Constructive Solid Geometry, CSG
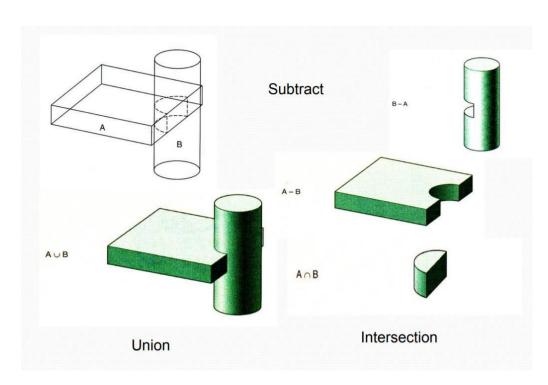
CSG defines a model in terms of combining basic and generated (using extrusion and sweeping operation) solid shapes.

Objects are represented as a combination of simpler solid objects (primitives).

CSG uses Boolean operations to construct a model.

There are three basic Boolean operations:

Union (Unite, join) - the operation combines two volumes included in the different solids into a single solid.

Subtract (cut) - the operation subtracts the volume of one solid from the other solid object.

Intersection - the operation keeps only the volume common to both solids
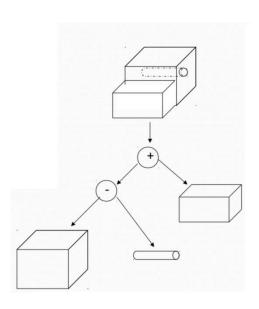
(CSG)- data structure

Data structure does not define model shape explicitly but rather implies the geometric shape through a procedural description

E.g: object is not defined as a set of edges & faces but by the instruction : union primitive1 with primitive 2

This procedural data is stored in a data structure referred to as a CSG tree

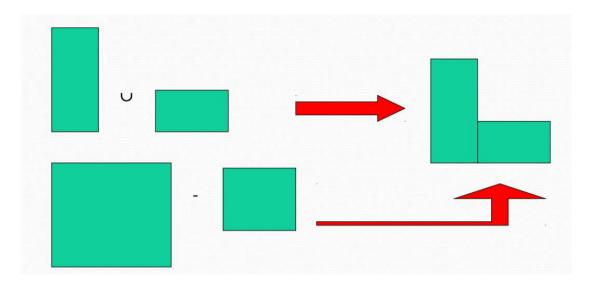The data structure is simple and stores compact data easy to manage

CSG Tree

CSG tree

 stores the history of applying boolean operations on the primitives.

Stores in a binary tree format

The outer leaf nodes of tree represent the primitives

The interior nodes represent the boolean operations performed.

CSG – Nonuniqueness of solid model

☐More than one procedure (and hence database) can be used to arrive at the same geometry.