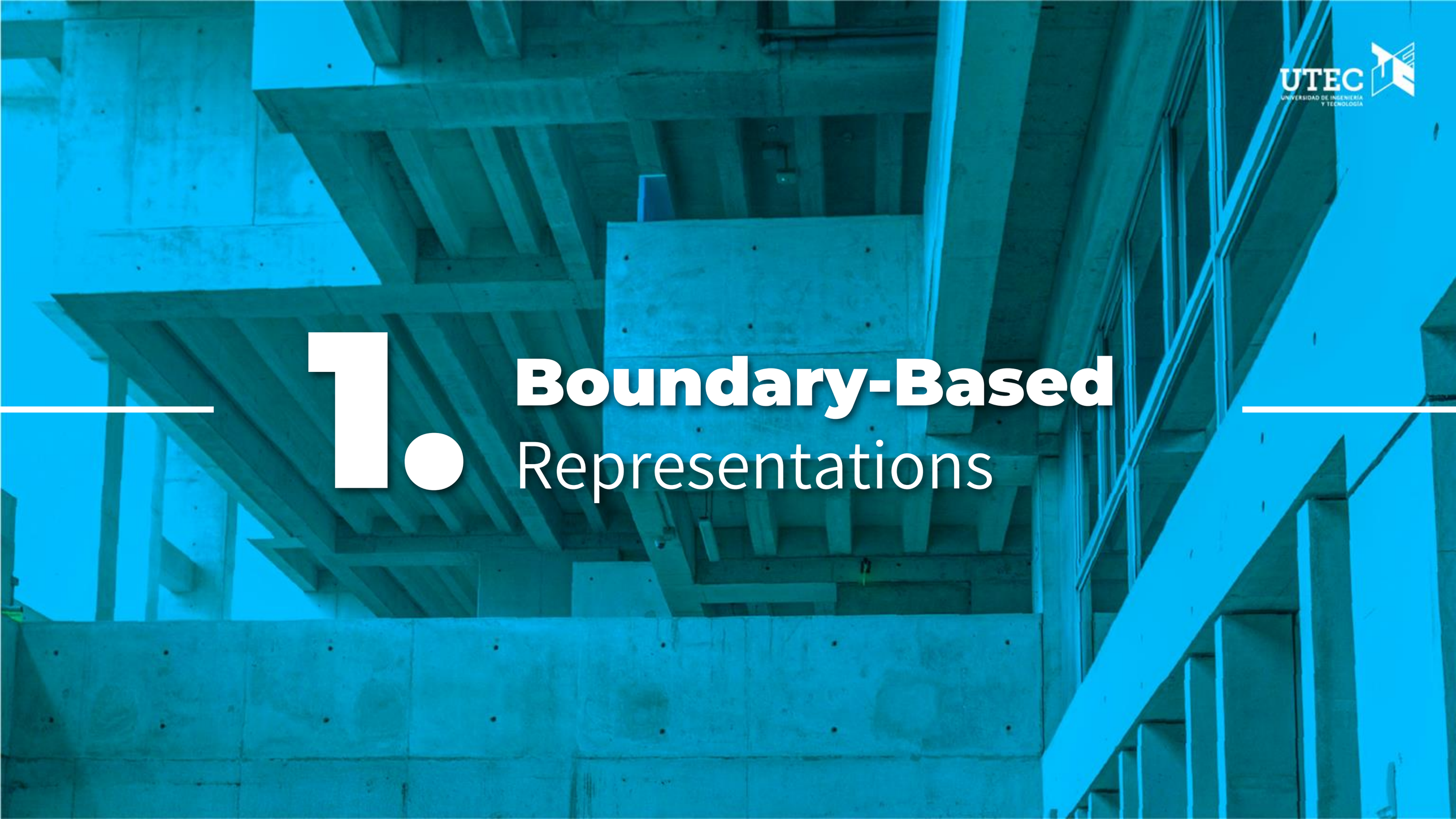
UTEC
UNIVERSIDAD DE INGENIERÍA Y TECNOLOGÍA

Sesión 8.2: Boundary-Based Representations

CS3102 EDA

Índice



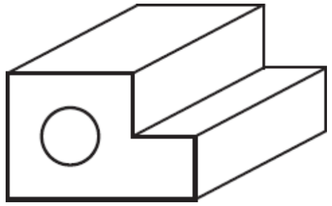
1. Boundary-Based Representations

Boundary-Based *Representations*

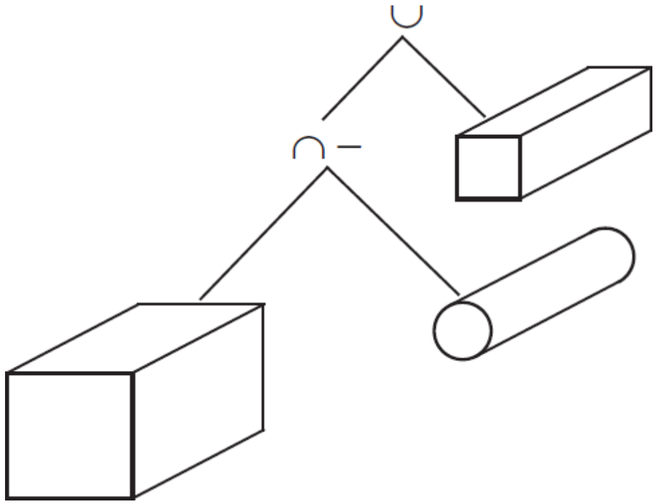
Buenas para el cálculo de propiedades relativas a la forma (perímetro, área)

Feature-query	Bastante fácil determinar las celdas que componen un objeto
Location-query	Es difícil determinar el valor asociado a un punto arbitrario del espacio dado por una celda

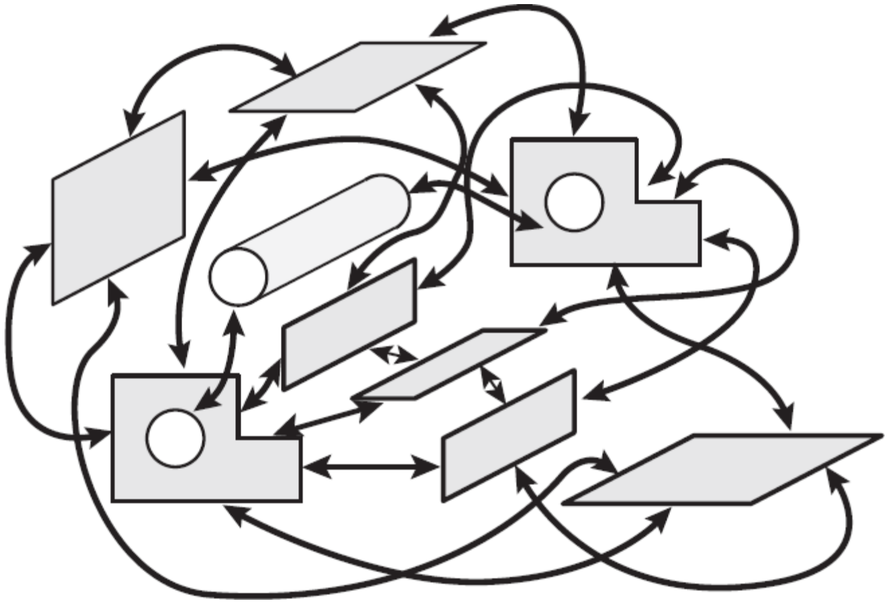
Boundary-Based *Representations*



Objeto

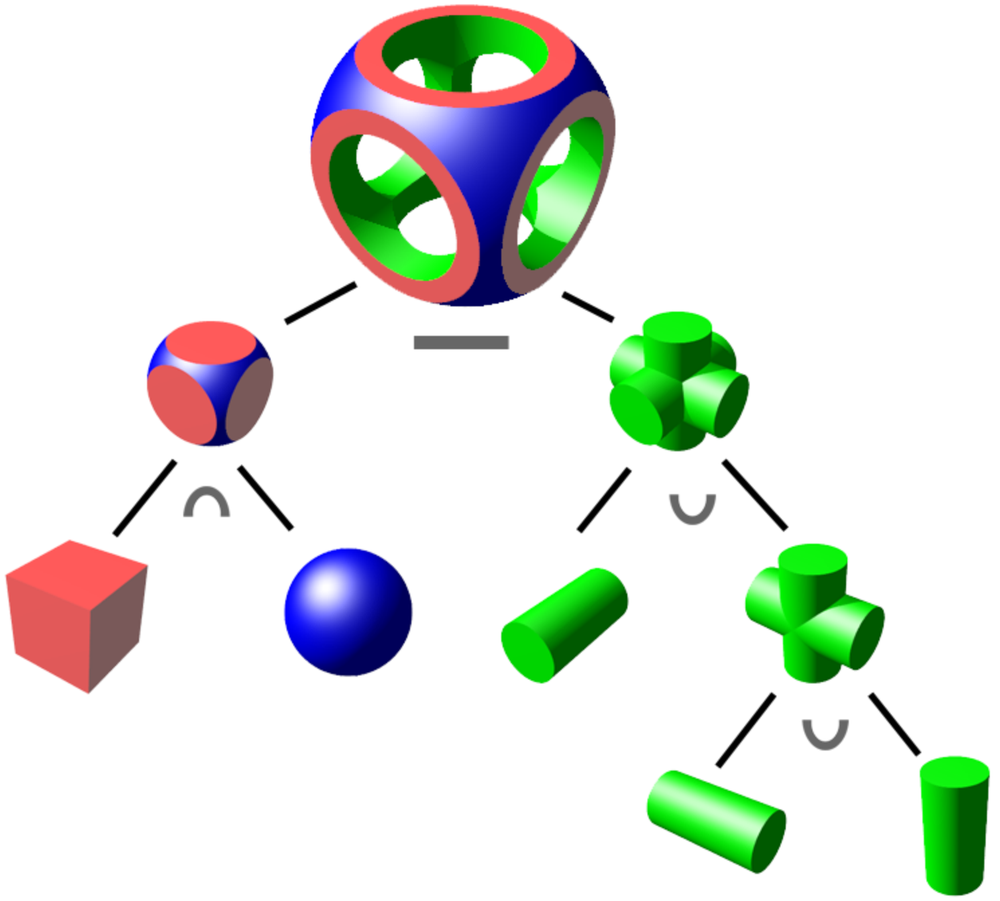


Constructive solid geometry (CSG)



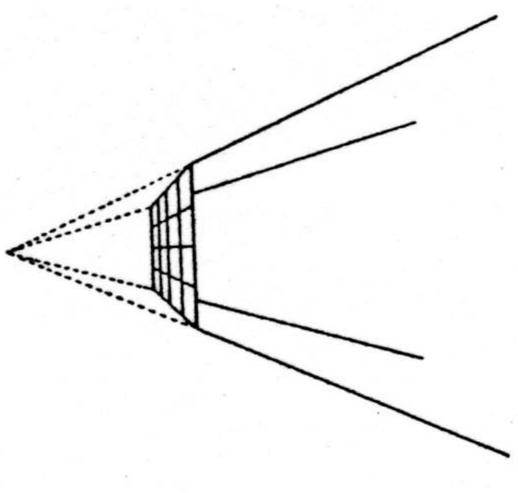
Boundary Model (BRep)

Constructive solid *geometry (CSG)*

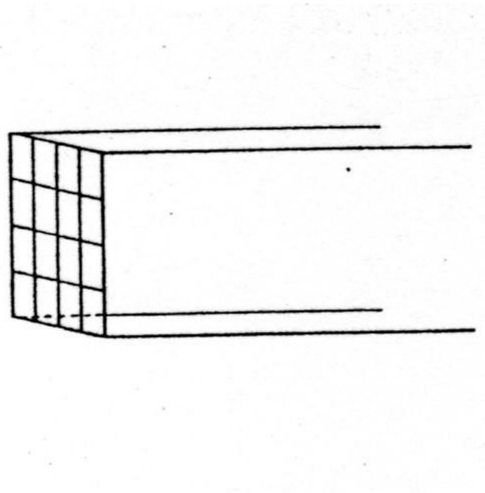


Constructive solid *geometry (CSG)*

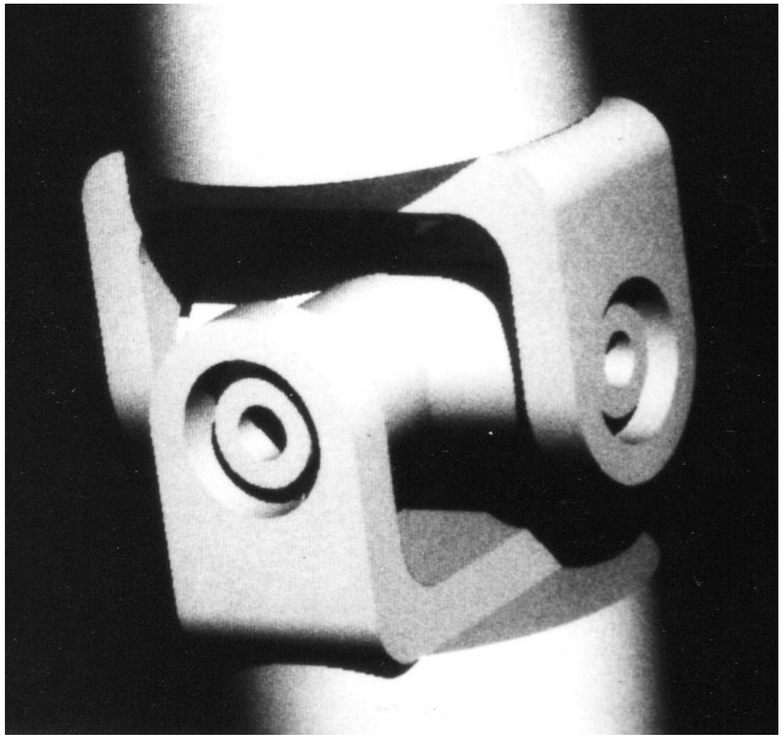
Ray casting



Pinhole Camera Model
for Perspective

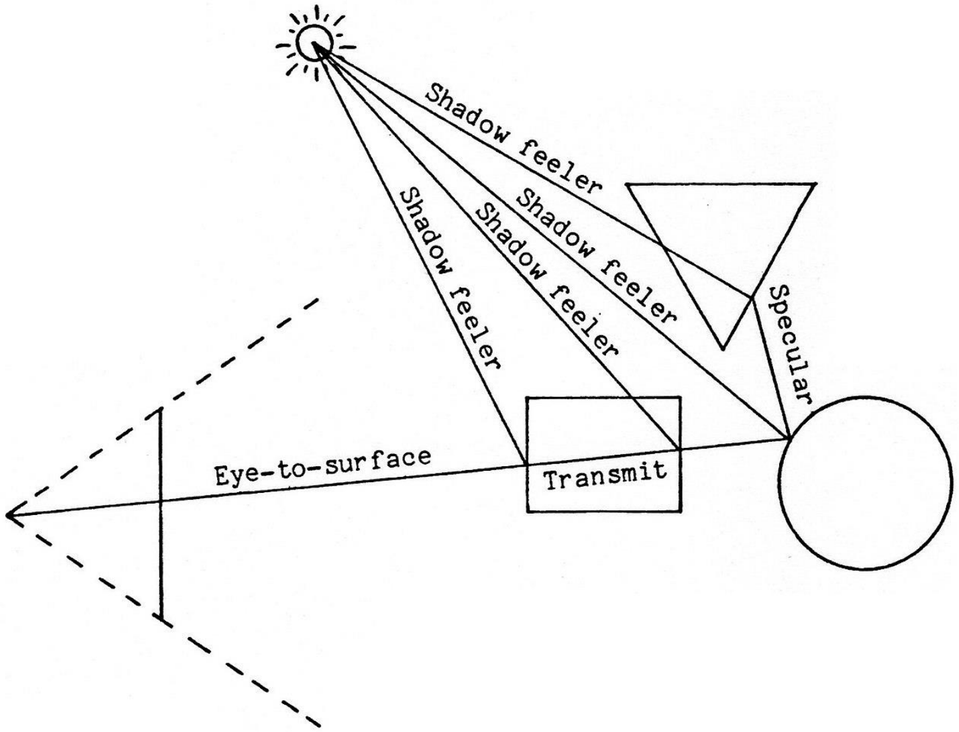


Parallel Projection View
for Solid Analysis

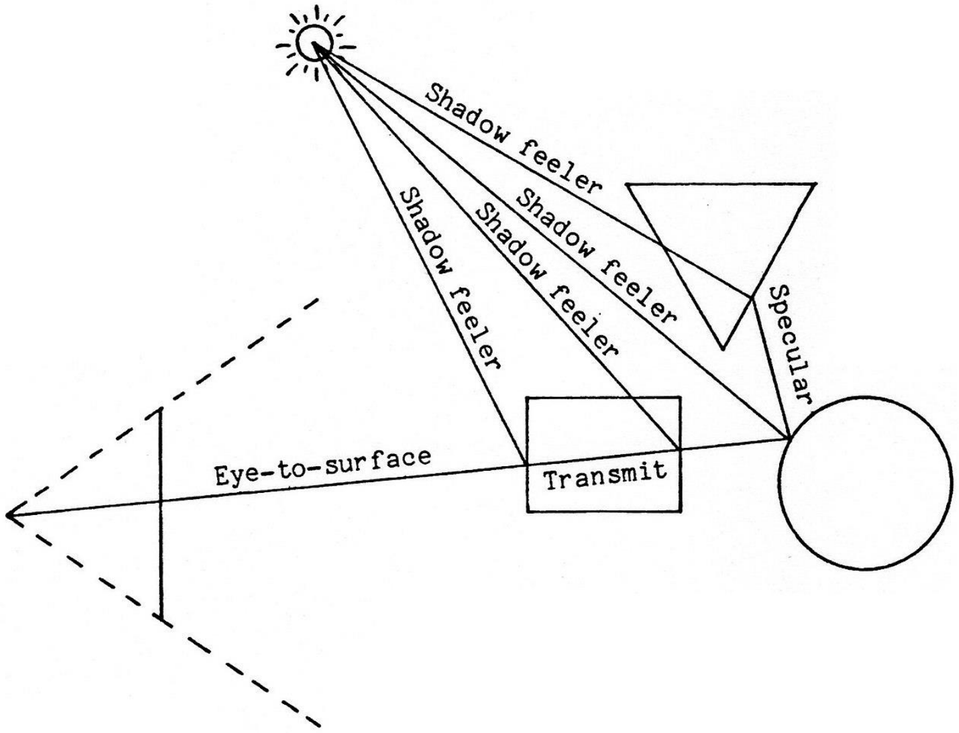


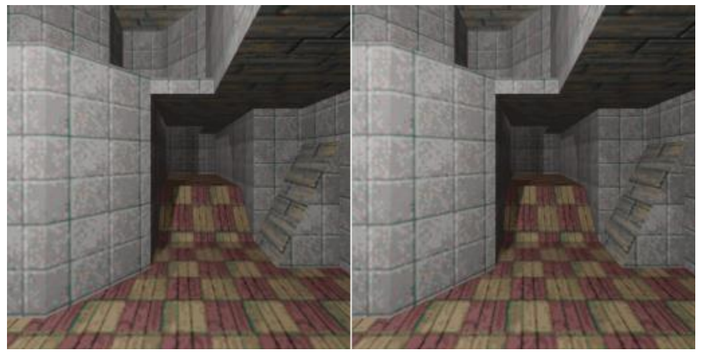
Constructive solid *geometry (CSG)*

Ray casting



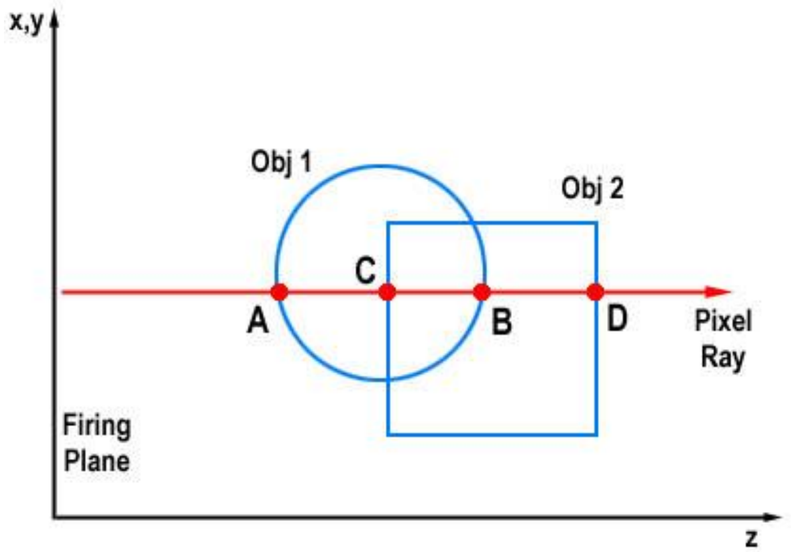
Constructive solid *geometry (CSG)*





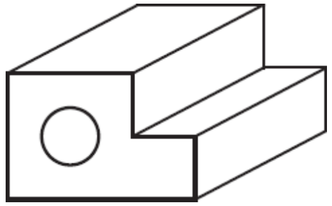
Constructive solid *geometry (CSG)*

Ray casting

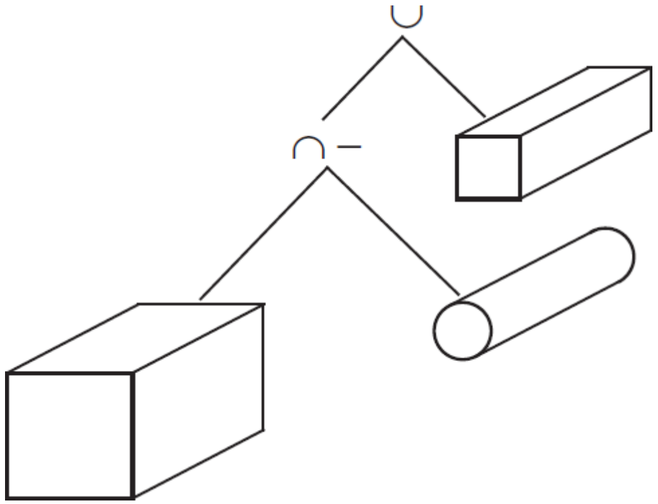


	Límites
Obj 1 ∪ Obj 2	A, D
Obj 1 ∩ Obj 2	C, B
Obj 2 − Obj 1	B, D

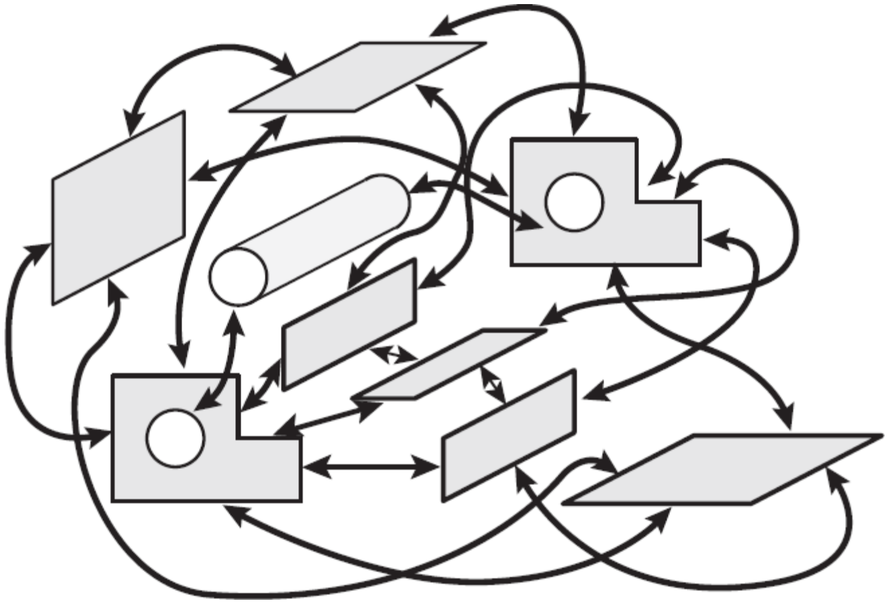
Boundary-Based *Representations*



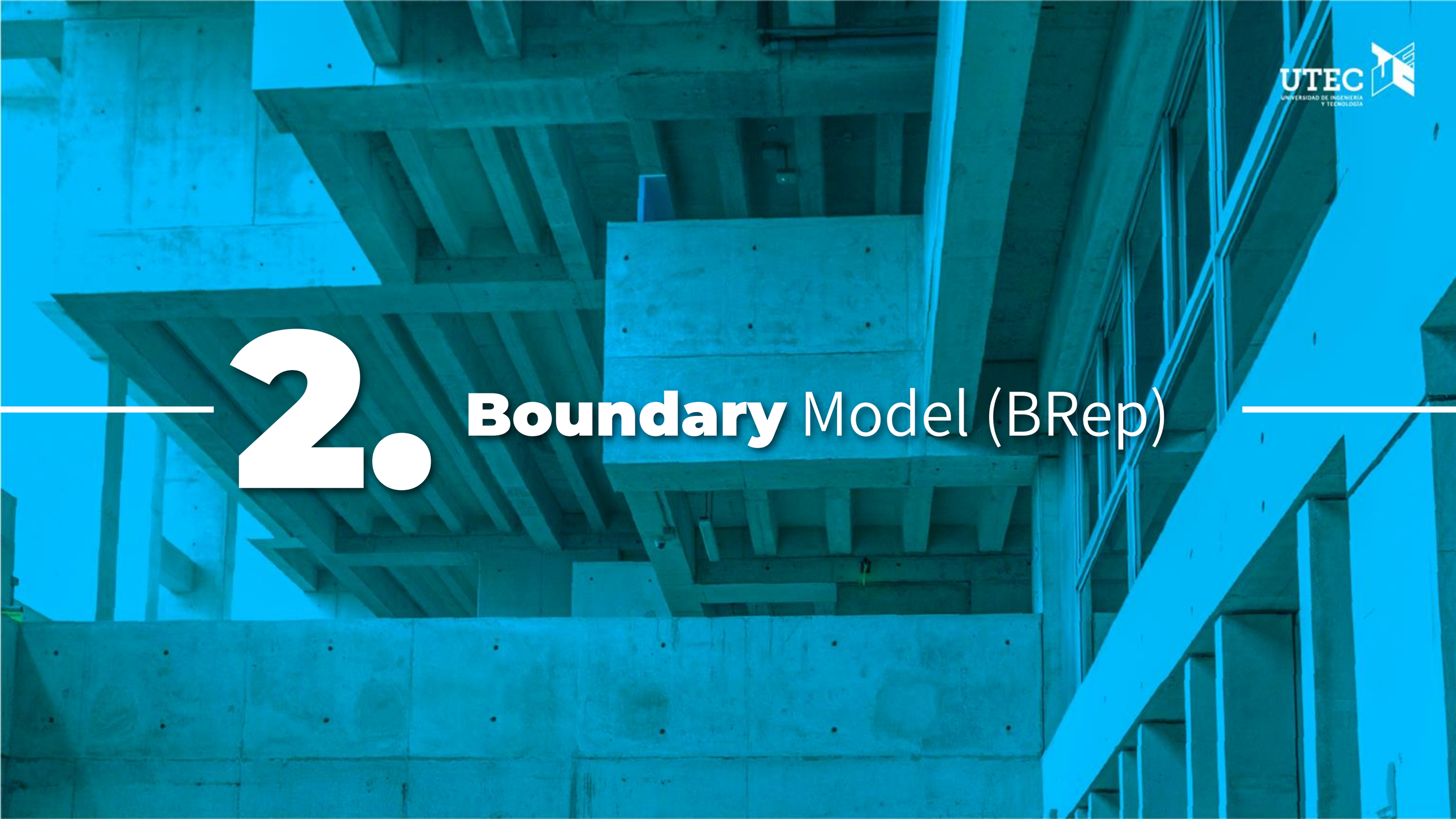
Objeto



Constructive solid geometry (CSG)



Boundary Model (BRep)

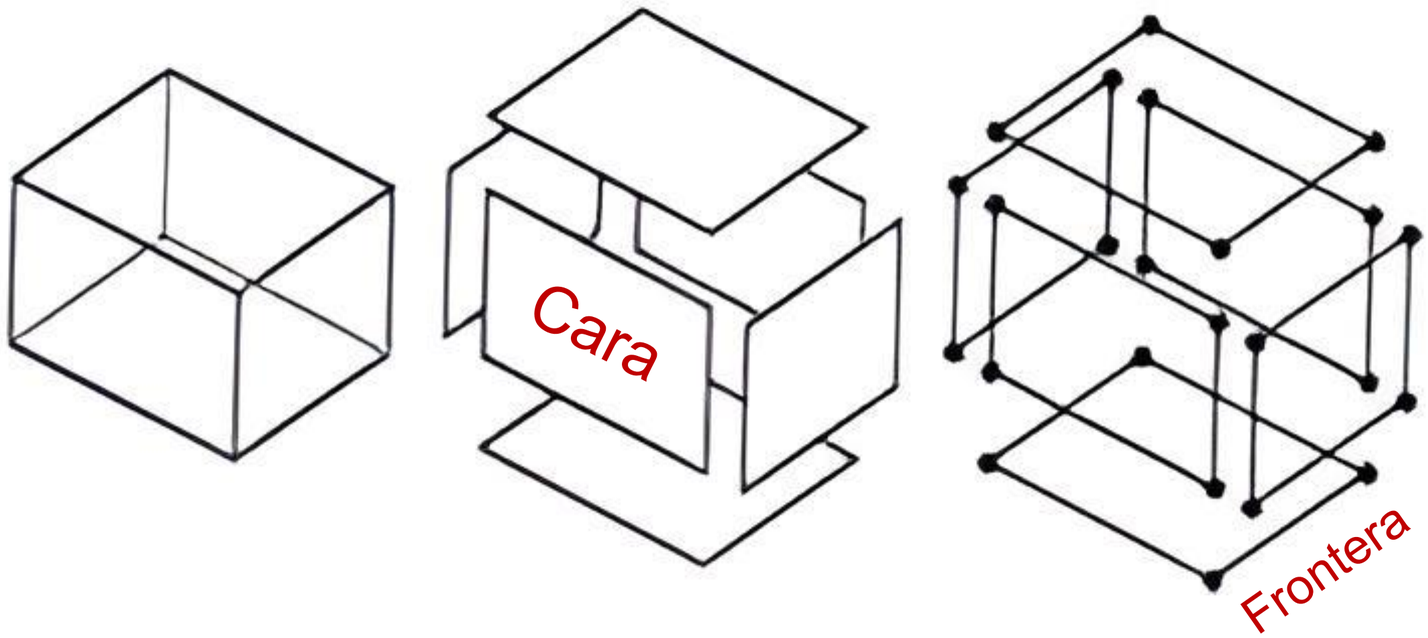


2. **Boundary** Model (BRep)

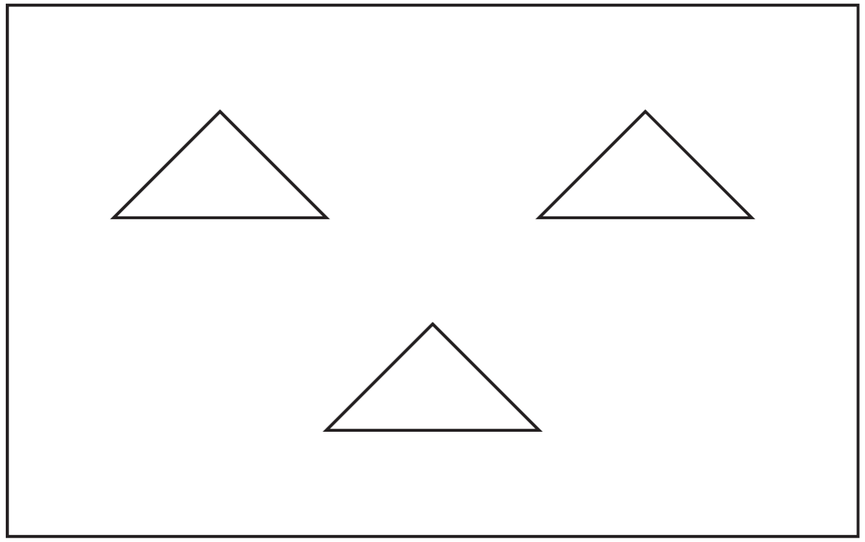
Boundary *Model (BRep)*

Vértices  **Aristas**  **Caras**

Boundary *Model (BRep)*

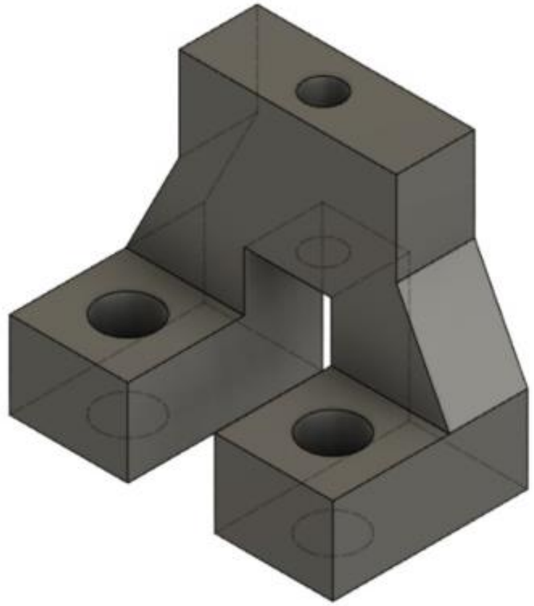


Boundary *Model (BRep)*



Las fronteras de una cara no tienen por qué estar conectadas

Boundary *Model (BRep)*



Caras adyacentes

Dos caras que comparten al menos una arista en común

Caras conectadas

Dos caras f_i, f_j están conectadas si existe una secuencia:

$$(f_i, f_{i+1}, \cdots, f_{j-1}, f_j)$$

tal que f_k es adyacente a f_{k+1} para todo $k \in [i, j\rangle$

Boundary *Model (BRep)*

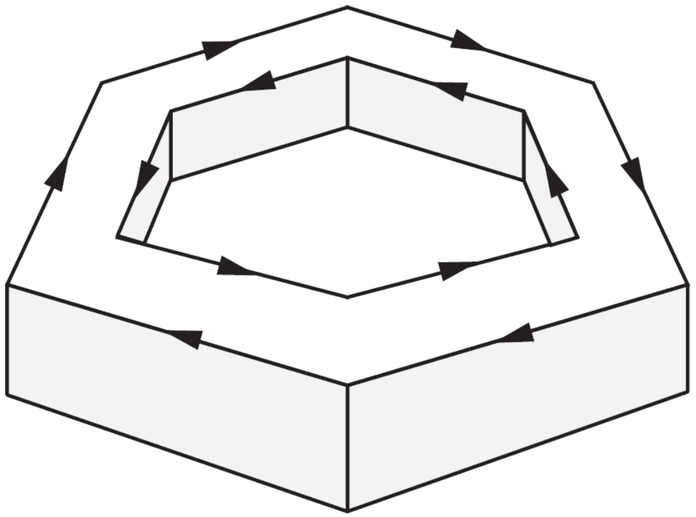
Solo trabajaremos con objetos con las siguientes propiedades:

- **Compactos**
- **Orientables**
- **2-manifold**

Boundary *Model (BRep)*

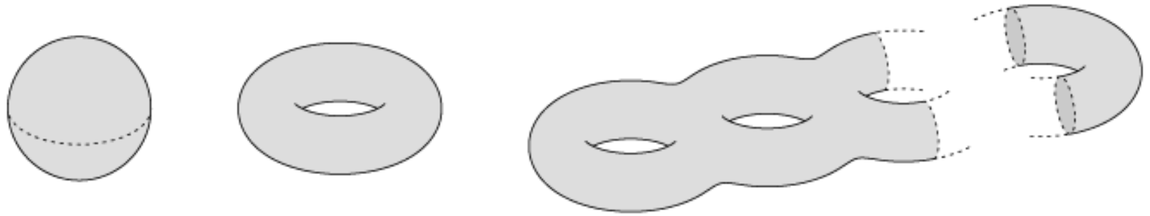
Compacto

- Topológicamente cerrado
- Acotado

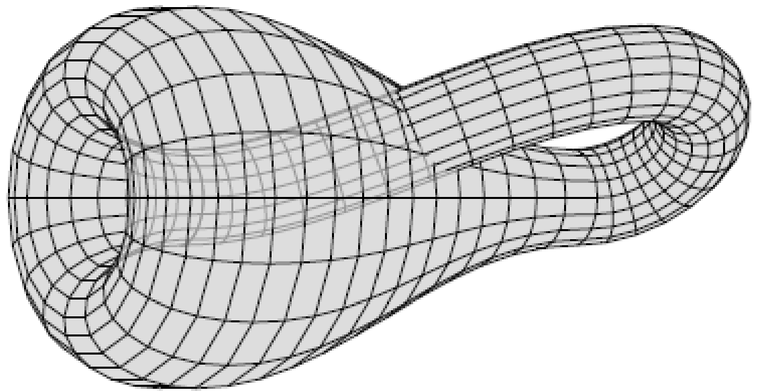


Boundary *Model (BRep)*

Orientable



No orientable



Boundary *Model (BRep)*

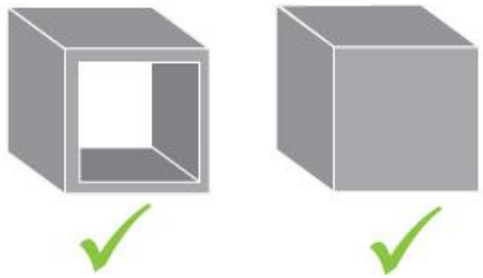
2-manifold

M es un espacio topológico, decimos que M es una n-manifold si satisface las siguientes propiedades:

- M es Hausdorff
- M es segundo numerable
- Para cada punto x en M, existe un conjunto abierto U que contiene a x y un homeomorfismo $f\colon U \to V$, donde V es un conjunto abierto de $\mathbb{R}^n$.

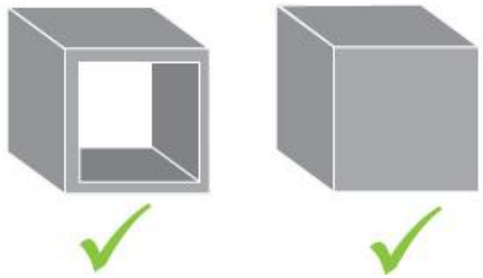
Boundary *Model (BRep)*

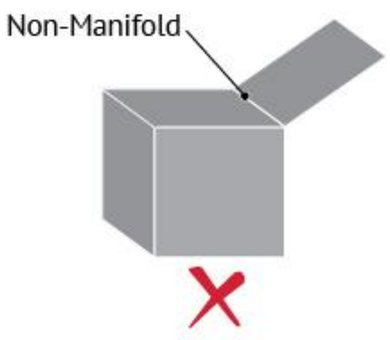
2-manifold



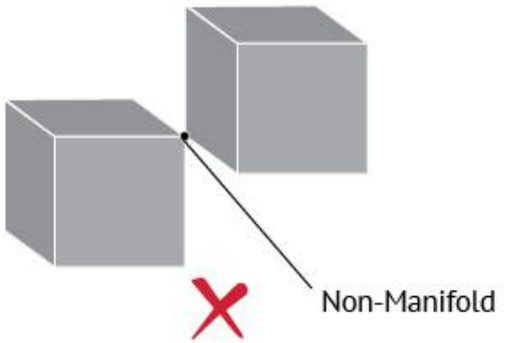
Boundary *Model (BRep)*

2-manifold





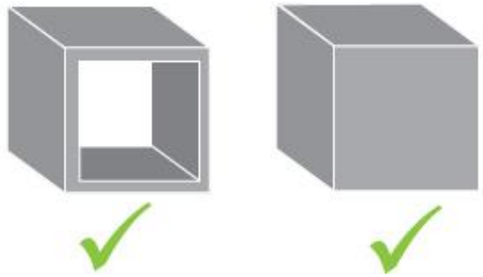
Multiply connected geometry



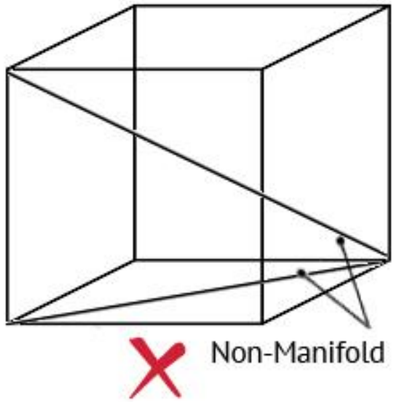
Several surfaces connected to a single vertex

Boundary *Model (BRep)*

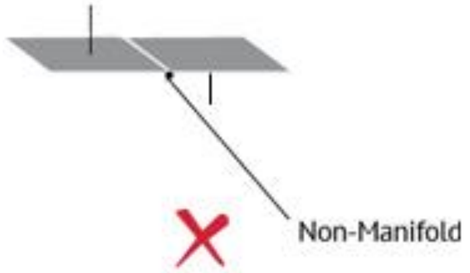
2-manifold



Open objects



Internal faces

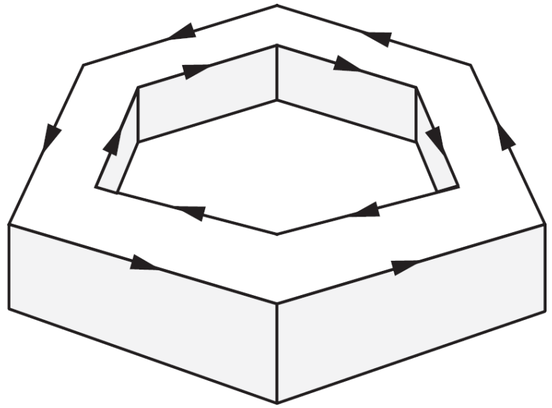


Opposite normals

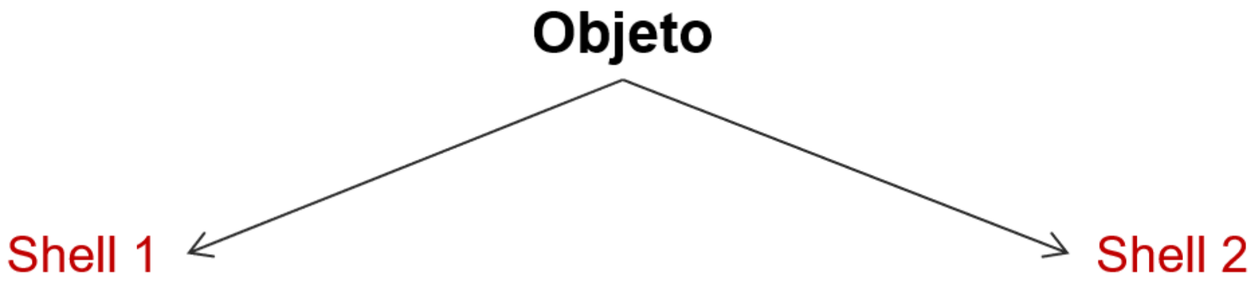
Boundary *Model (BRep)*

Shell Conjunto máximo conectado de caras

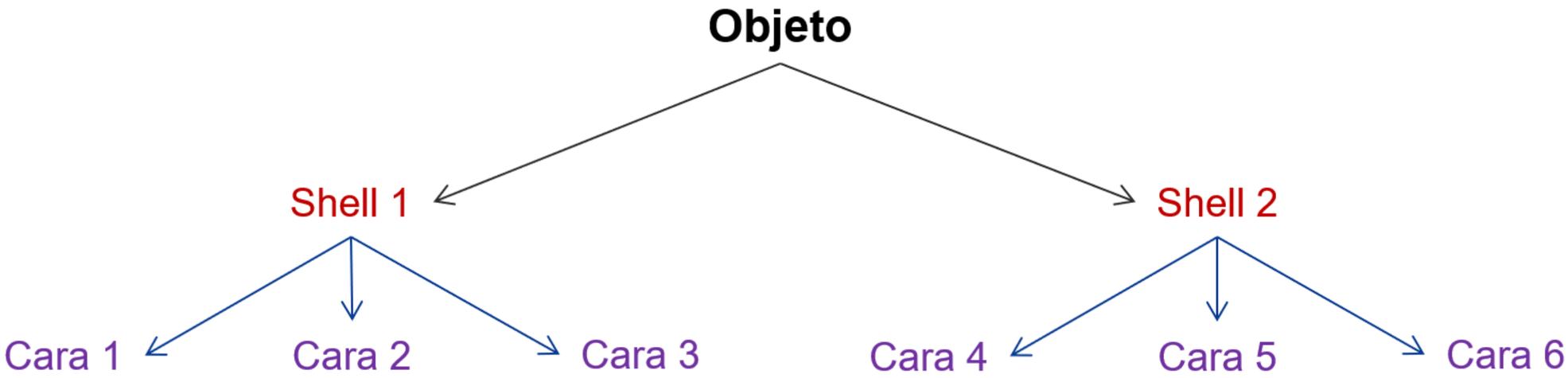
Loop Cadena cerrada de aristas (es decir, un ciclo) que delimita una cara



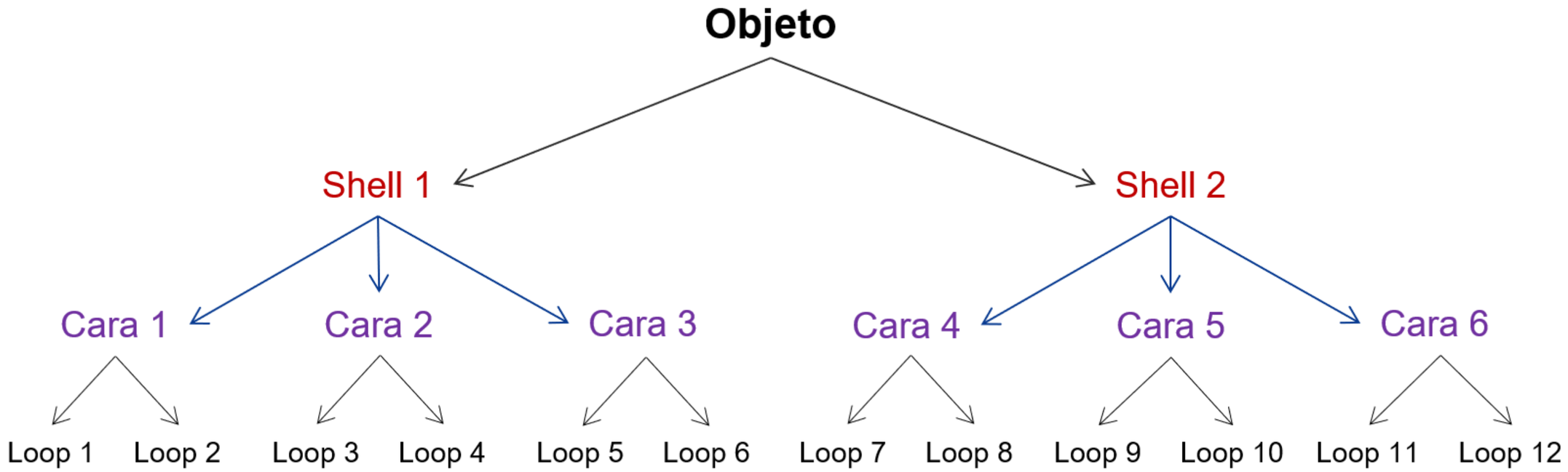
Boundary *Model (BRep)*



Boundary *Model (BRep)*



Boundary *Model (BRep)*



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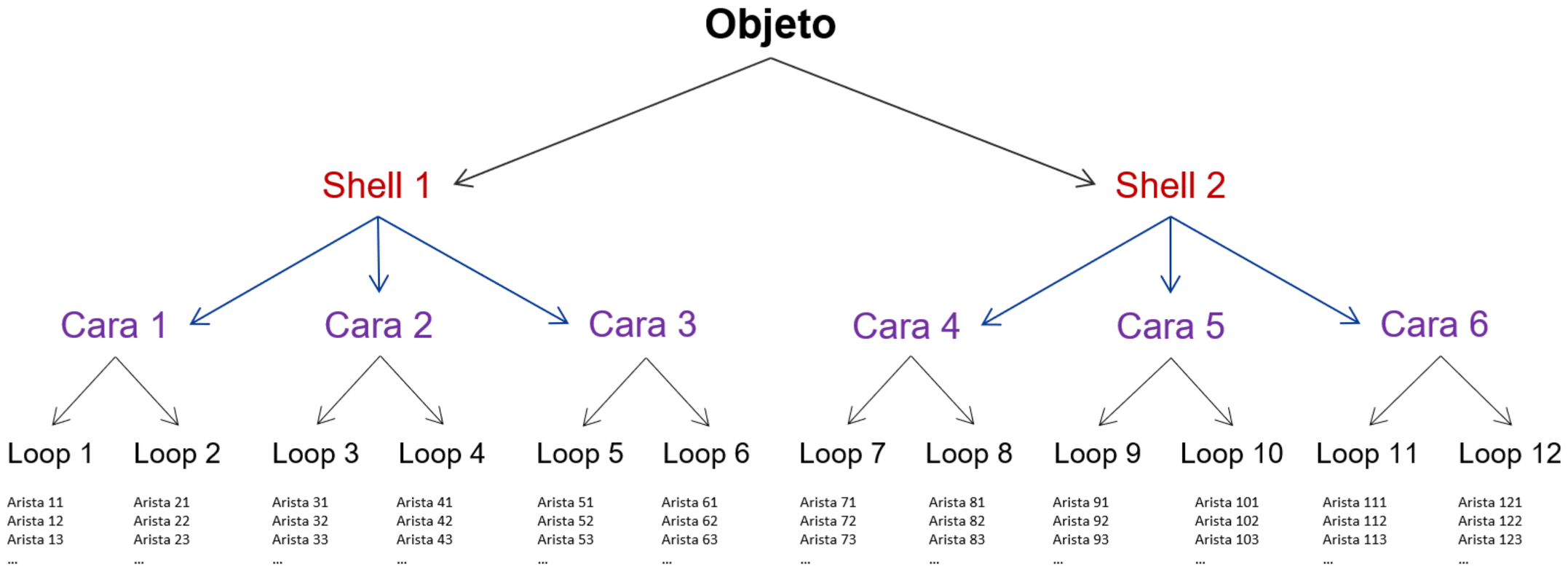

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