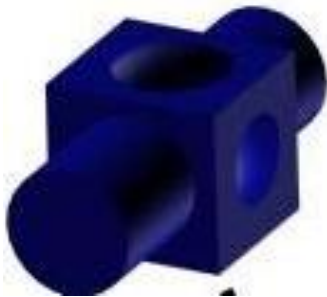## Constructive Solid Geometry

1. Boolean Operations

Write out a tree of Boolean operations that produces the model below. Assume you can start out with a sphere, a cube and a cylinder as your primitive implicit surfaces.

2. From Boolean Operations to Functions

Label each of the leaves in the following tree with a name for the implicit function associated with it. Derive a composite implicit function for the root of the tree based on the functions at the leaves. You may use the functions max, min and – as well.
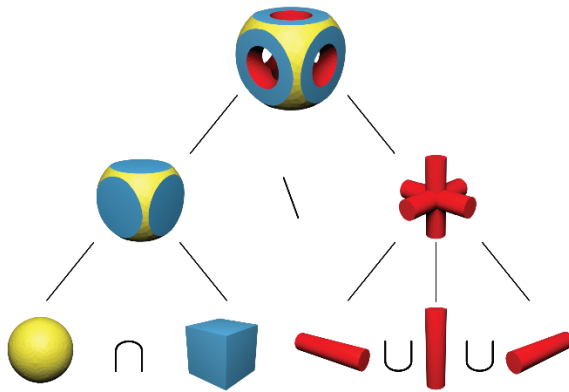
3. Ray-Tracing a CSG Object

Describe a strategy for ray-tracing a CSG object. Consider intersecting a ray with each leaf....how would you proceed to find the hitpoint you need on the composite object?