element is a line that represents the last visible part of the curve surface.



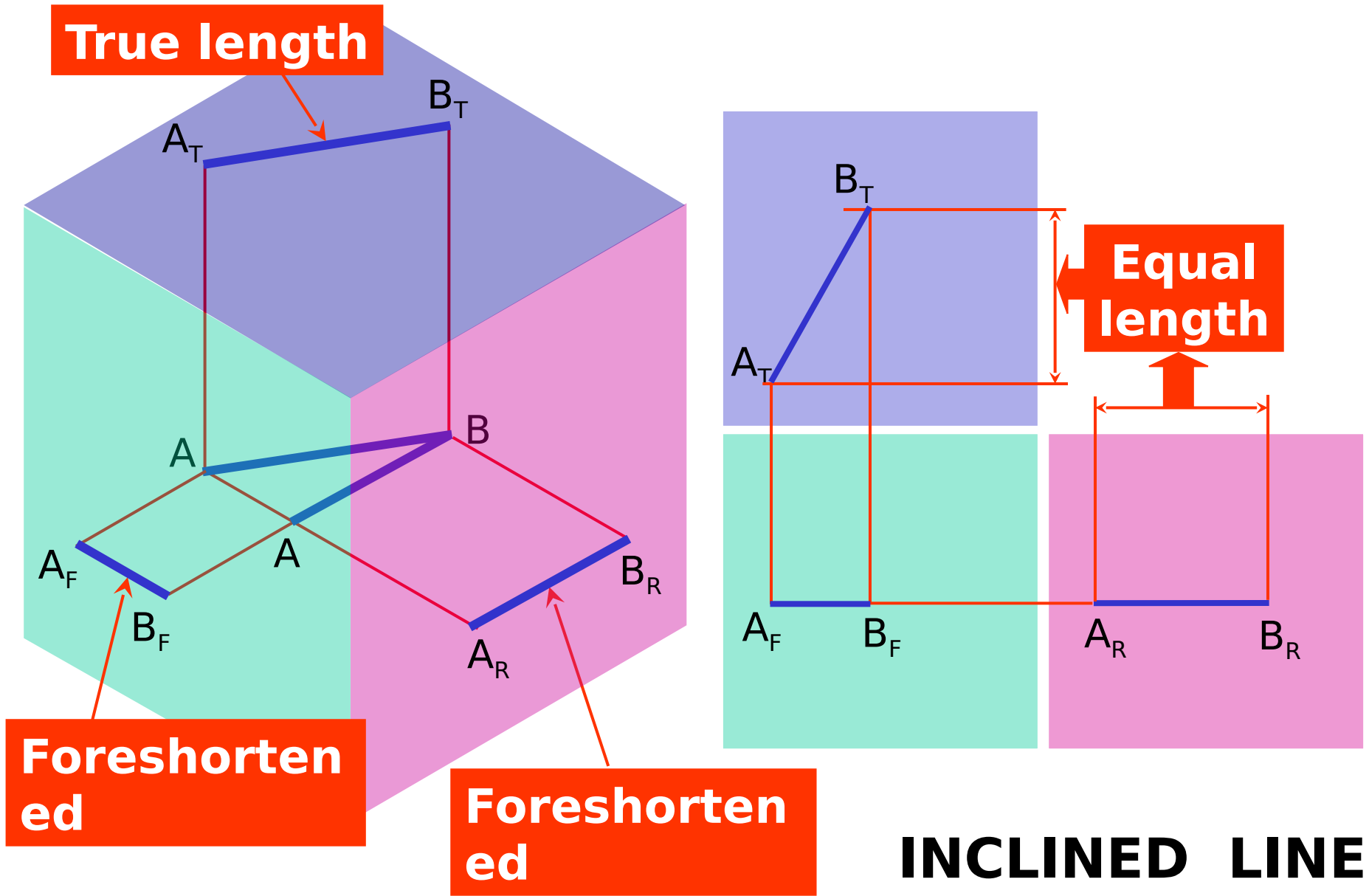
PROJECTION OF POINT(S)



PROJECTION OF LINE

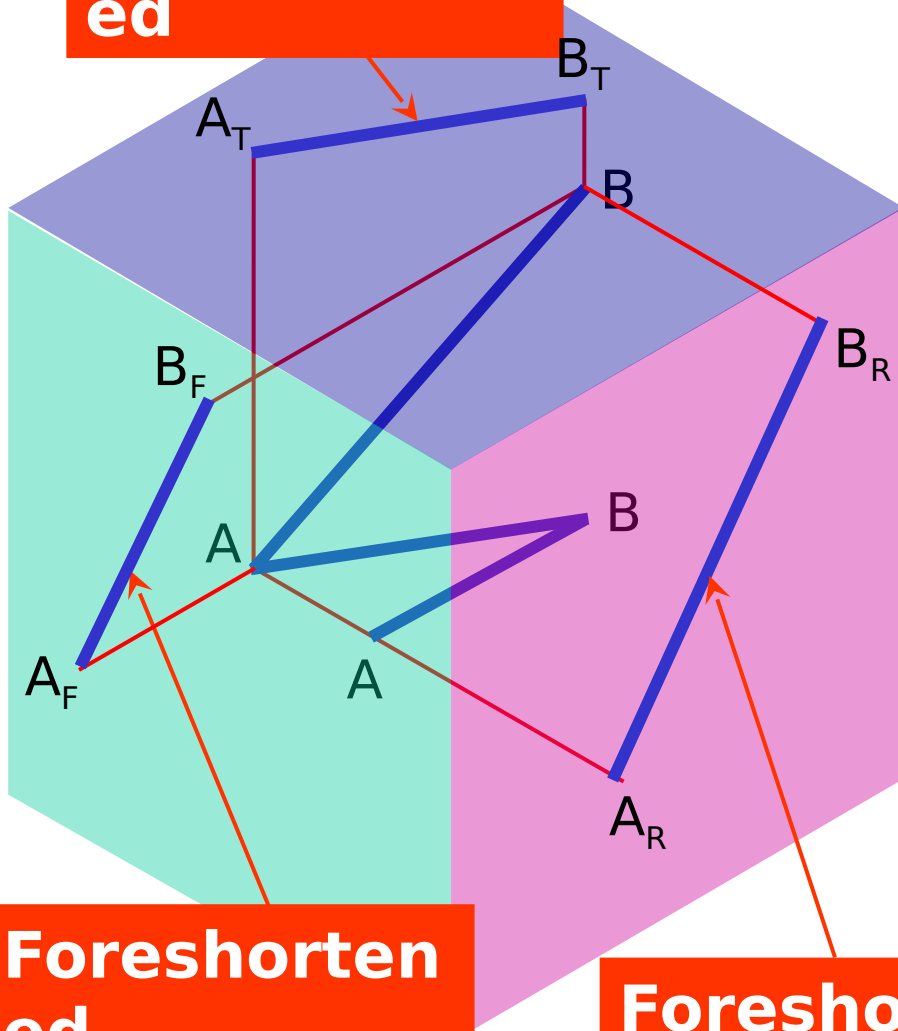


PROJECTION OF LINE



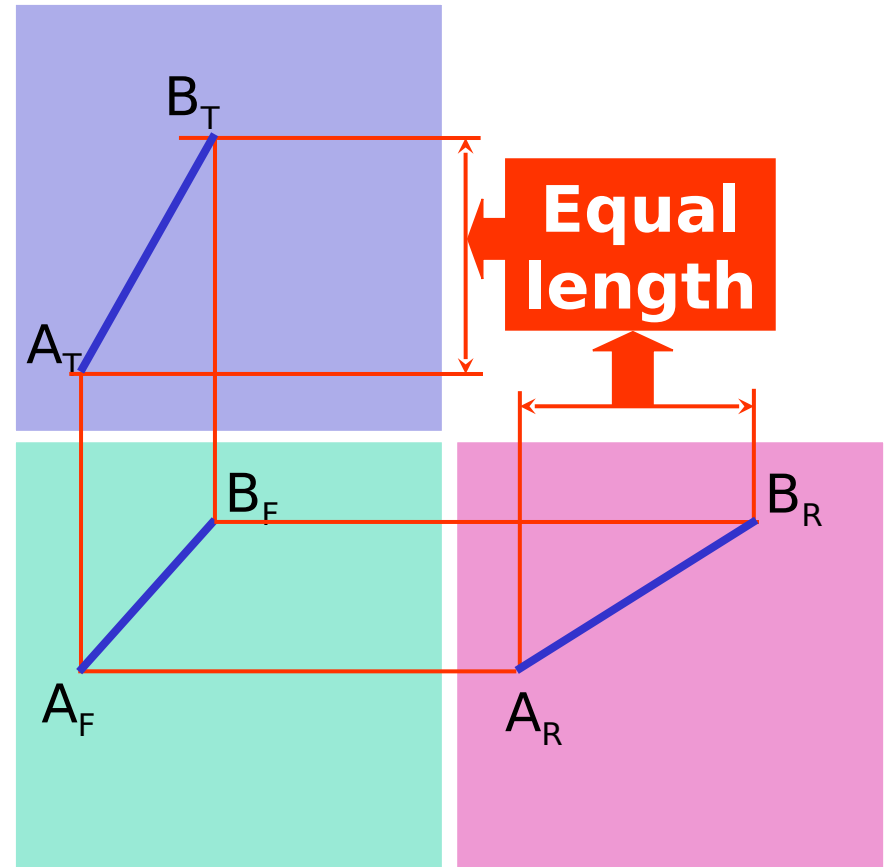
PROJECTION OF LINE

**Foreshorten
ed**



**Foreshorten
ed**

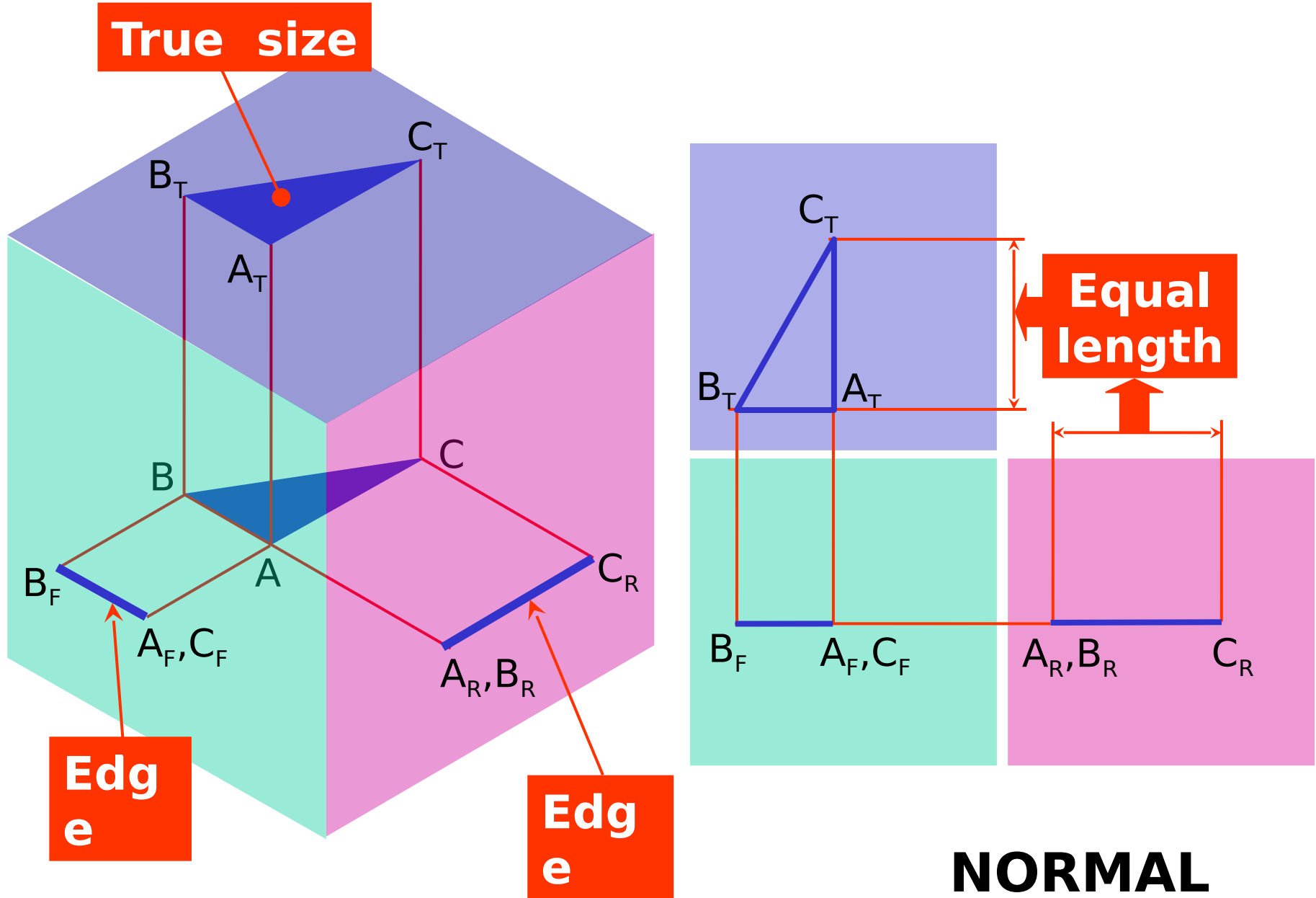
**Foreshorten
ed**



**Equal
length**

OBLIQUED LINE

PROJECTION OF PLANE



Foreshortened



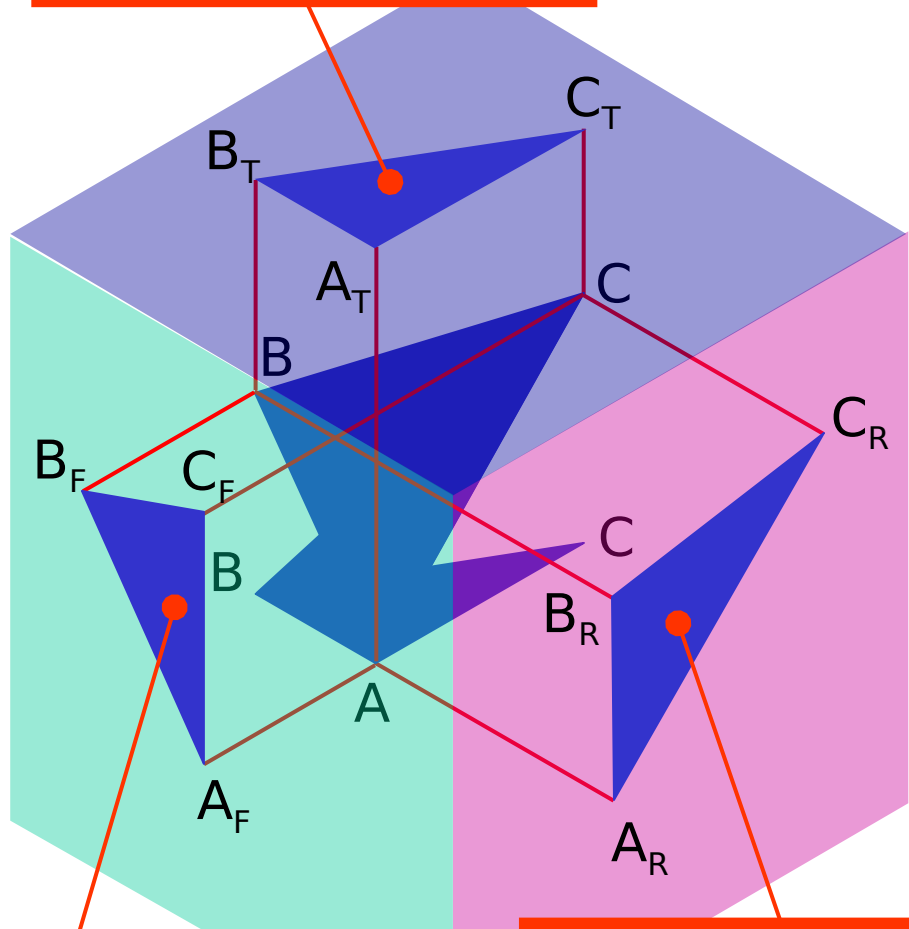
Edge



INCLINED

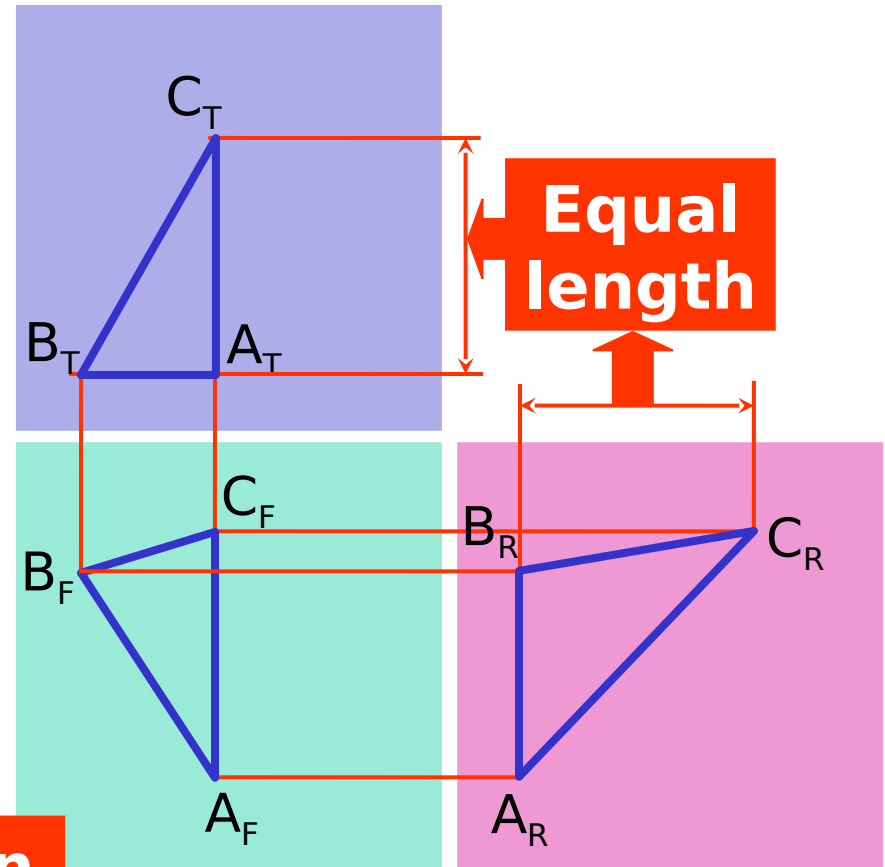
PROJECTION OF PLANE

Foreshortened



**Foreshorten
ed**

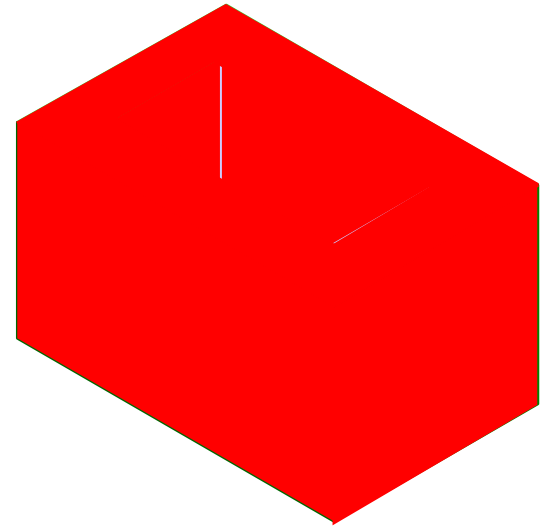
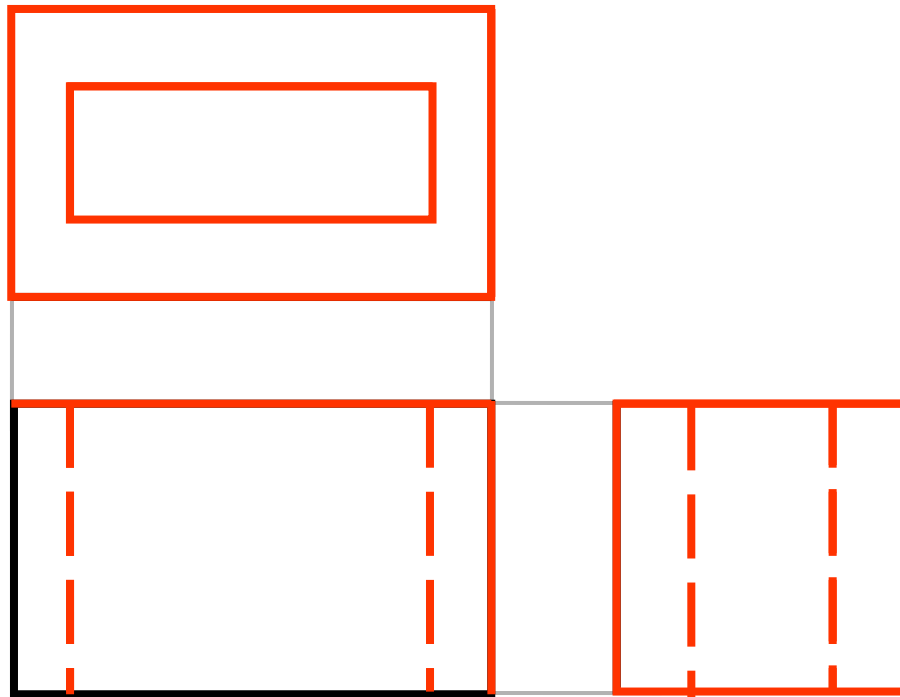
**Foreshorten
ed**



OBLIQUED

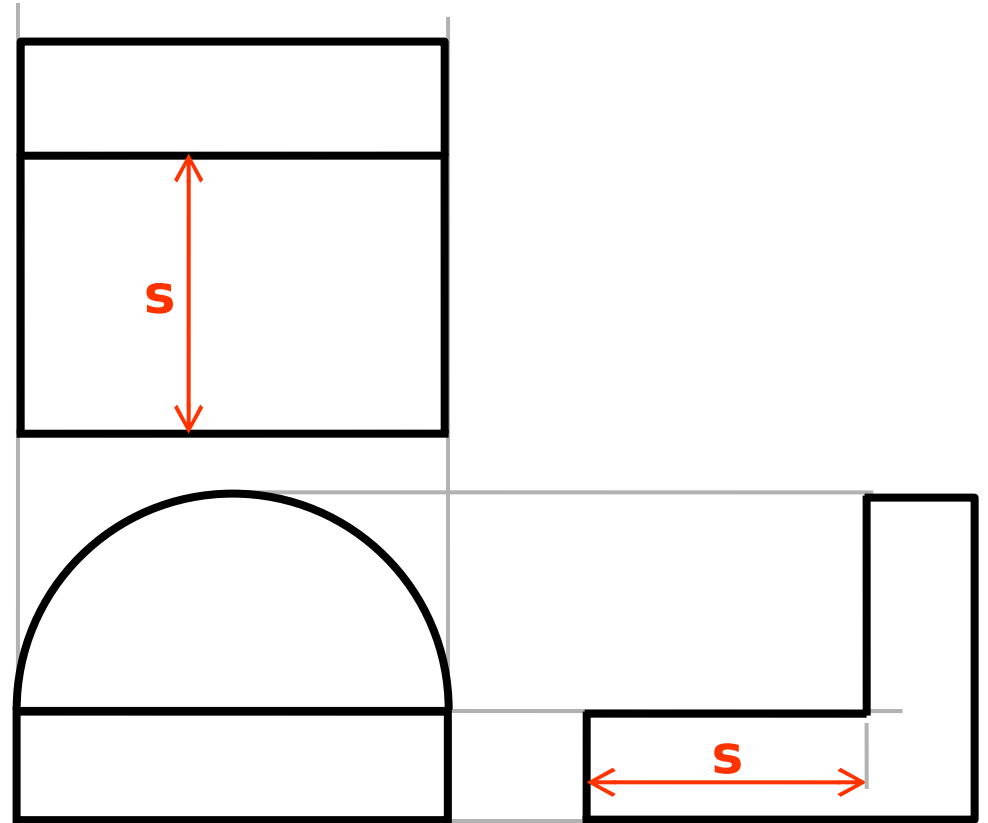
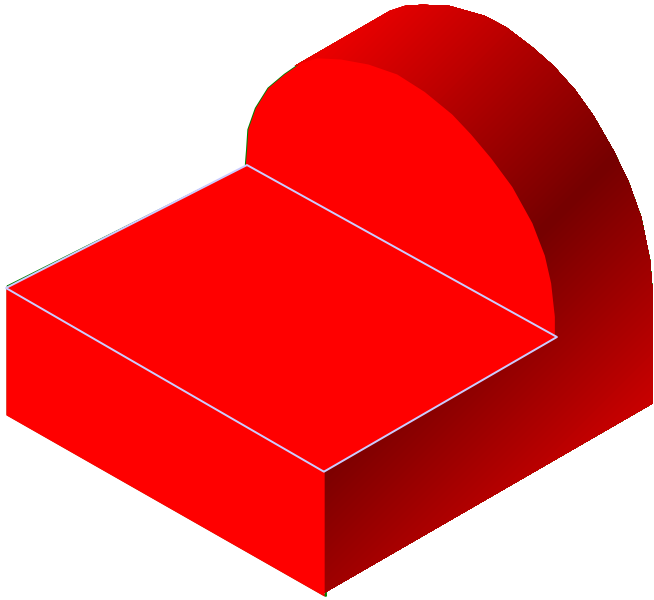
PROJECTION OF OBJECT

The views are obtained by projecting all object features to the picture plane.

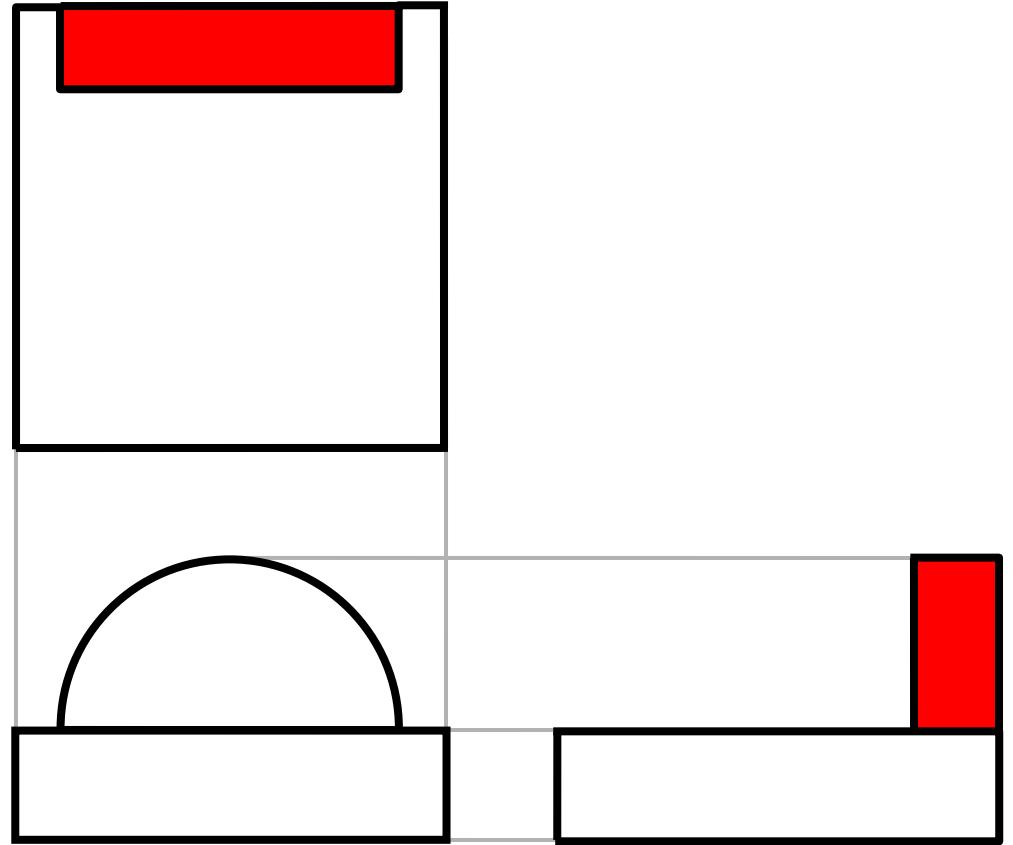
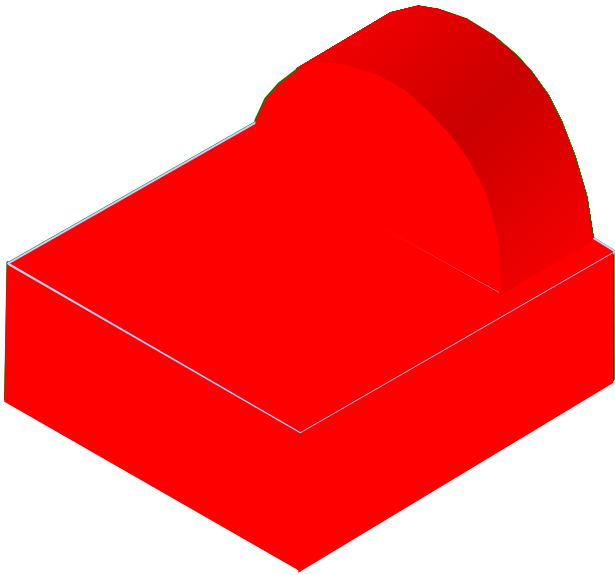


You have to project the remaining surfaces which are invisible too !

PROJECTION OF OBJECT

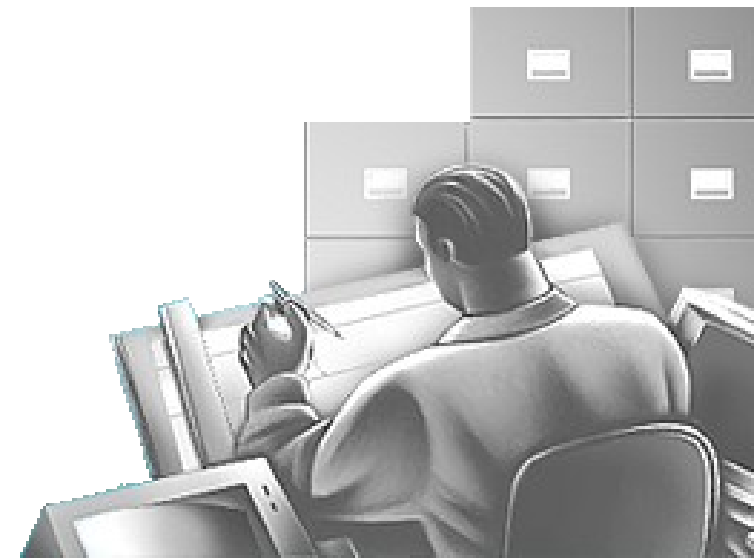


PROJECTION OF OBJECT





Line Convention



LINE CONVENTION

- Precedence of coincide lines.
- Hidden line drawing.
- Center line drawing.

PRECEDENCE OF LINE

Order of
importance

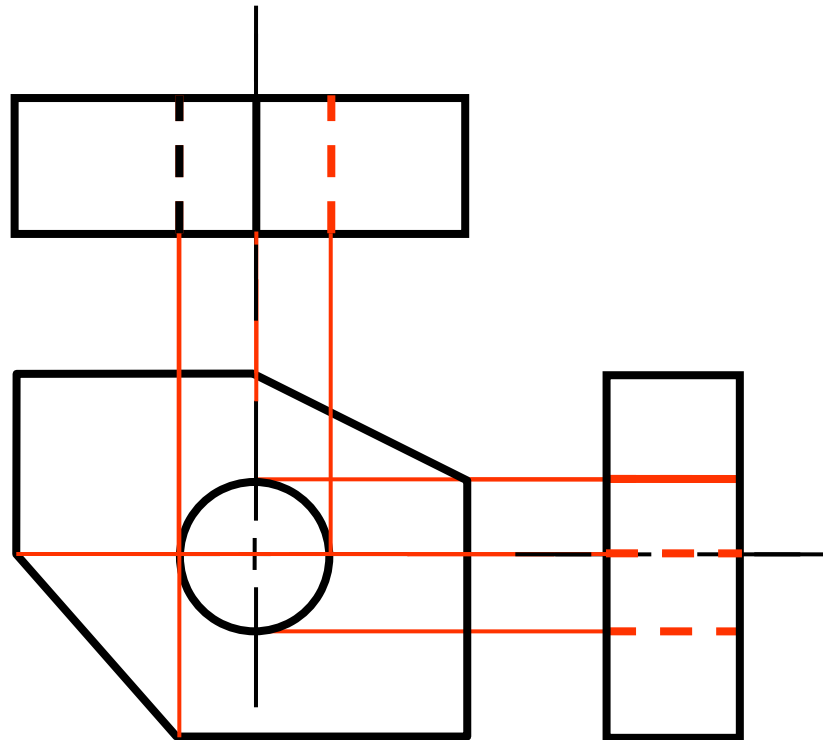
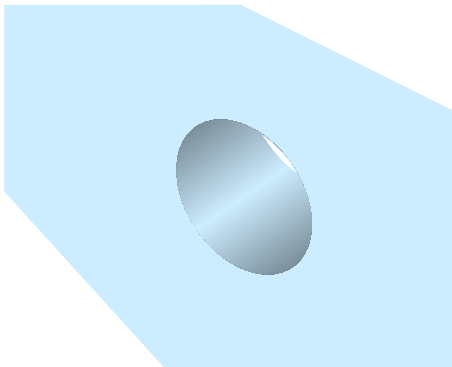
Visible
line



Hidden
line

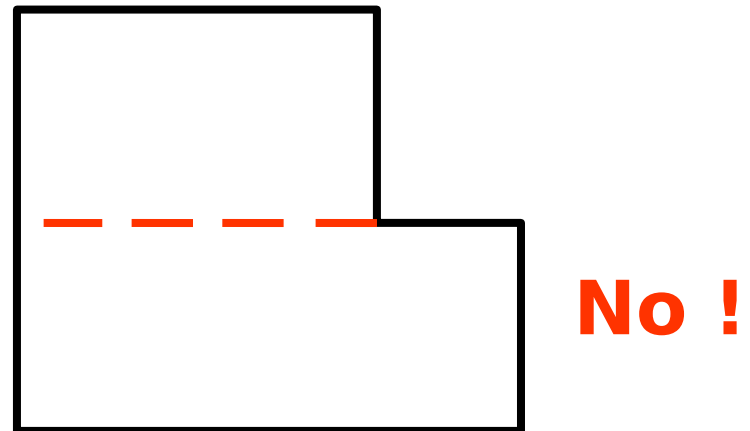
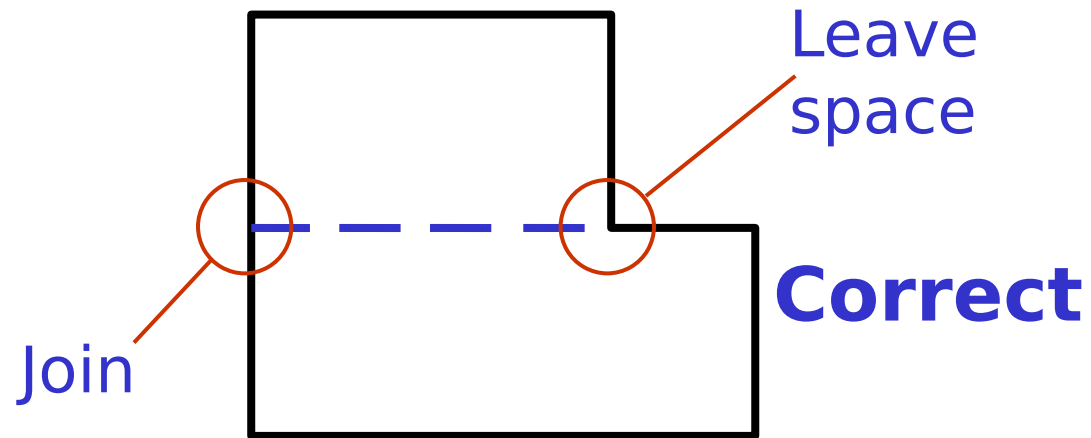
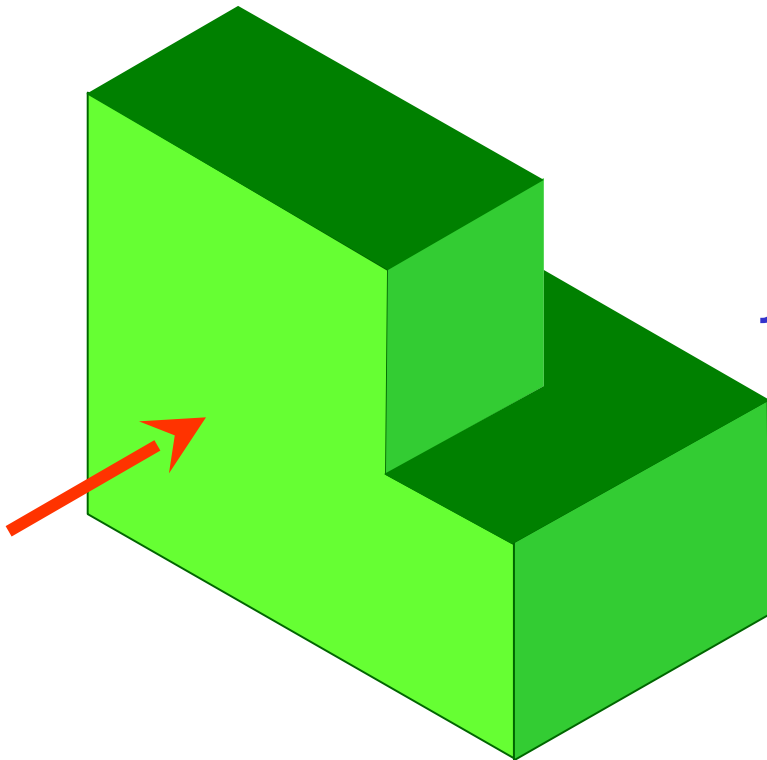


Center
line



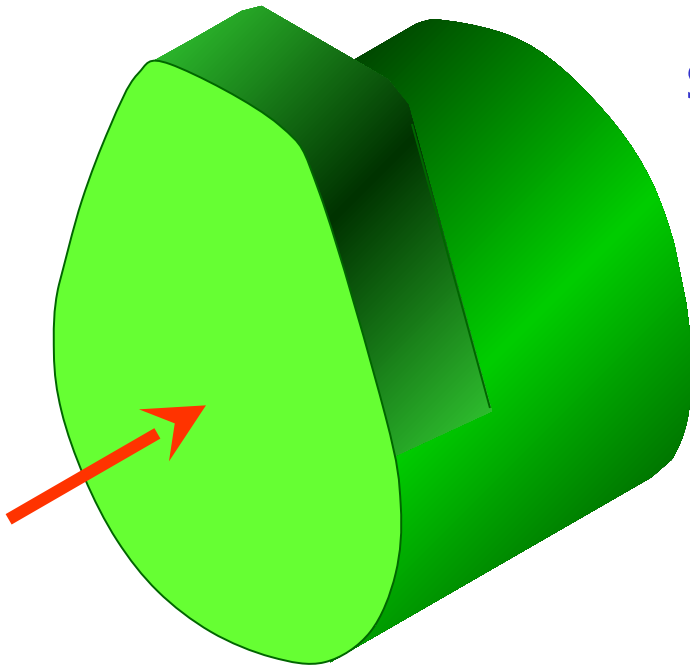
HIDDEN LINE PRACTICE

Hidden line should join a visible line, **except** it extended from the visible line.



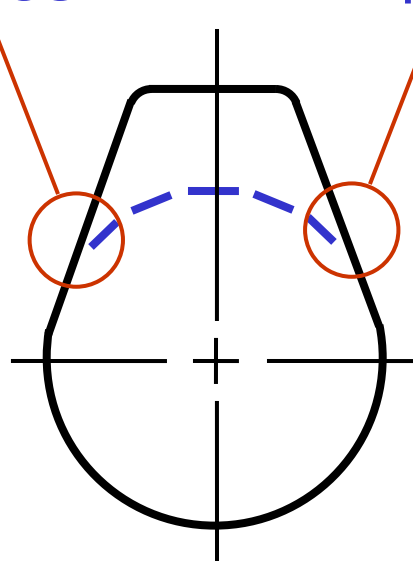
HIDDEN LINE PRACTICE

Hidden line should join a visible line, **except** it extended from the visible line.

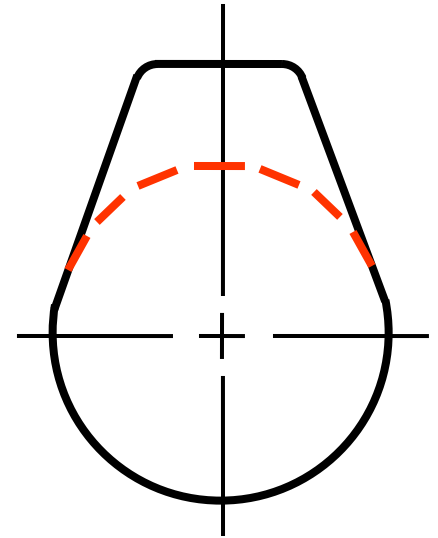


Leave
space

Leave
space



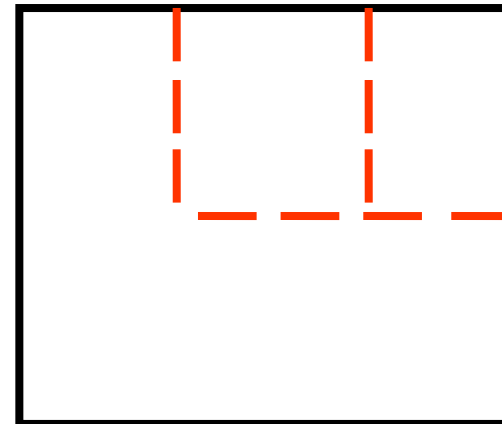
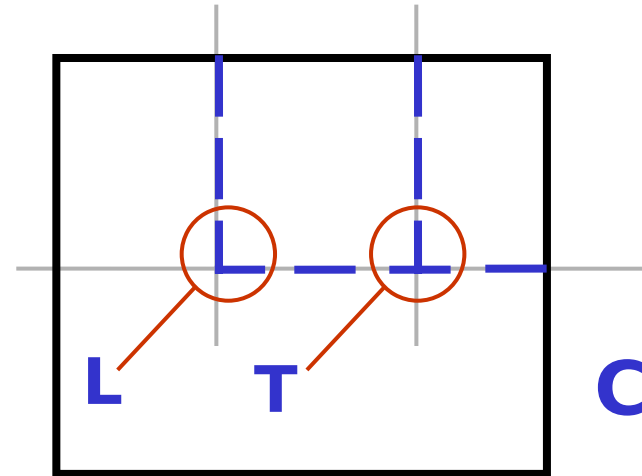
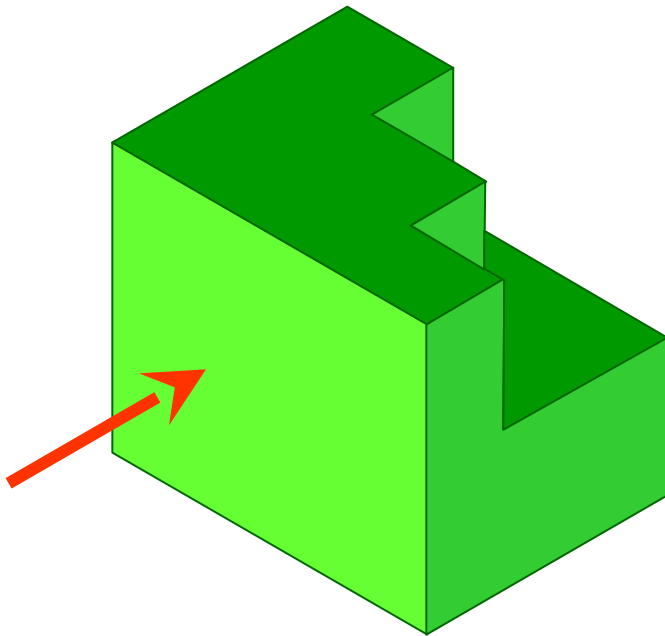
Correct



No !

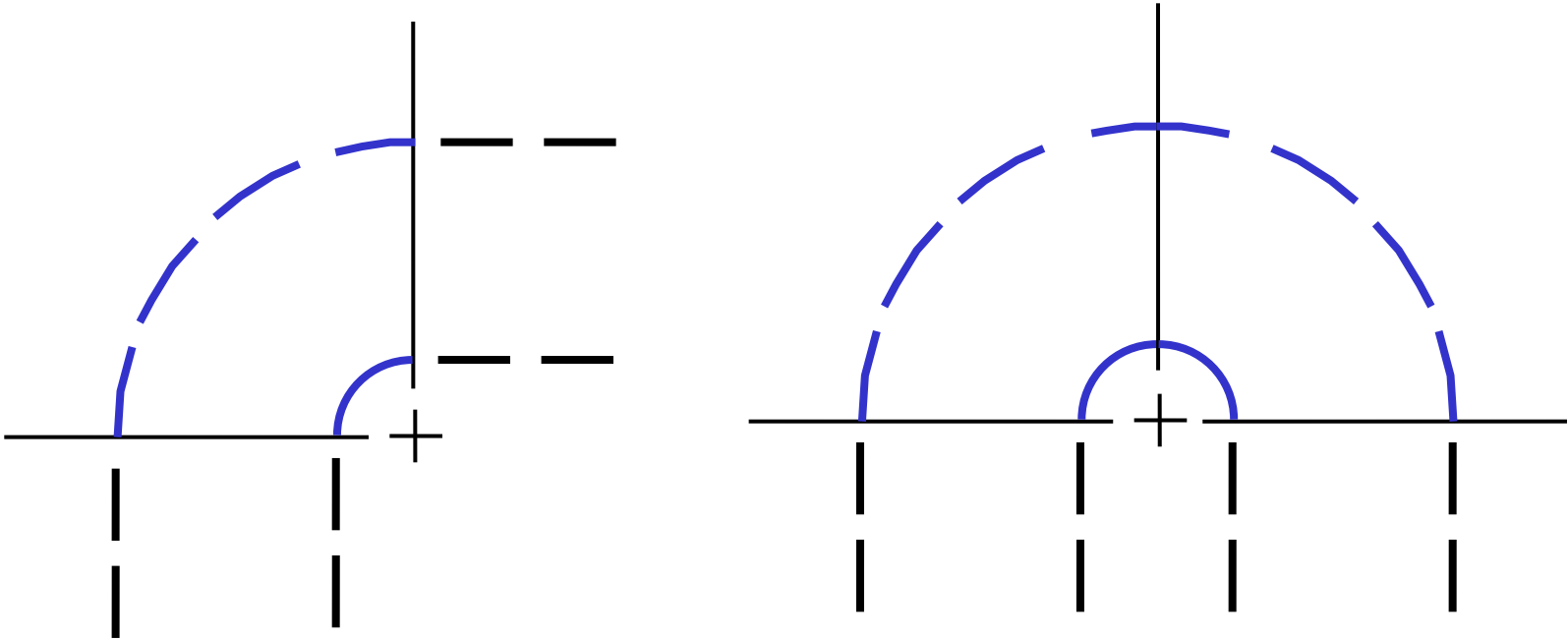
HIDDEN LINE PRACTICE

Hidden line should intersect to form **L** and **T** corners.



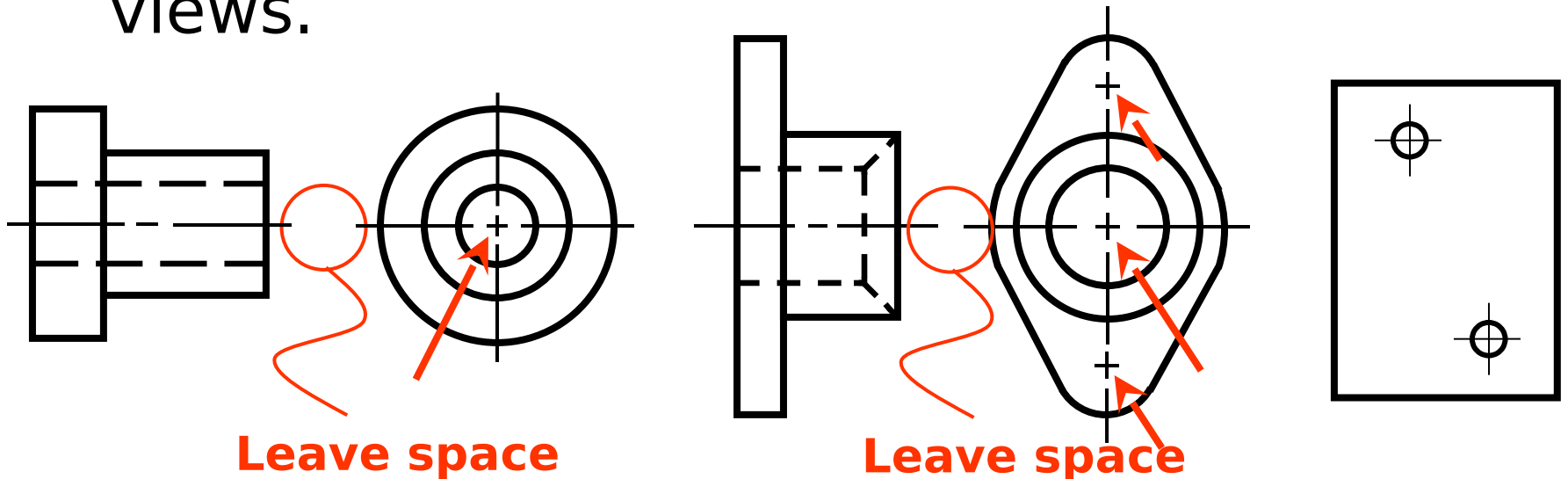
HIDDEN LINE PRACTICE

■ Hidden arcs should start on a center line.



CENTER LINE PRACTICE

- In circular view, short dash should cross at the intersections of center line.
- For small hole, center line is presented as thin continuous line.
- Center line should not extend between views.



CENTER LINE PRACTICE

- Leave the gap when centerline forms a continuation with a visible or hidden line
- Center line should always start and end with long dash.

