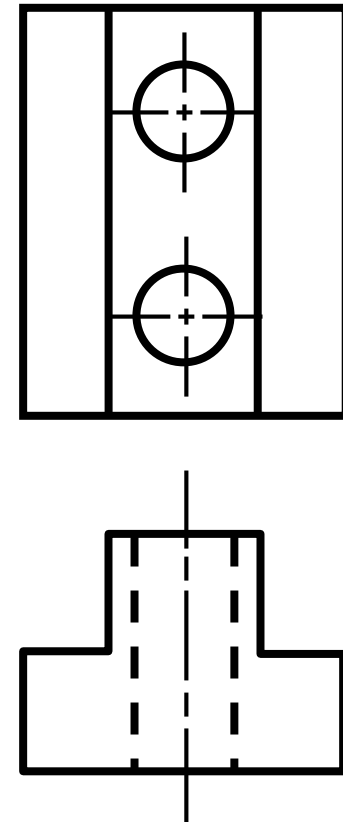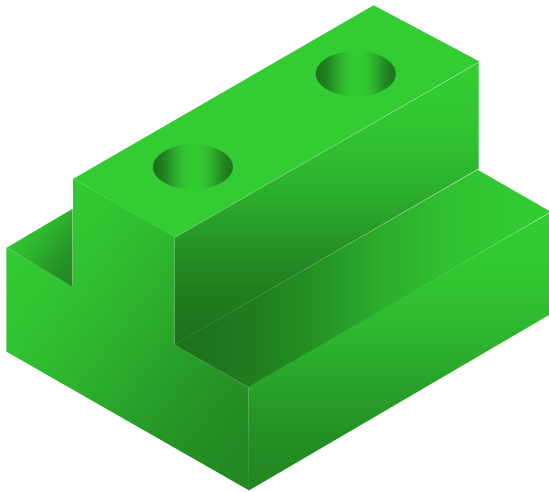# Chapter 3

Orthographic Projection

TOPICS

- Object representation

- Multiview projection

- Glass box concept

- Orthographic projection of point, line, plane, surface and object.

- Line convention

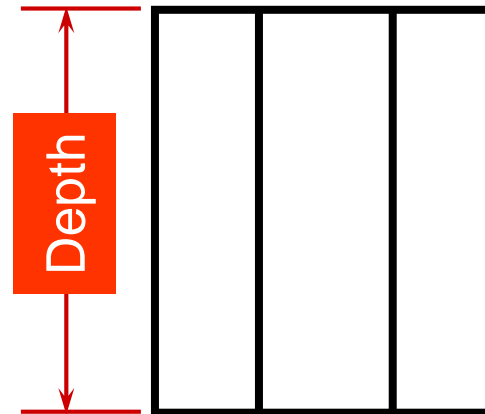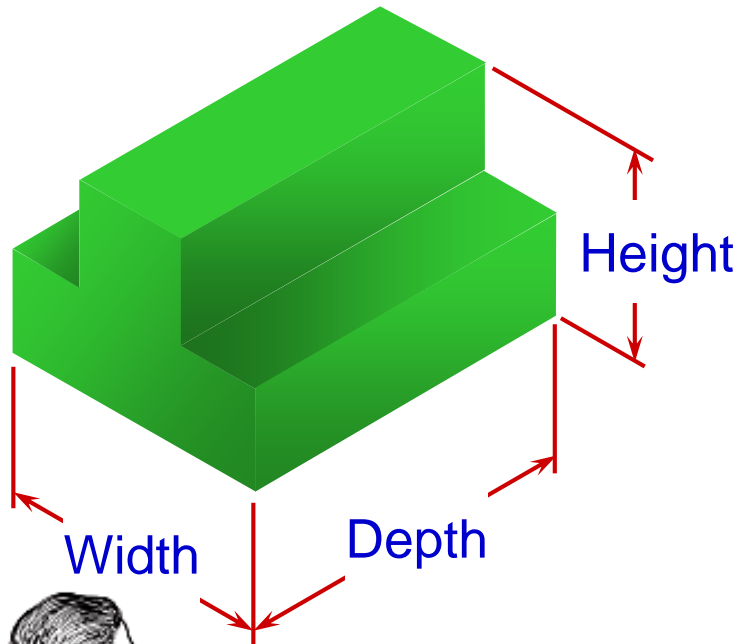# OBJECT   REPRESENTATION

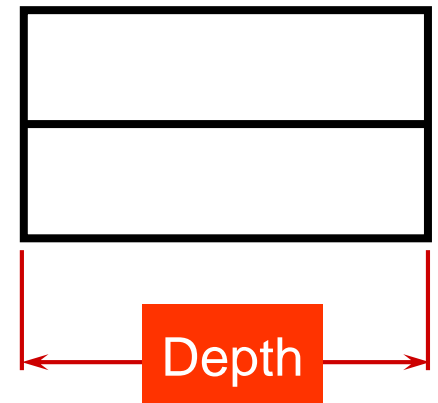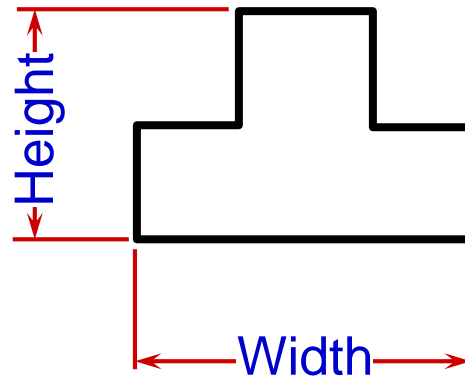- **Axonometric projection**

- **Multiview projection**

MULTIVIEW PROJECTION

Three principle dimensions of an object …

… can be presented only two in each view.

Height

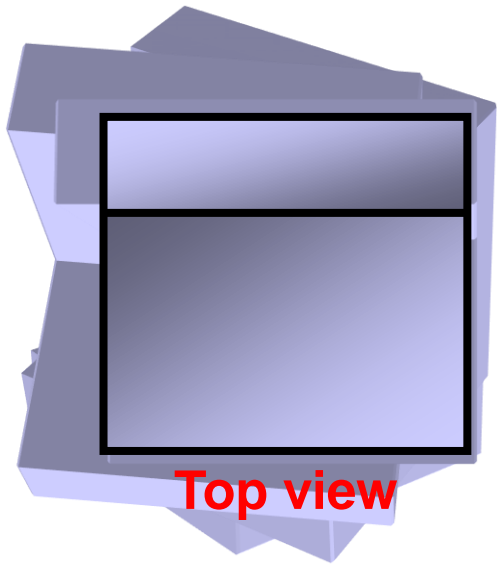Width

Depth

Depth

Height

Width

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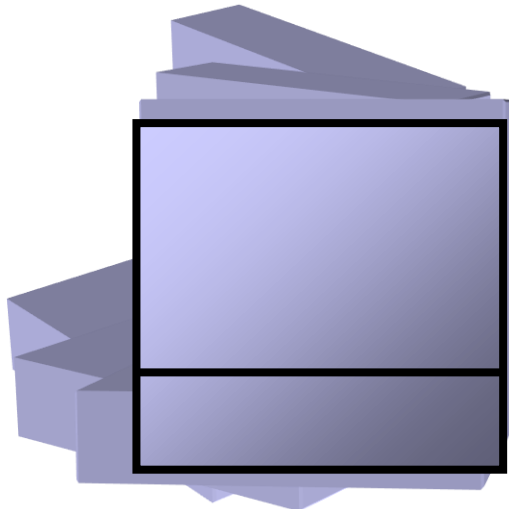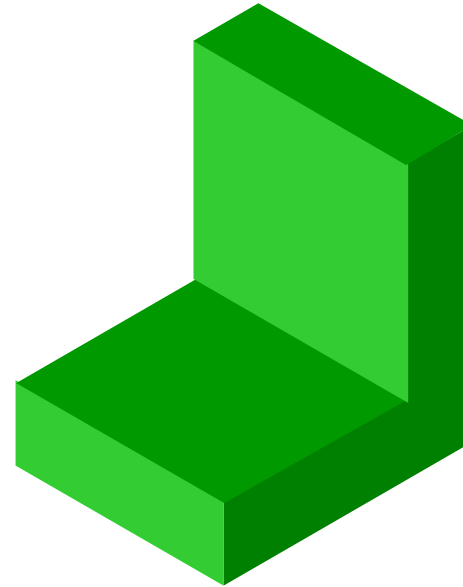
Adjacent view(s) is needed to fulfill the size description.

TO OBTAIN MULTIVIEW REPRESENTATION OF AN OBJECT

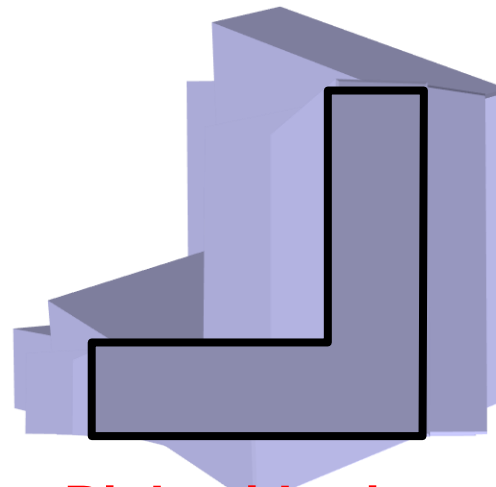1. Revolve the object with respect to observer.

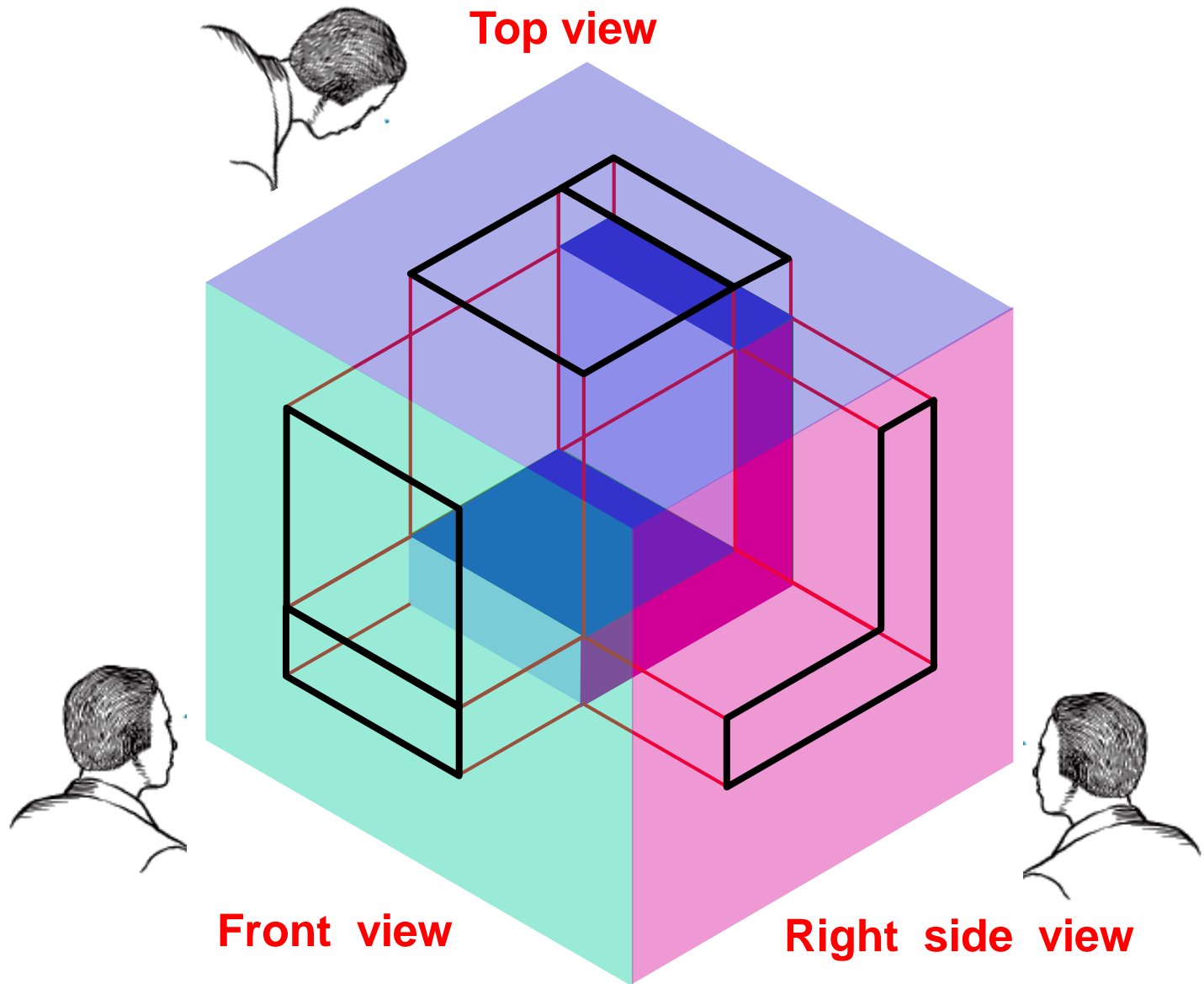2. The observer move around the object.

REVOLVE THE OBJECT

Top view

Front view

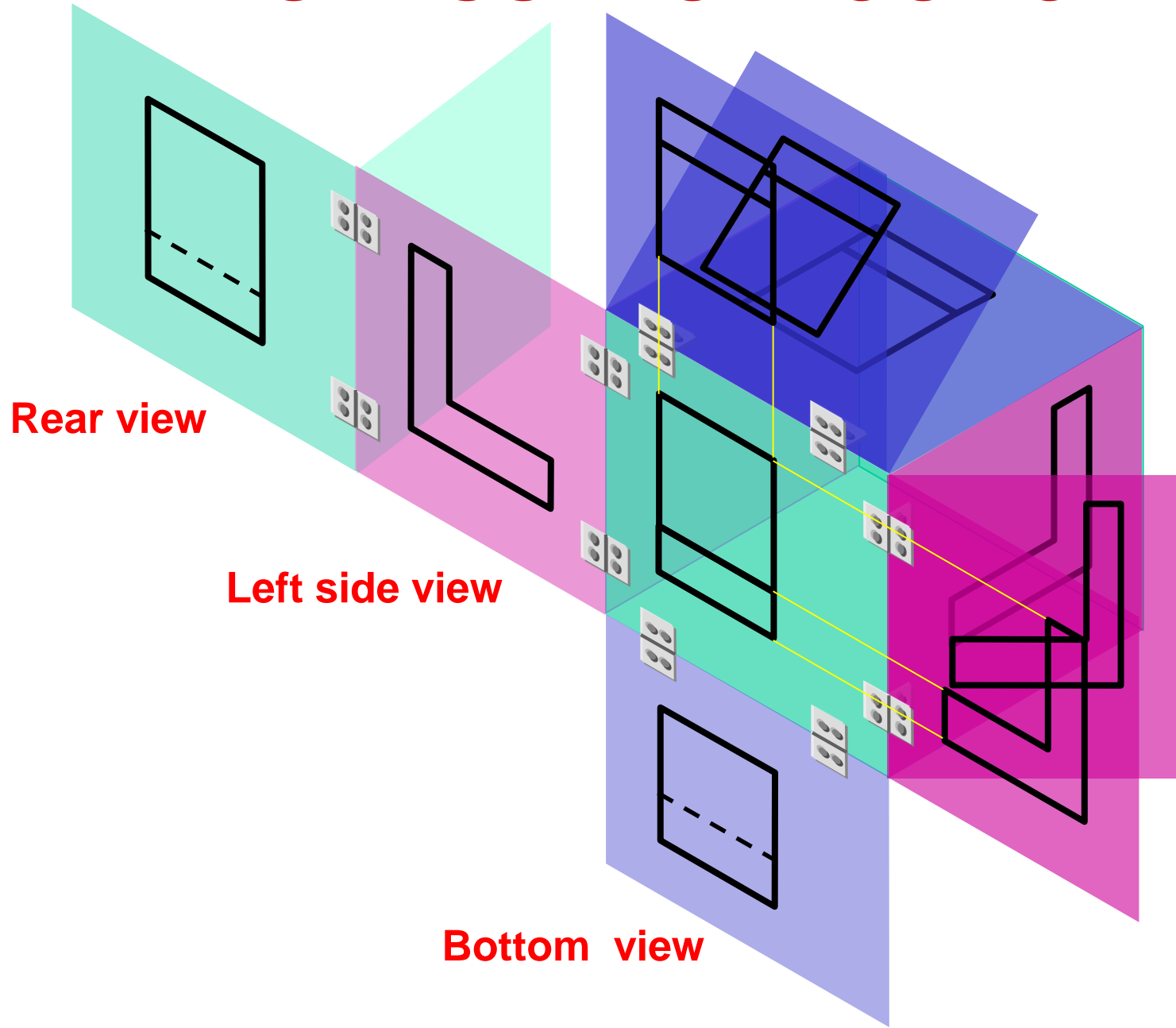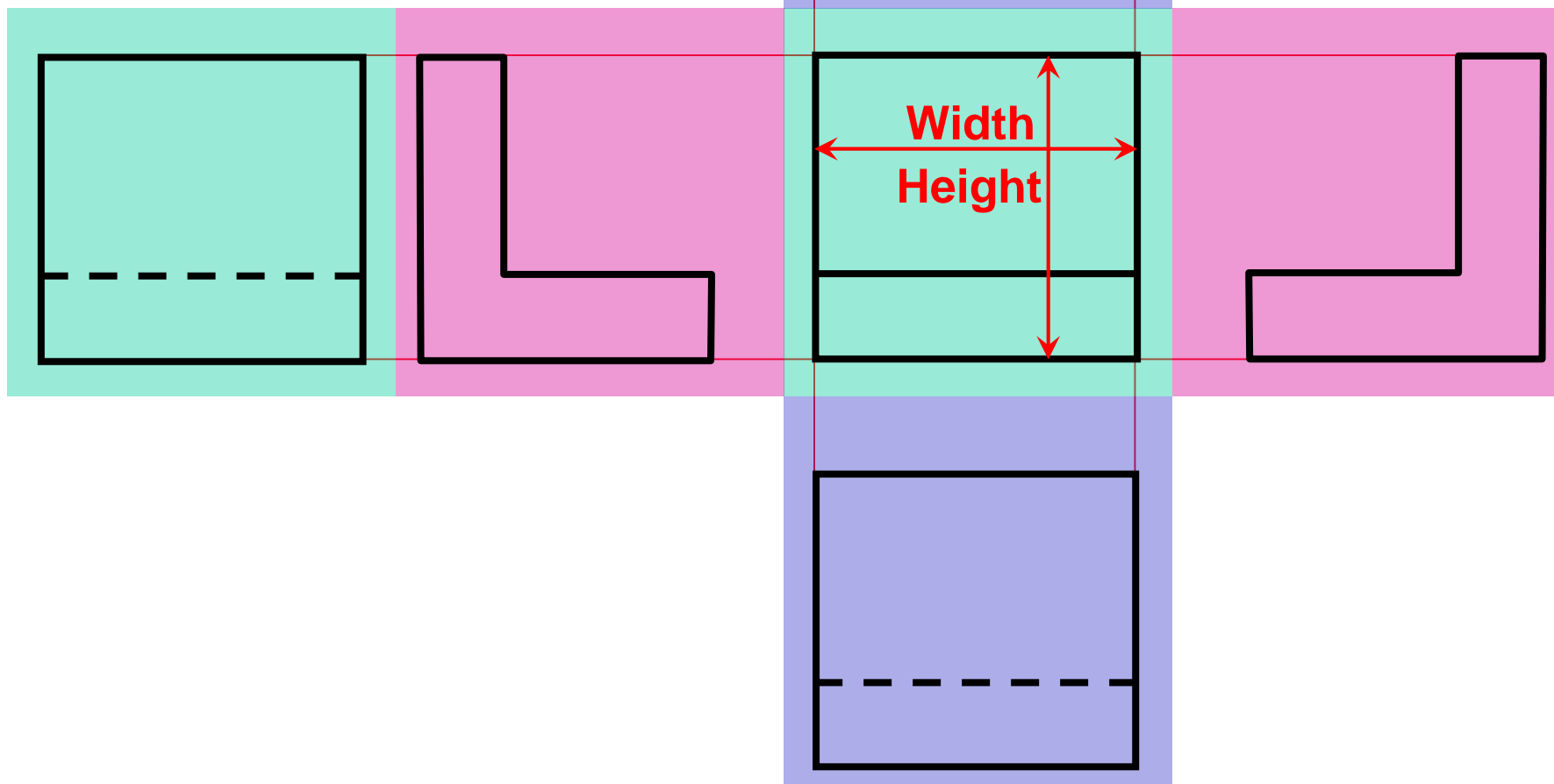Right side view

OBSERVER MOVE AROUND

Top view

Front view

Right side view

THE GLASS BOX CONCEPT

Rear view

Left side view

Bottom view

History

Depth

Width

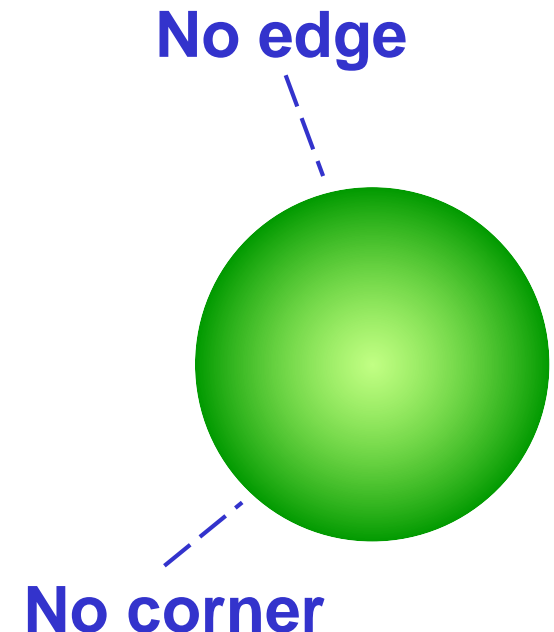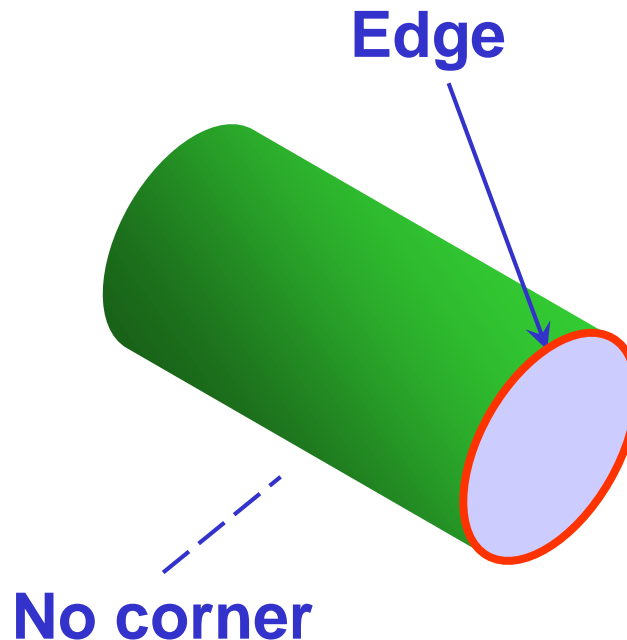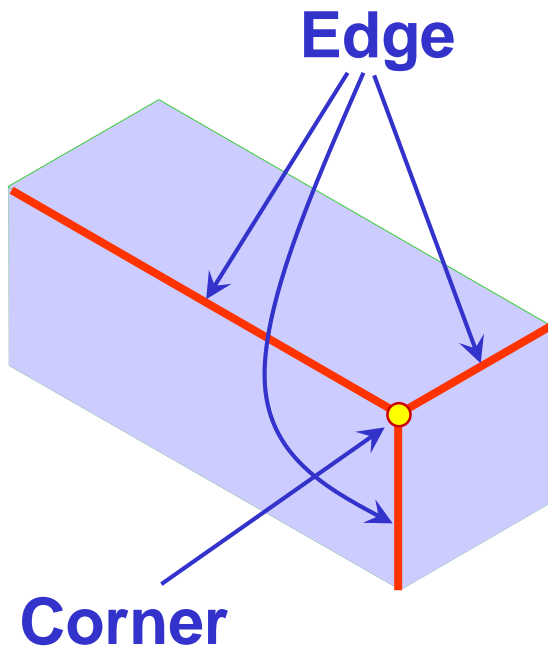Height
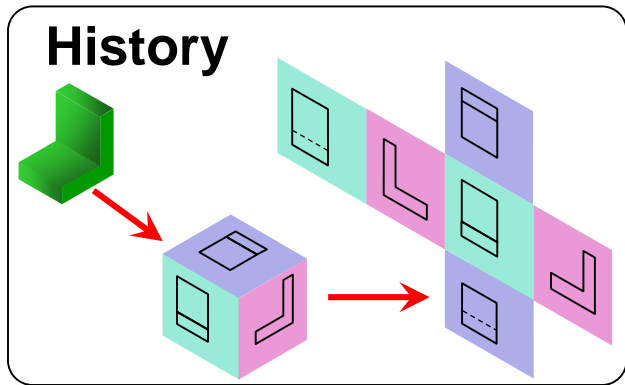
Orthographic Projection
of Object Features

OBJECT FEATURES

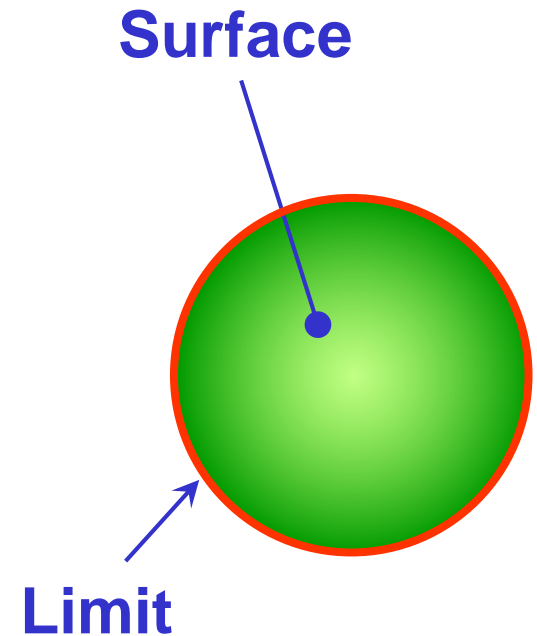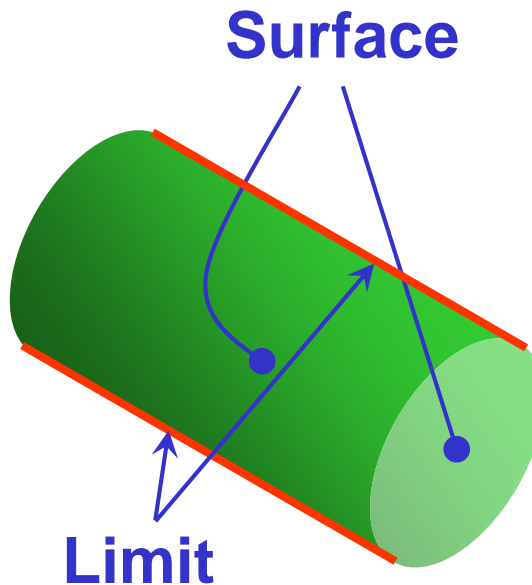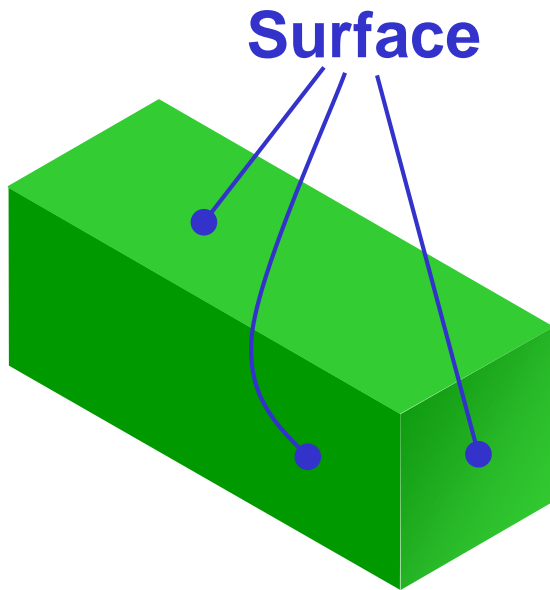**Edges**   are lines that represent the boundary between two faces.

Corners   Represent the intersection of two or more edges.
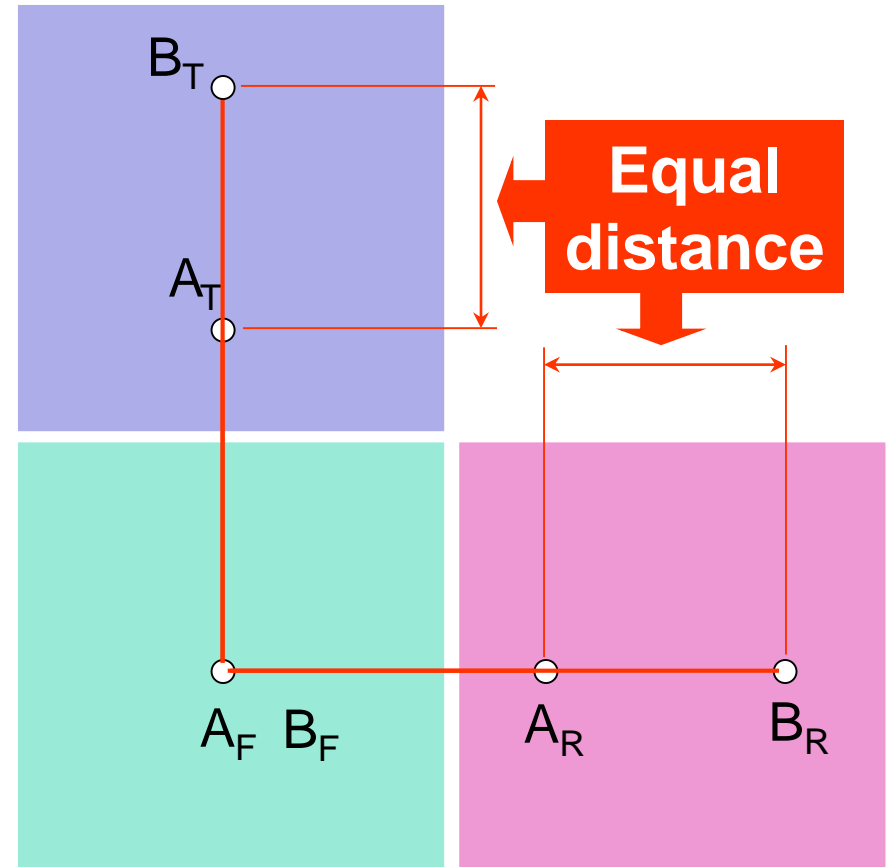
Edge

Edge

No edge

Corner
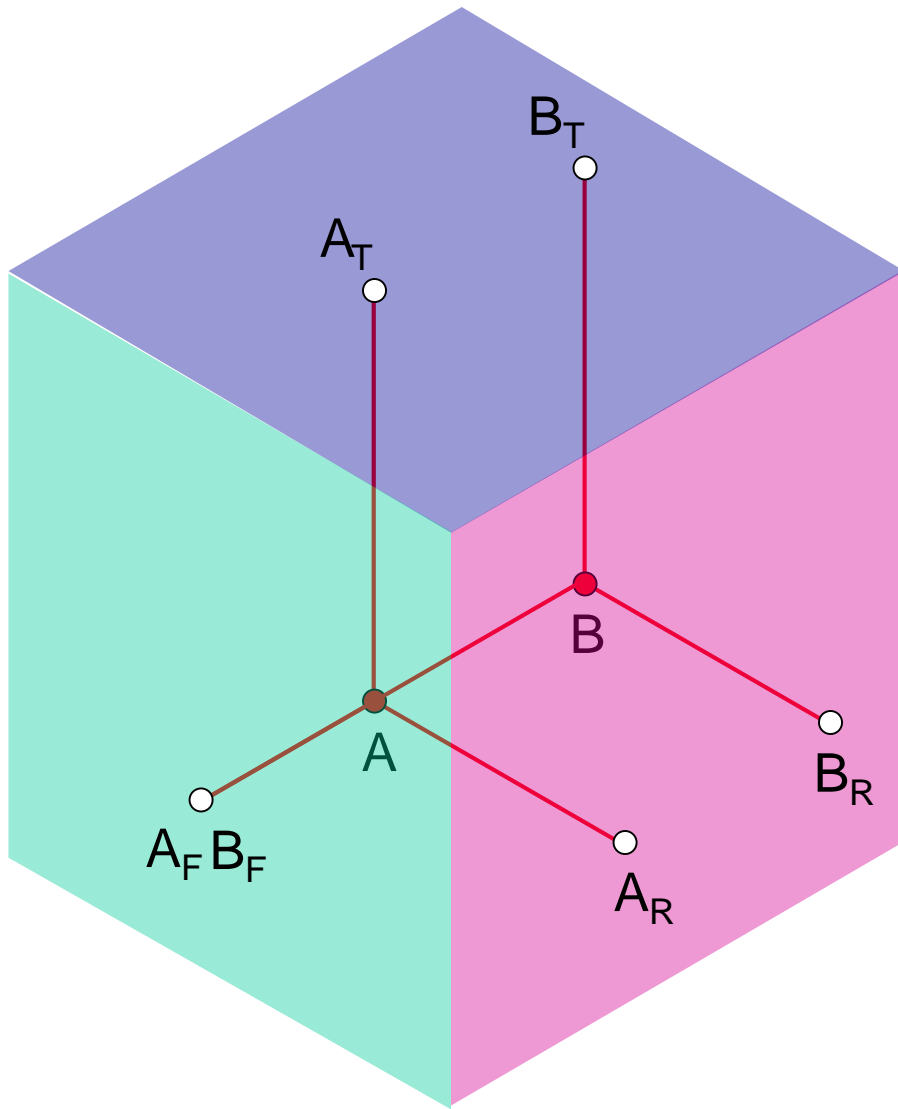
No corner

No corner

OBJECT FEATURES

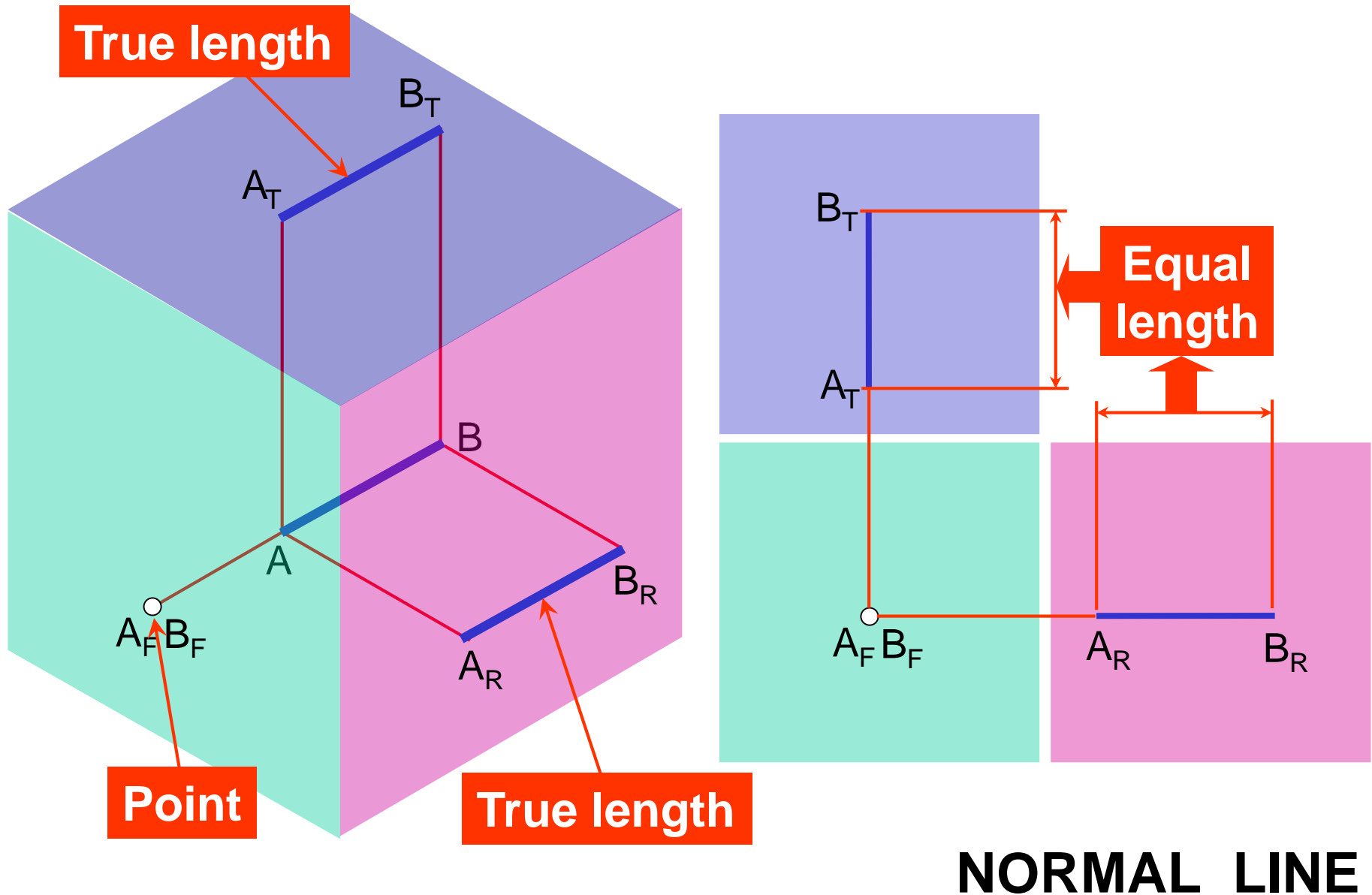**Surfaces**   are areas that are bounded by edges or limiting element.

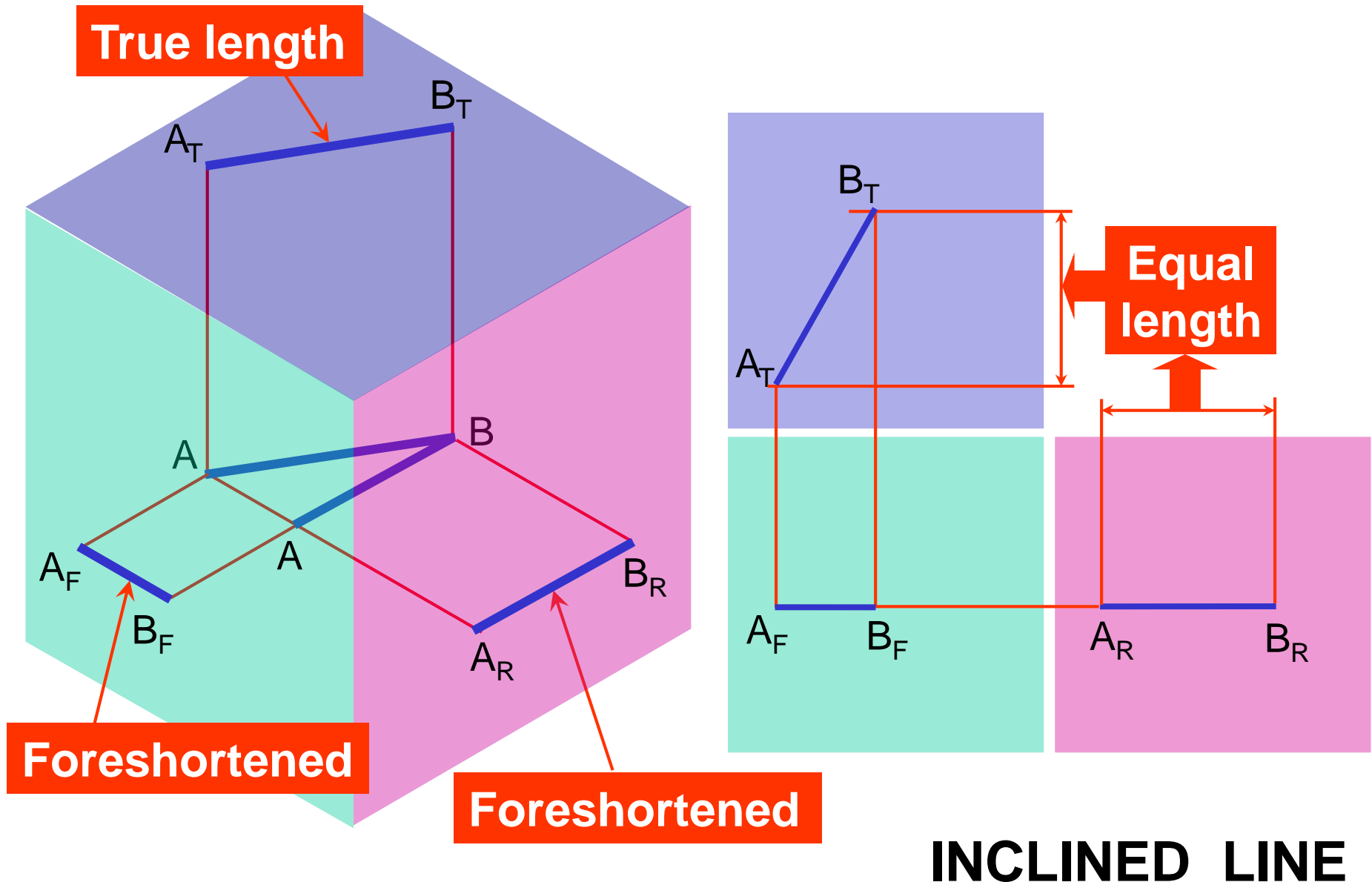**Limiting element**   is a line that represents the last visible part of the curve surface.
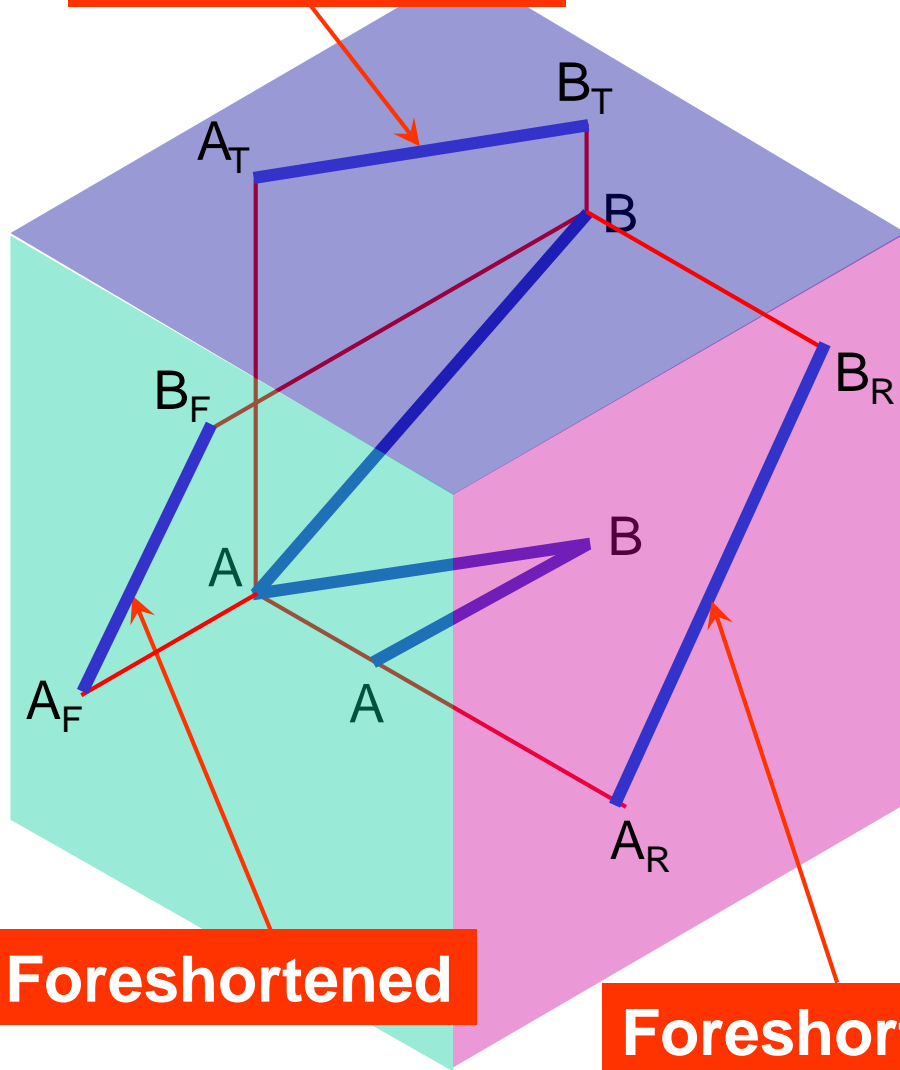
PROJECTION OF POINT(S)

PROJECTION OF LINE

True length

B_T

A_T

B

A

A_F B_F

Point

A_R

B_R

True length

Equal length

B_T

A_T

A_F B_F

A_R

B_R

NORMAL LINE

PROJECTION OF LINE

True length

A_T B_T

Foreshortened

A_F

B_F

A B

A

A_R

B_R

Foreshortened

B_T

A_T

Equal length

A_F B_F

A_R B_R

INCLINED LINE

PROJECTION OF LINE

Foreshortened

B_T

A_T

B

B_F

B_R

A

B

A_F

A

A_R

Foreshortened

Foreshortened

B_T

A_T

Equal length

B_F

B_R

A_F

A_R

OBLIQUED LINE

PROJECTION OF PLANE

True size

Edge
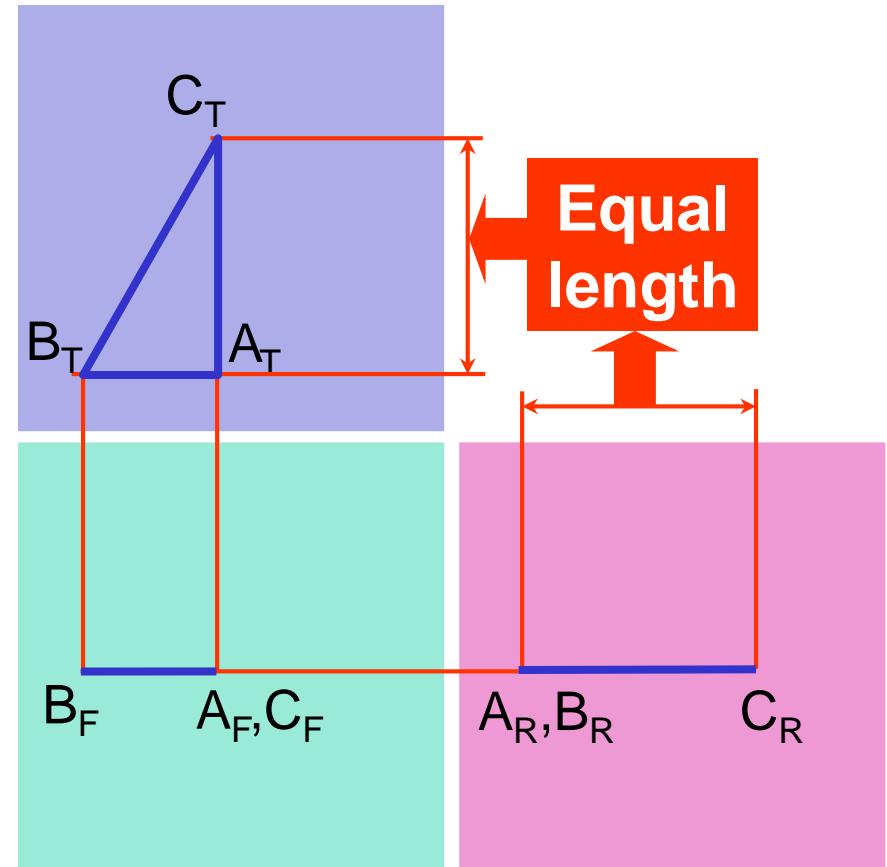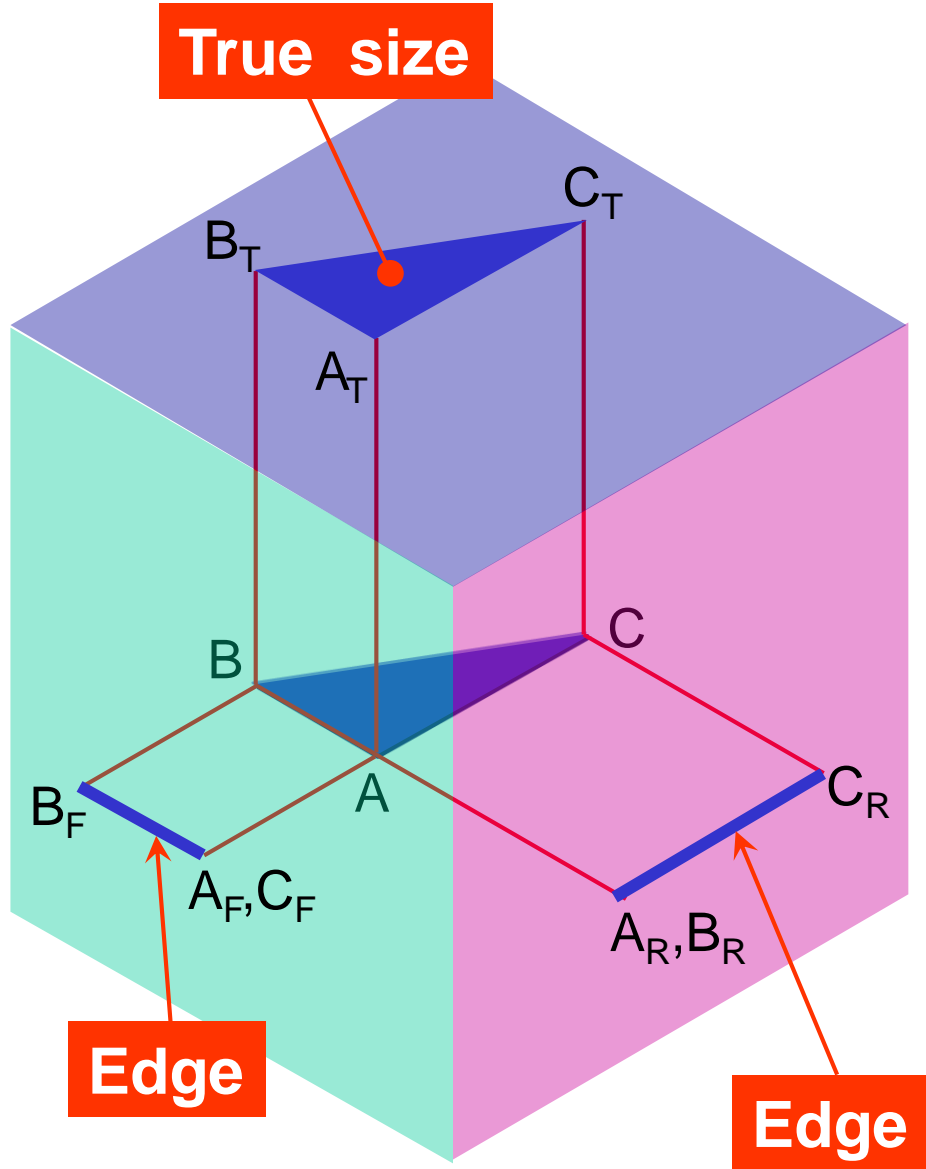
Edge

Equal length

NORMAL PLANE

PROJECTION OF PLANE

Foreshortened

Foreshortened

Edge
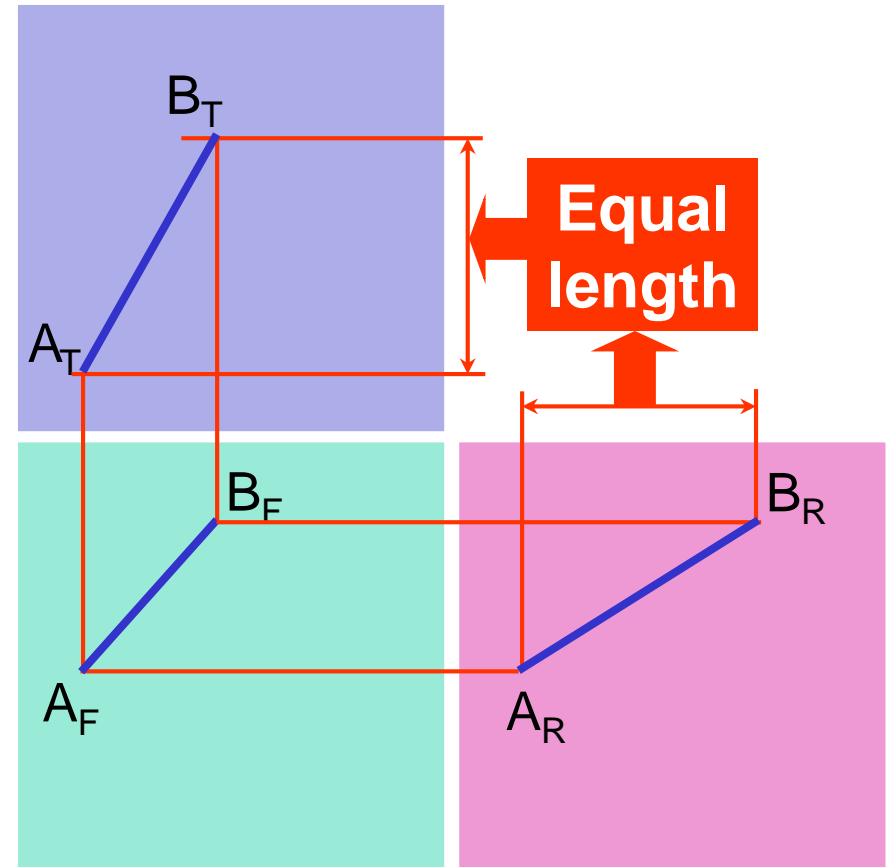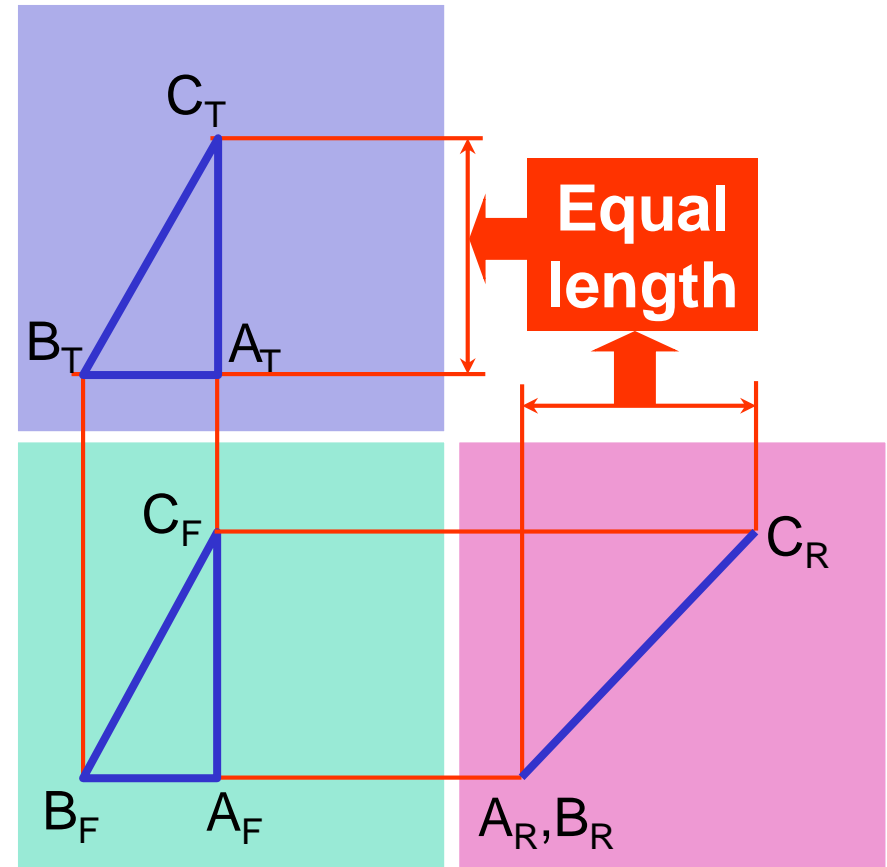
Equal length

INCLINED PLANE

PROJECTION OF PLANE

Foreshortened

Foreshortened

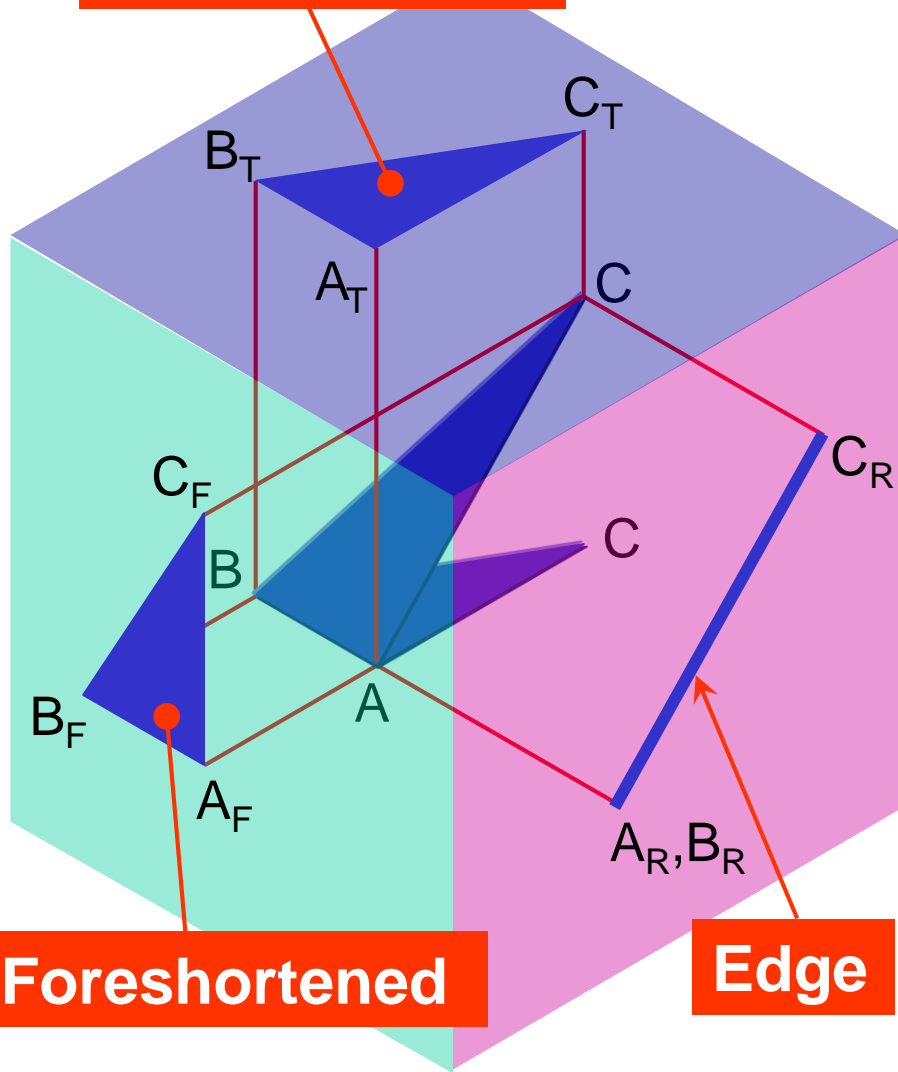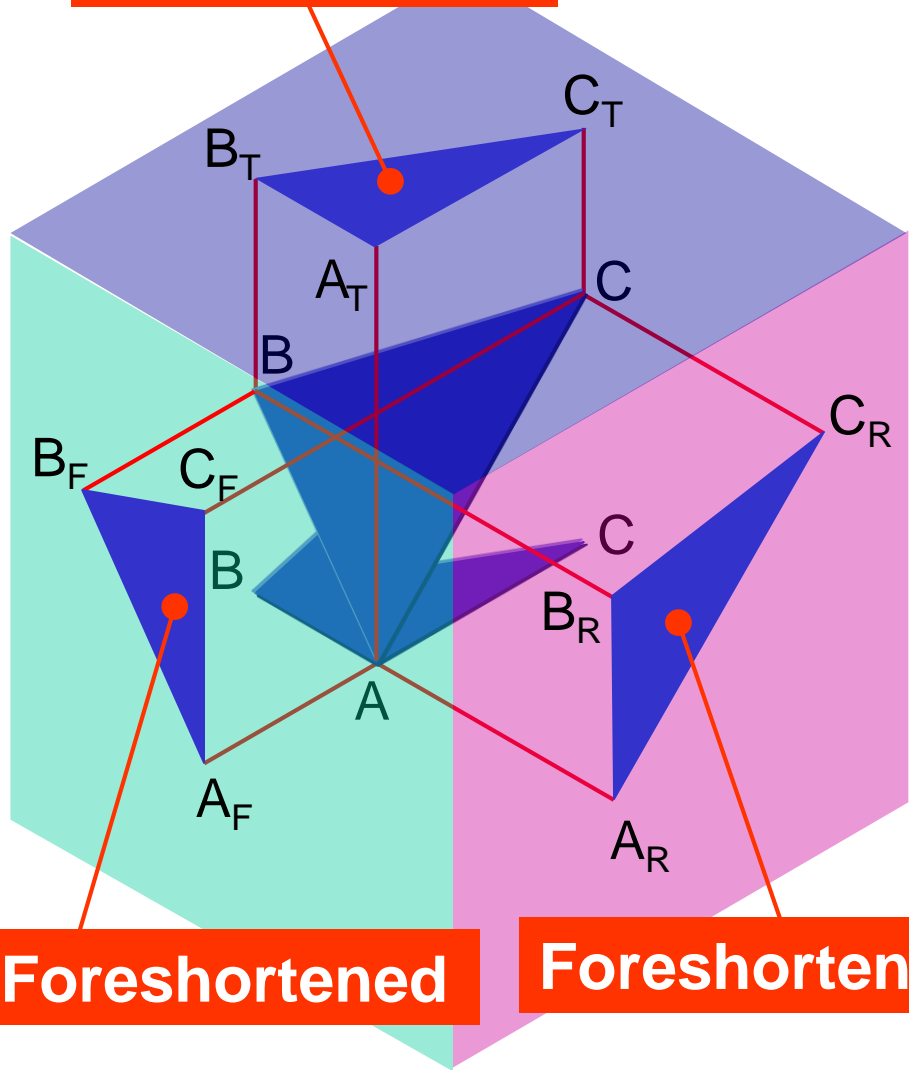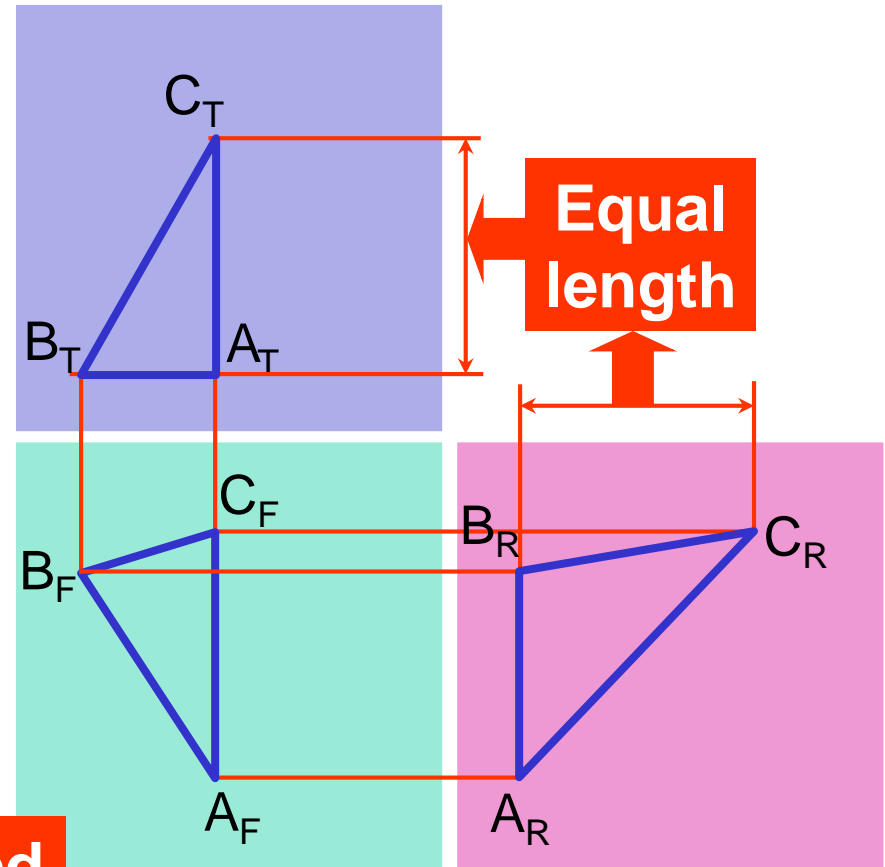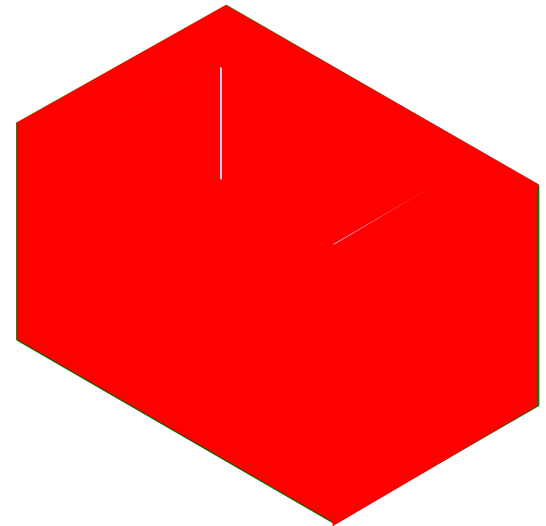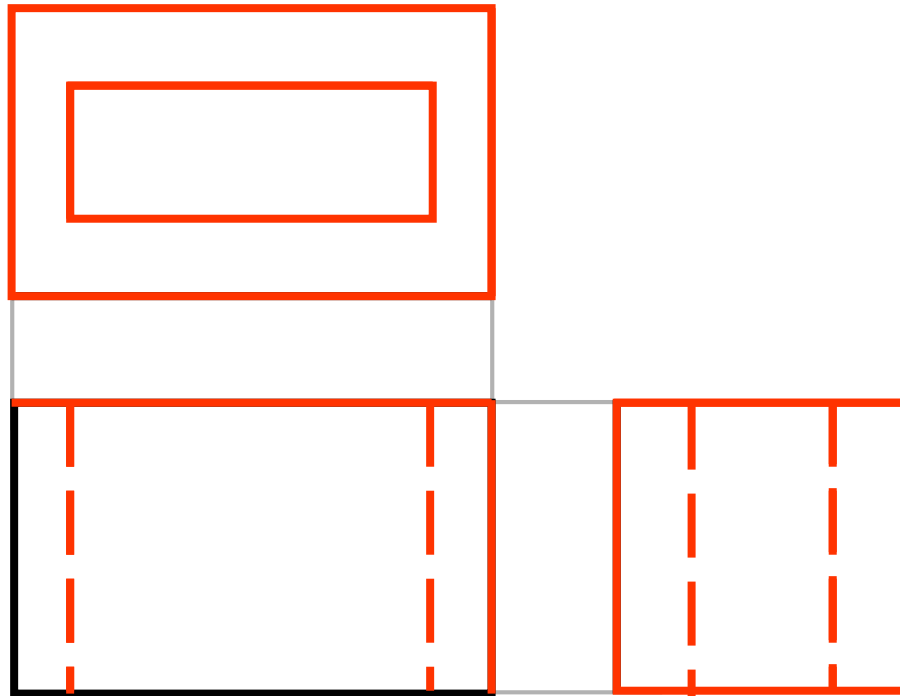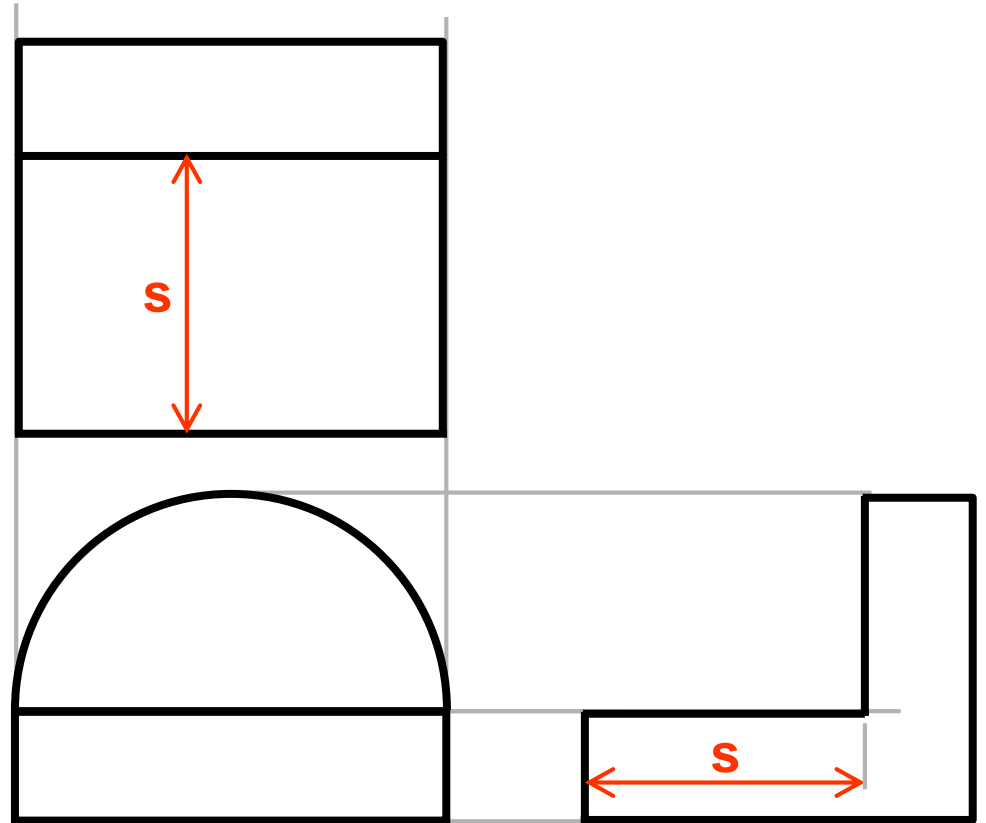Foreshortened
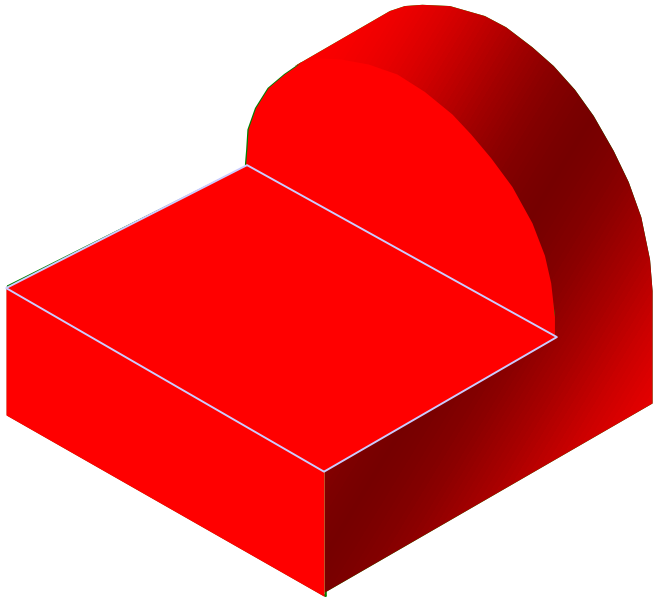
Equal length

OBLIQUED PLANE

PROJECTION OF OBJECT

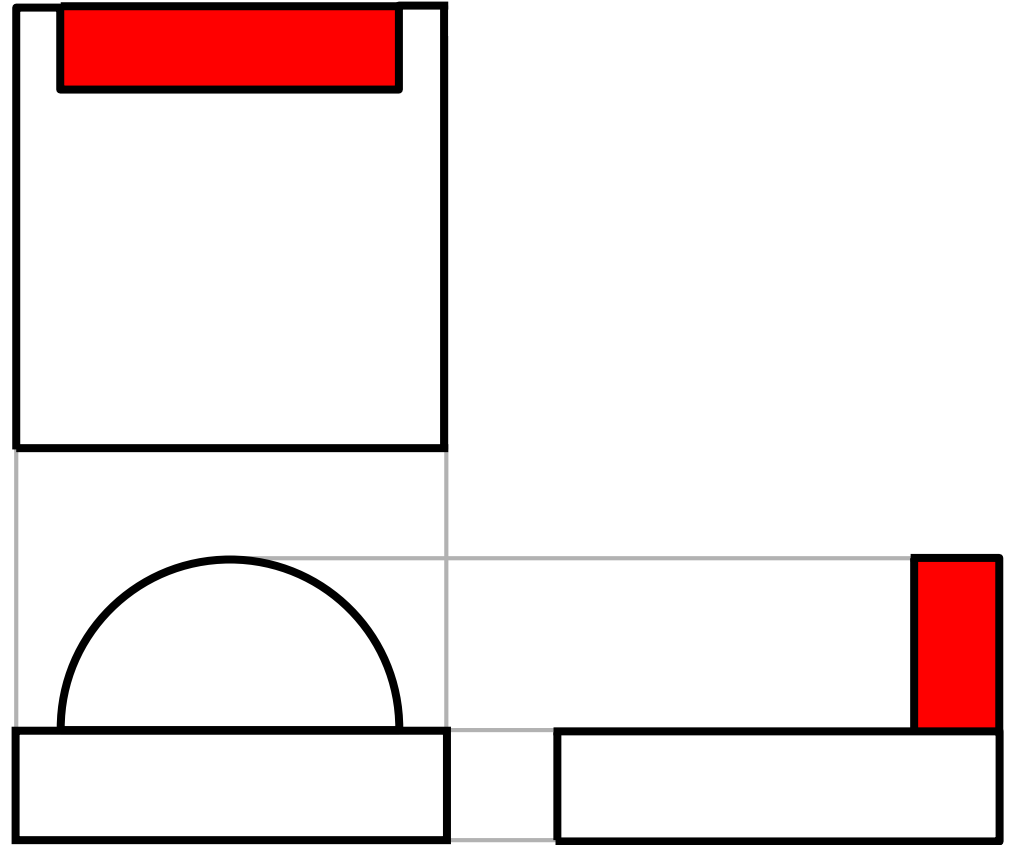The views are obtained by projecting all object features to the picture plane.
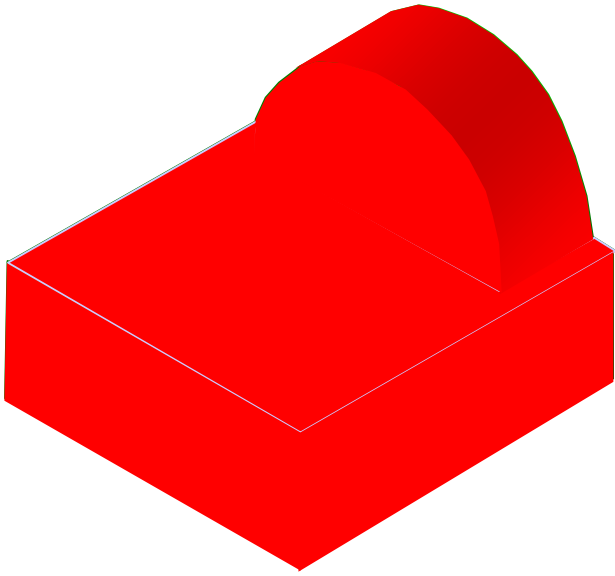
You have to project the remaining surfaces which are invisible too !

PROJECTION OF OBJECT

PROJECTION OF OBJECT

Line Convention

LINE CONVENTION

- Precedence of coincide lines.

- Hidden line drawing.

- Center line drawing.
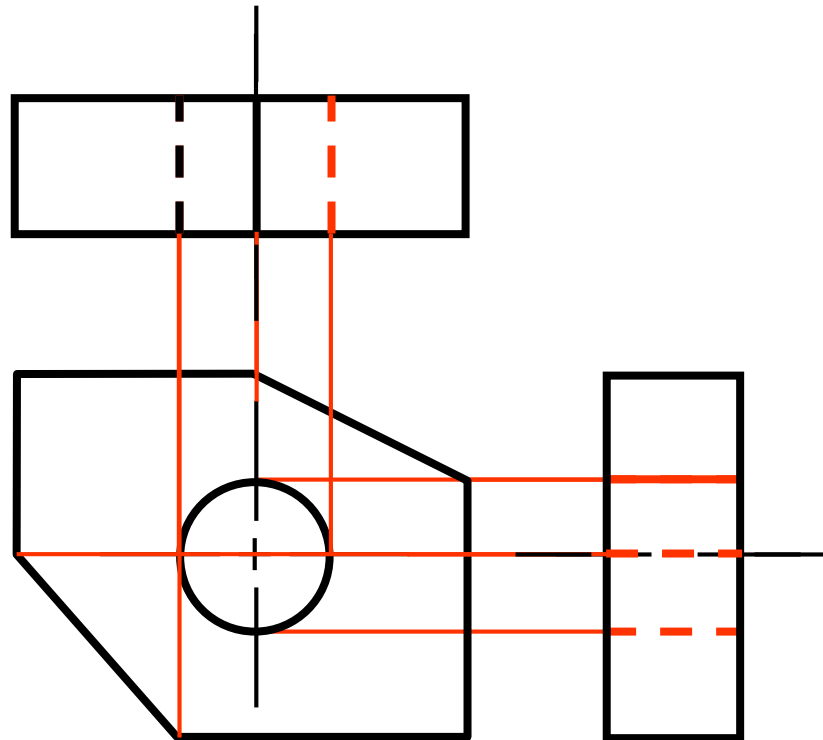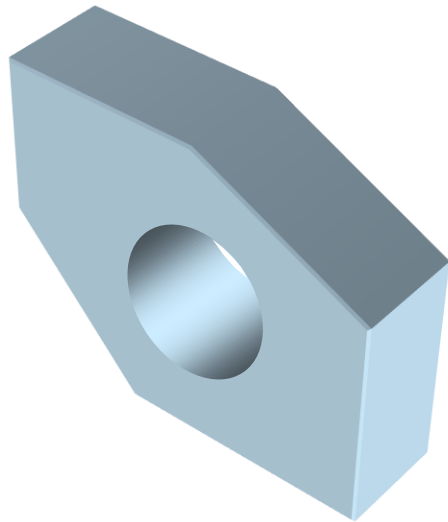
PRECEDENCE OF LINE

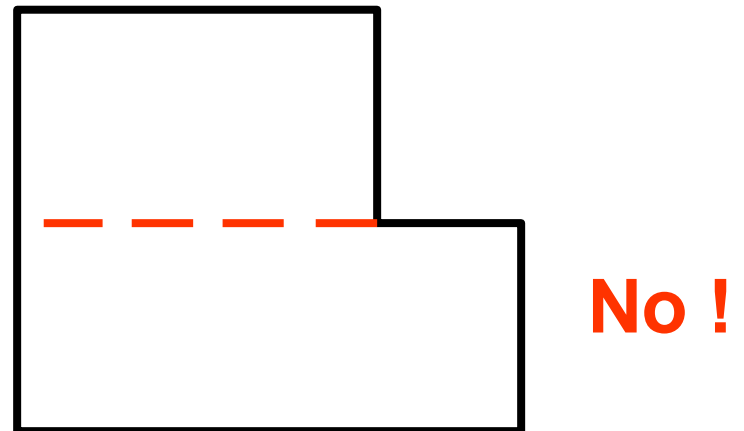**Order of importance**

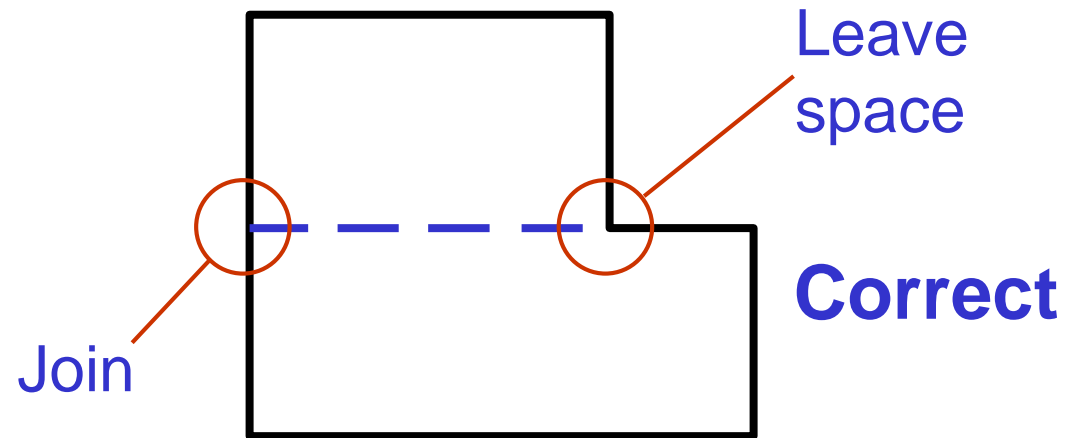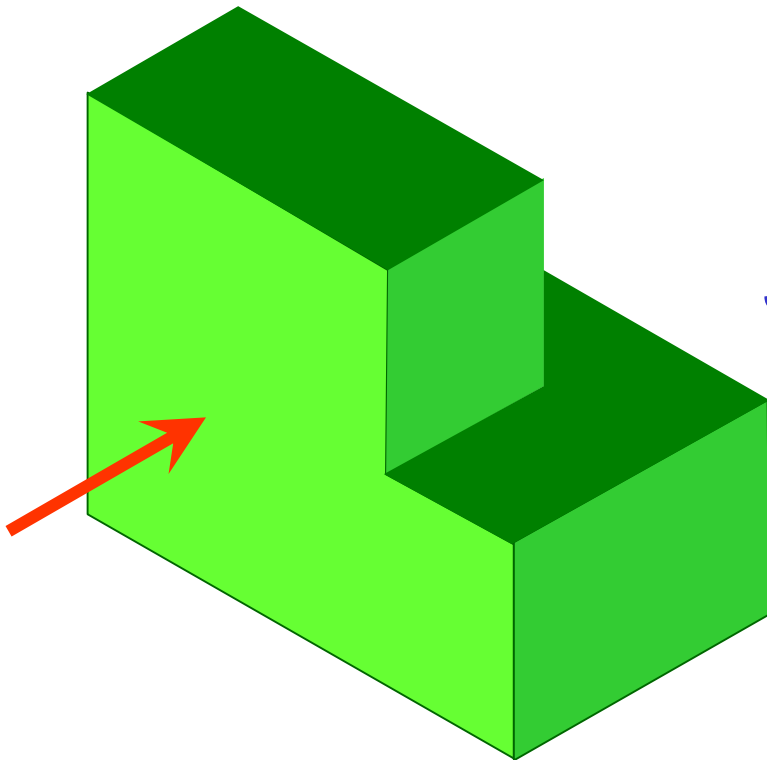| Visible line	→	Hidden line	→	Center line

HIDDEN LINE PRACTICE

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

Leave space

Join

Correct

No !

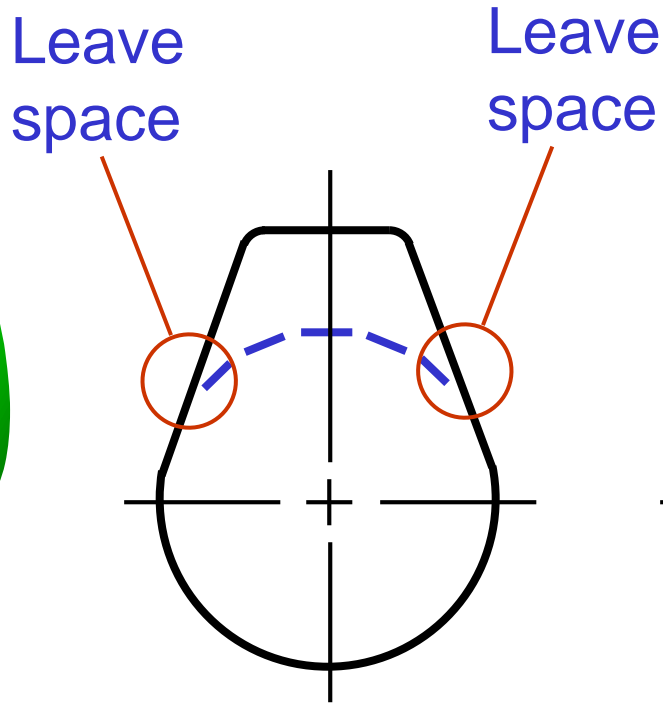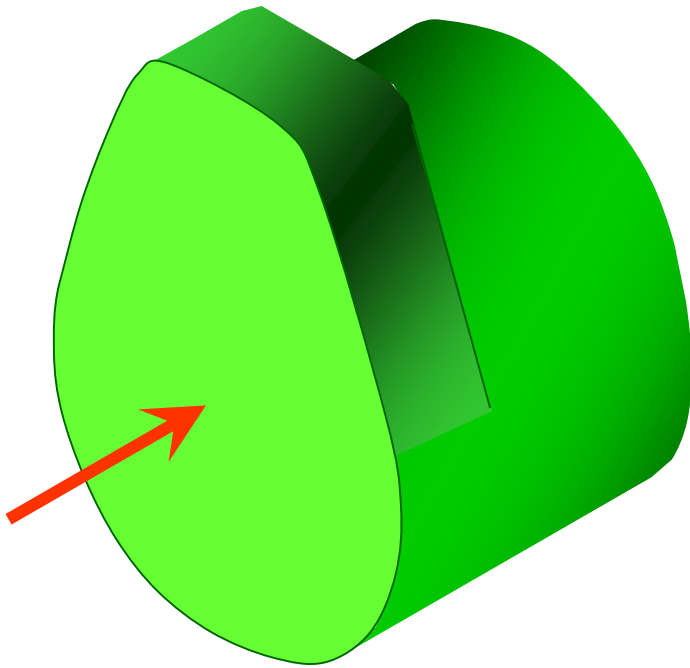# HIDDEN LINE PRACTICE

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

Leave space

Leave space

Correct

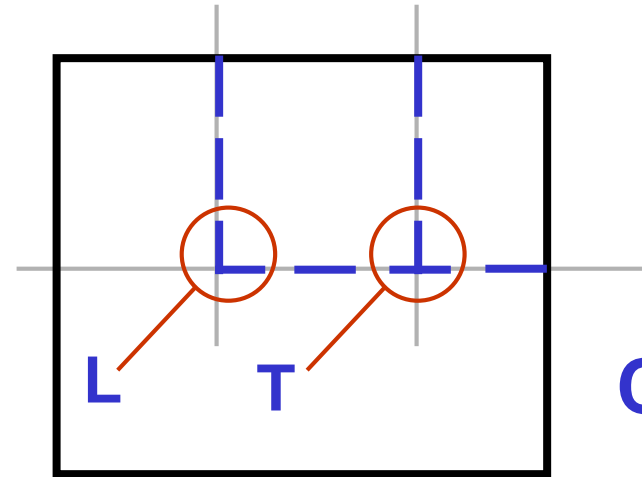**No !**
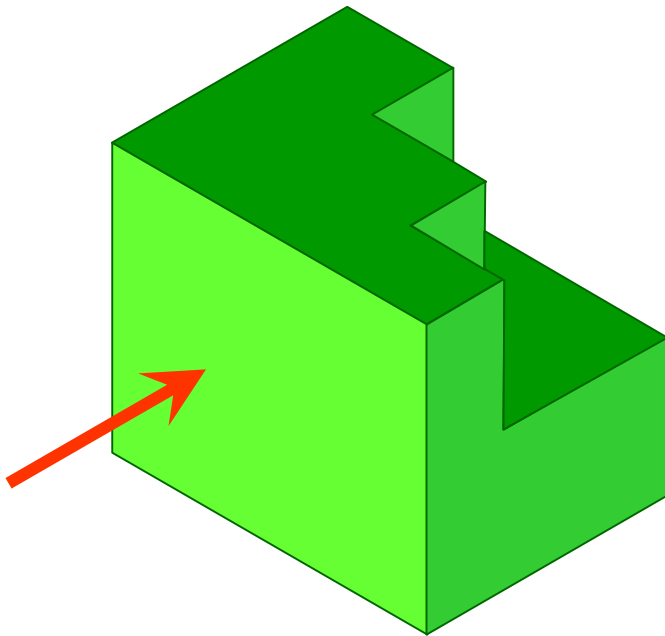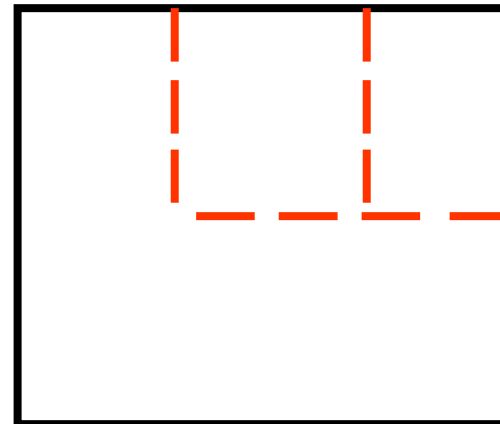
HIDDEN LINE PRACTICE

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

Correct

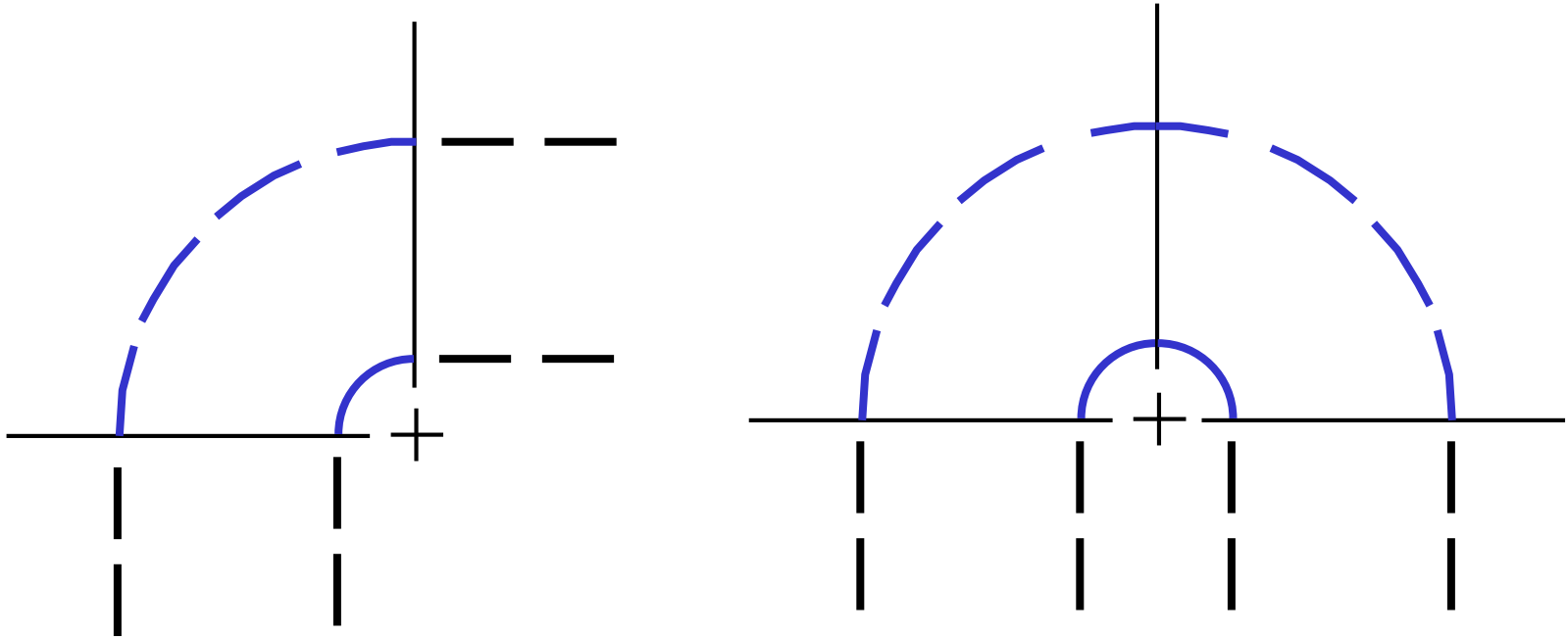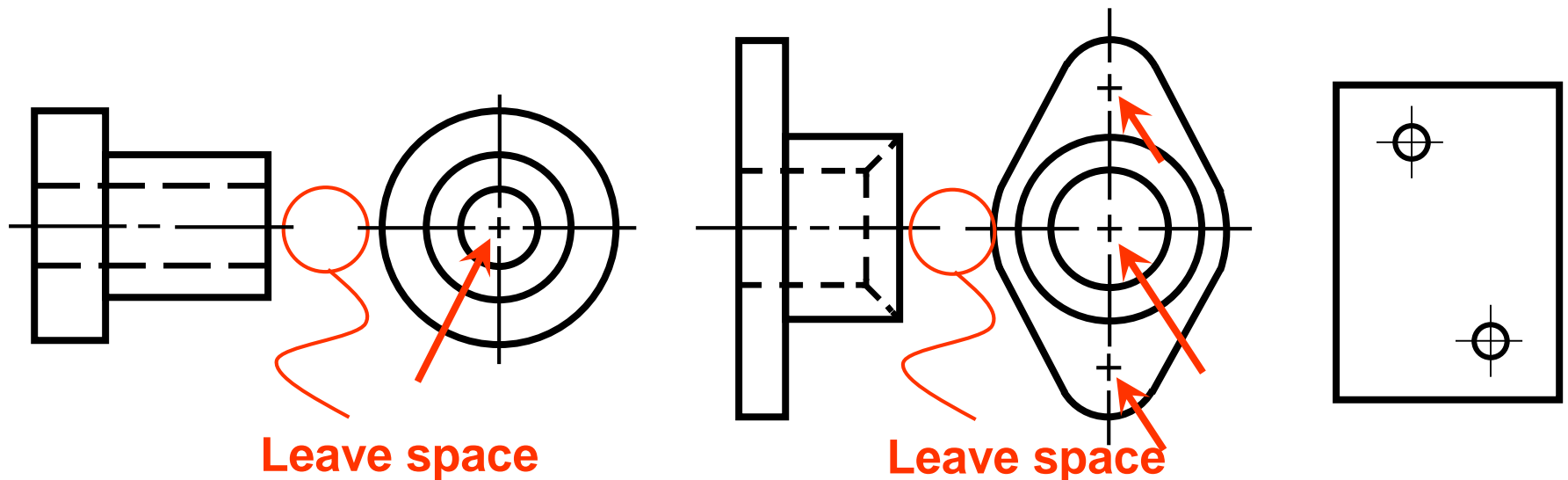**No !**

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.

Leave space

Leave space

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.

Leave space

Leave space

Leave space

Leave space