SOLID MODELING

- Solid modeling is one of the most effective geometric modeling method. In this approach, models are displayed as solids to viewer, there by eliminating any chance of misinterpretation.
- The solid modeling is used to make the object more realistic.

SOLID MODELING TECHNIQUES

- Half – space Method
- Boundary representation Method
- Constructive Solid Geometry (CSG)
- Analytical Solid Geometry (ASM)
- Primitive instancing
- Sweep representation
- Spatial portioning representation

CONSTRUCTIVE SOLID GEOMETRY (CSG)

- This method is also known as C-rep. In this method, solid graphic primitives are employed for constructing the model.
- The solid primitives include cubes, spheres, cylinders, rectangle blocks and pyramids.

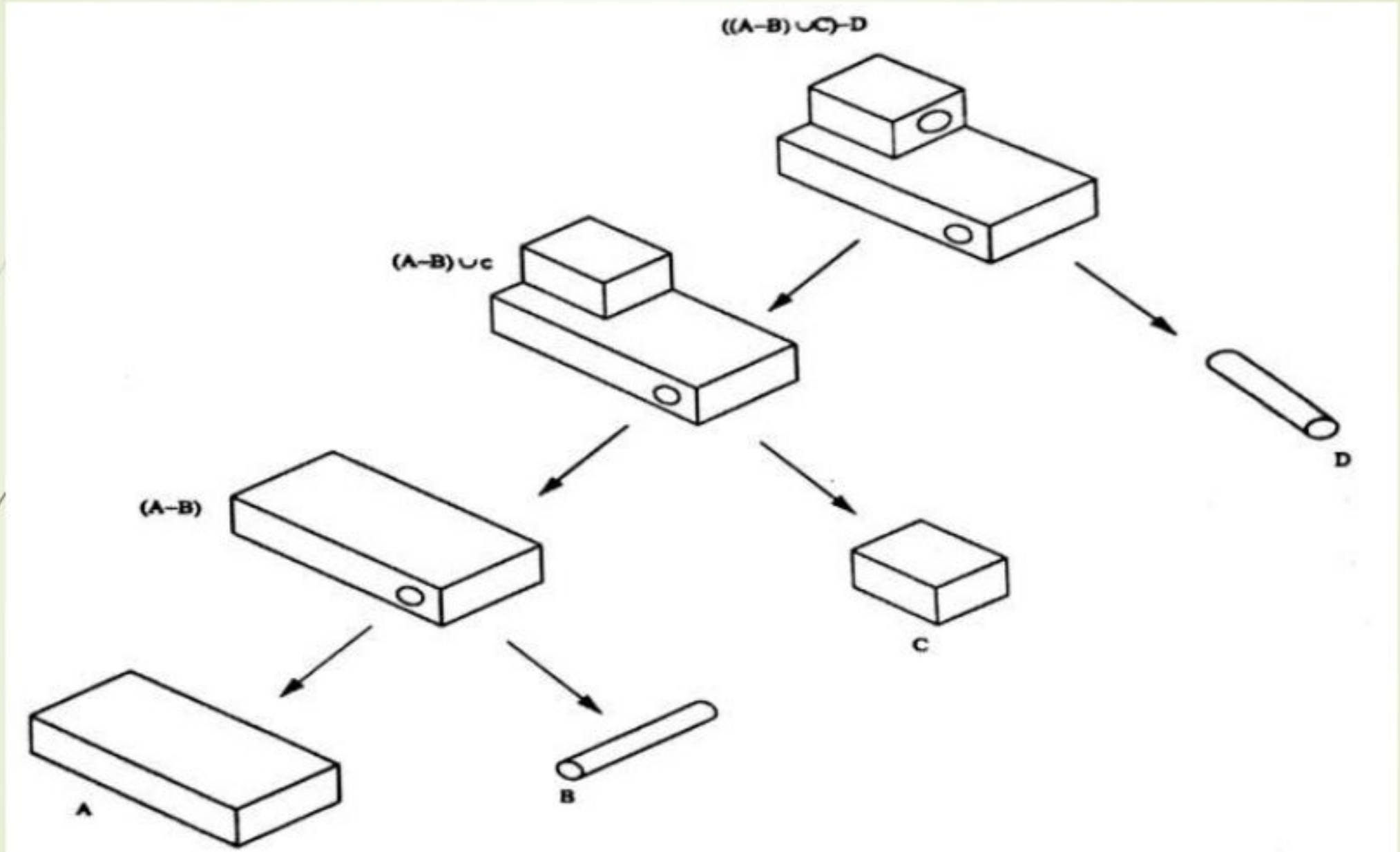


Figure 2.42 Unbalanced tree

Object = (A – B) ∪ (C – D) ---- balanced tree

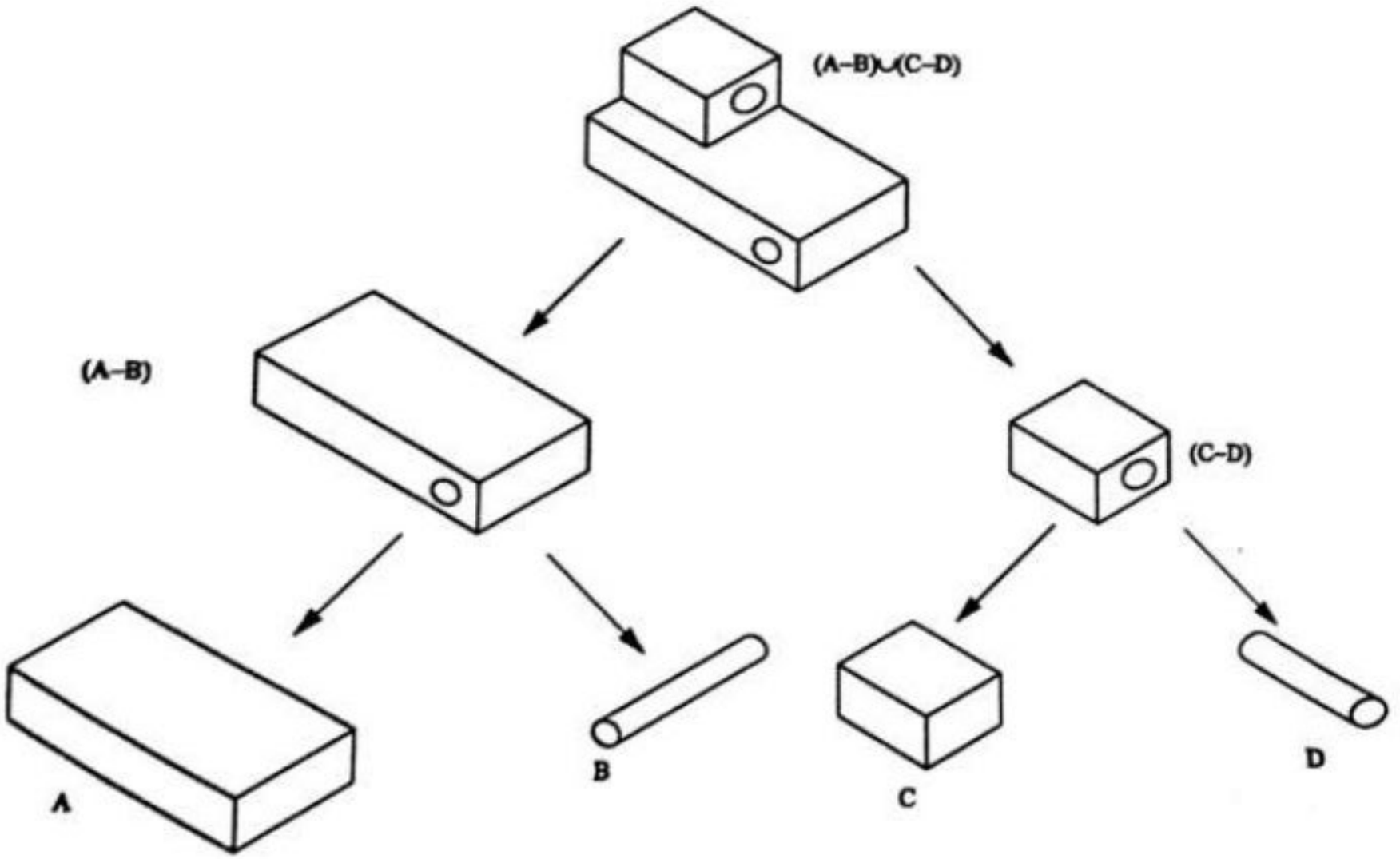


Figure 2.43 Balanced tree

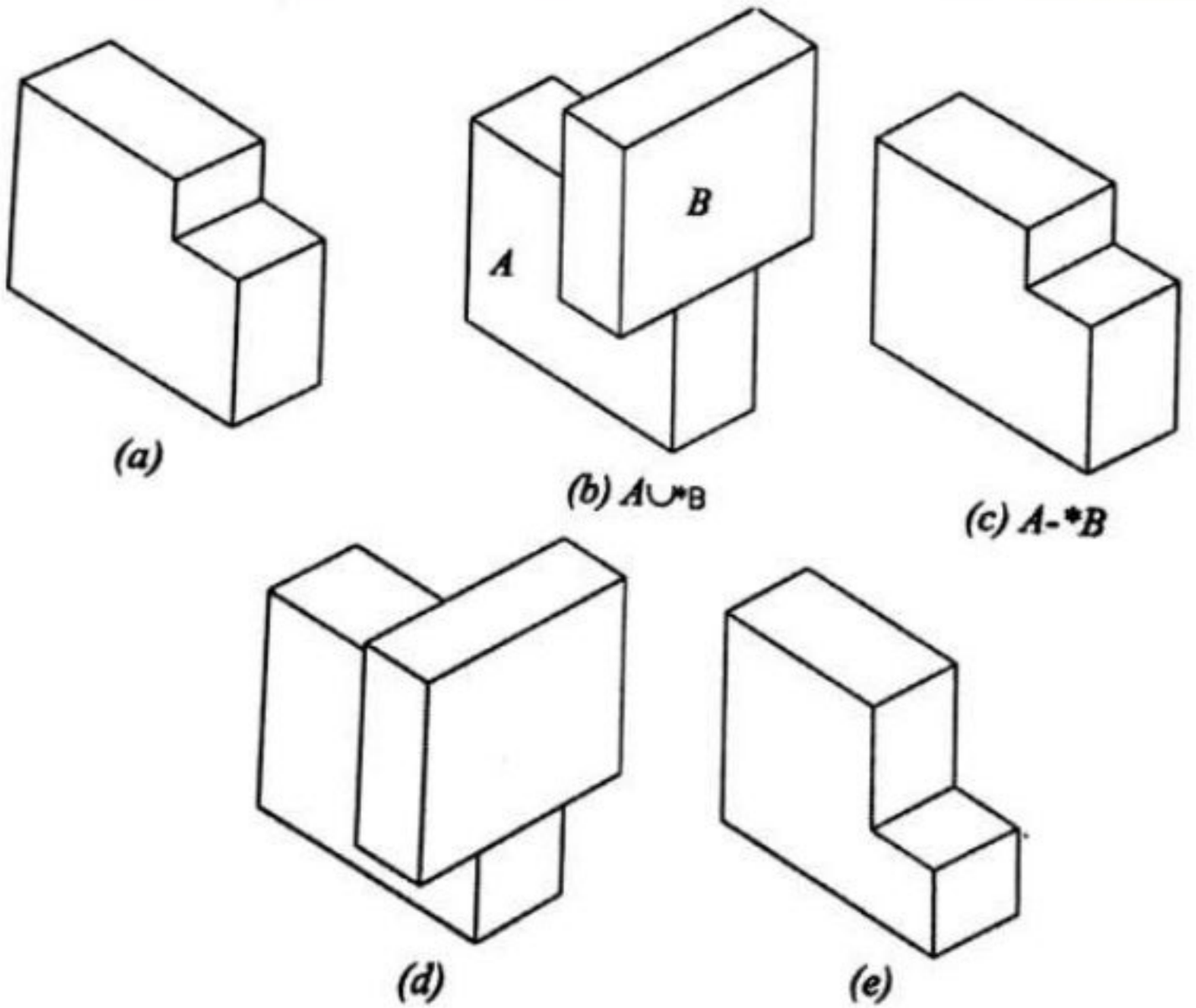


Figure 2.44

CSG MODEL

- The constructive solid model uses building block approach
- The physical objects can be divided into set of elements and combined in order to form an object.

ADVANTAGES OF CSG

- This requires less storage space
- This method is advantageous in the initial creation of solid models. Using Boolean operations, it is easy to construct solid models precisely.
- Less skill is enough
- CSG is more user friendly

DISADVANTAGES OF CSG

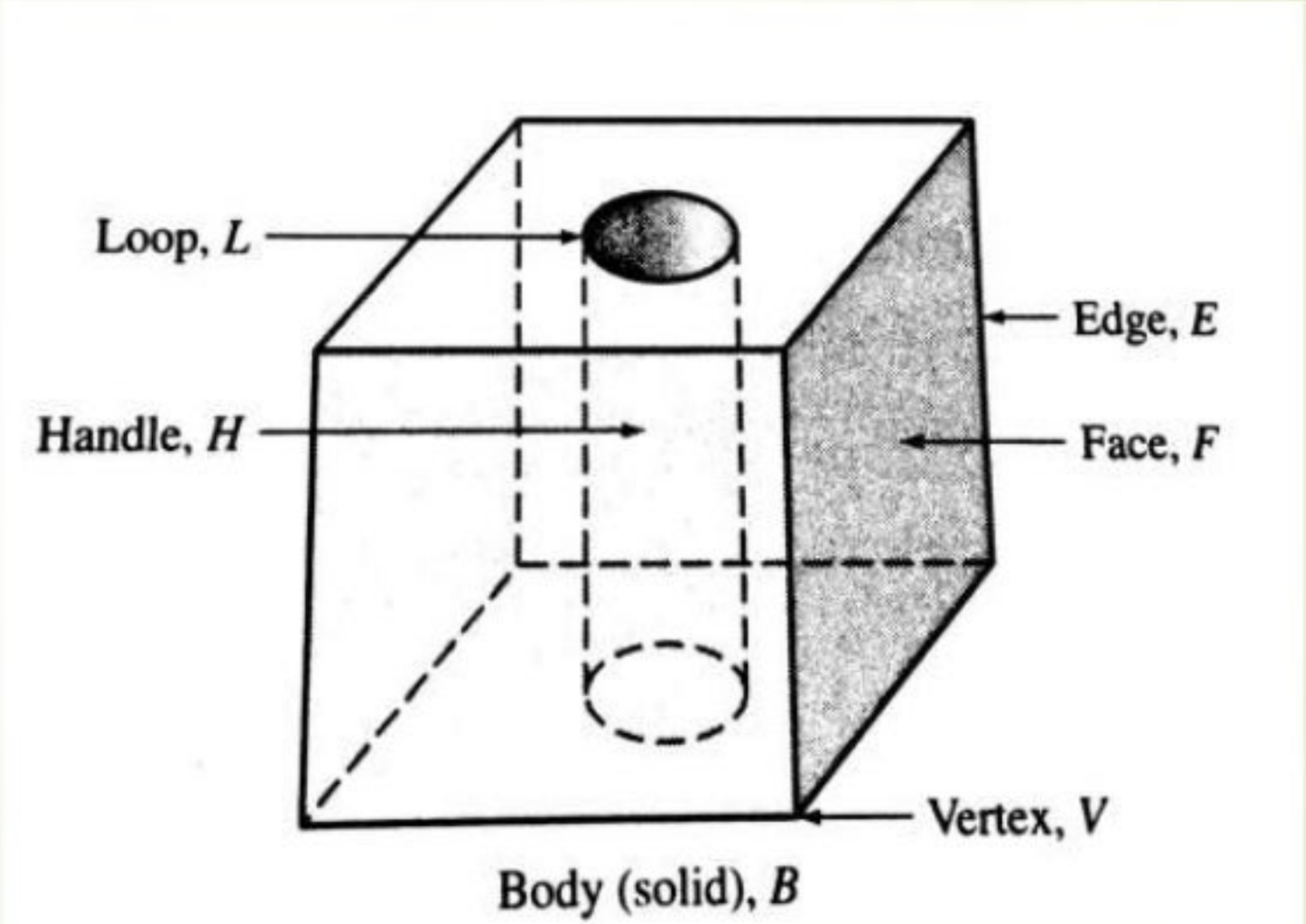
- This method involves more computational work for creating a solid model
- For complicated solid geometry, in this method is not appropriate
- The tree is not unique for the same part design

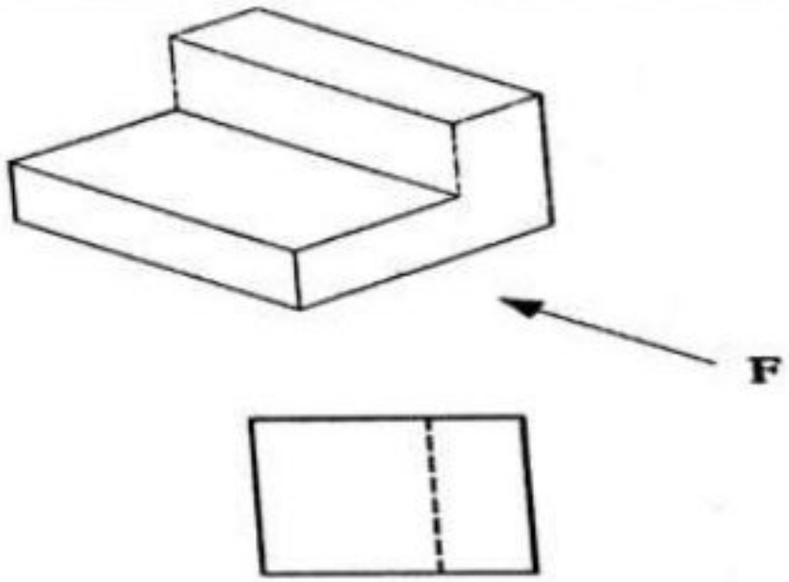
Boundary representation Method

- Boundary representation is one of the most popular and widely used schemes to create solid models of physical objects.
- In this method, front view, top view, bottom view, side view of an object is sketched and connected by means of lines to create a relationship.

PRIMITIVES OF B-rep MODEL

- Edge
- Vertex
- Face
- Loop
- Genus or Handle
- Body





(c) B-rep information

ADVANTAGES OF B-rep

- This method is very powerful for creating complex shapes solid models.
- B-rep model can be easily converted into wire frame model system.
- B-rep system stores an explicit definition of the model boundaries.
- B-rep system is very much compatible with other systems.

DISADVANTAGES OF B-rep

- This requires more storage space.
- This concept cannot be applied for tool path generation.