Basic 3D Modeling with IRIT

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박영진

IRIT

- **스크립팅 기능을 제공하는 오픈소스 3D 모델링 프로그램**
  - Computer Science Department, Technion, Israel의 Gershon Elber 교수님 제작
  - https://gershon.cs.technion.ac.il/irit/
  - 다양한 3D 데이터에 대한 처리 가능
- **스크립트 파일(*.irt) 작성**
- **스크립트 실행**
  - 명령 프롬프트(cmd)에서 c:\CG_irit 폴더 이동
    - cd c:\CG_irit
  - irit64 *.irt
  - 계산결과 혹은 생성된 파일(*.itd, *.obj ...) 확인

Box(VectorType Pt, NumericType Dx, NumericType Dy, NumericType Dz)

- creates a BOX polygonal object, whose boundary is coplanar with the XY, XZ, and YZ planes. The BOX is defined by Point as base position, and Dx, Dy, Dz as BOX dimensions. Negative dimensions are allowed.
- Example: B = BOX(vector(0, 0, 0), 1, 1, 1);
  creates a unit cube from 0 to 1 in all axes.

CYLIN(VectorType Center, VectorType Direction, NumericType Radius, NumericType Caps)

- creates a CYLINder geometric object, defined by Center as the center of the base of the CYLINder, Direction as the CYLINder's axis and height, and Radius as the radius of the base of the CYLINder.
- If Caps equals zero, no caps are created. If Caps equal one (two), only the bottom (top) cap is created. If Caps equal three, both the top and the bottom caps are created.

SPHERE(VectorType Center, NumericType Radius)

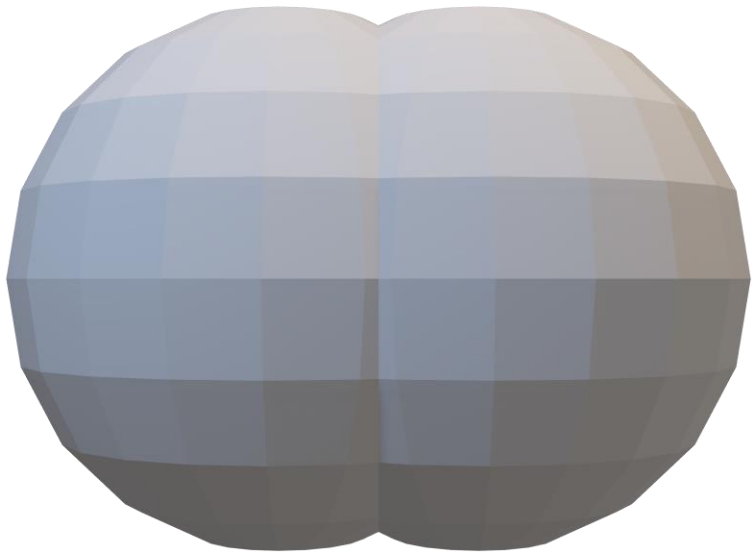
- creates a SPHERE geometric object, defined by Center as the center of the SPHERE, and with Radius as the radius of the SPHERE.

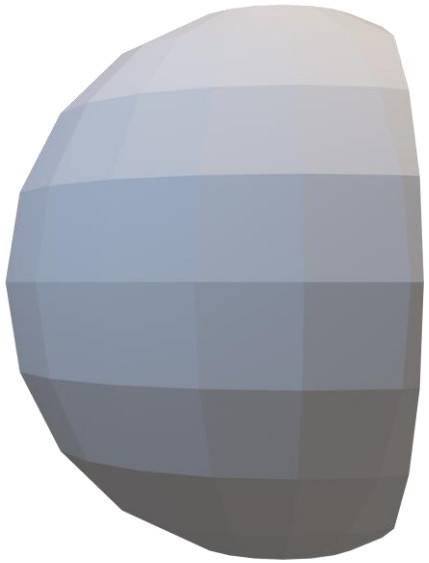
Translation / Rotation / Scale

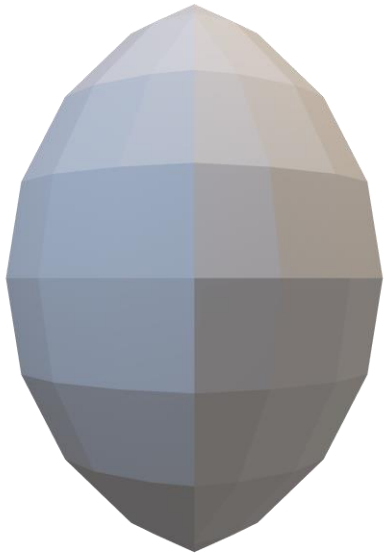
- tx(value) : x축으로 value만큼 이동
- ty(value) : y축으로 value만큼 이동
- tz(value) : z축으로 value만큼 이동
- rx(angle) : x축으로 angle만큼 회전
- ry(angle) : y축으로 angle만큼 회전
- rz(angle) : z축으로 angle만큼 회전
- sx(value) : x축으로 value만큼 신축
- sy(value) : y축으로 value만큼 신축
- sz(value) : z축으로 value만큼 신축

Boolean Operation

- Union +
- Difference –
- Intersection *





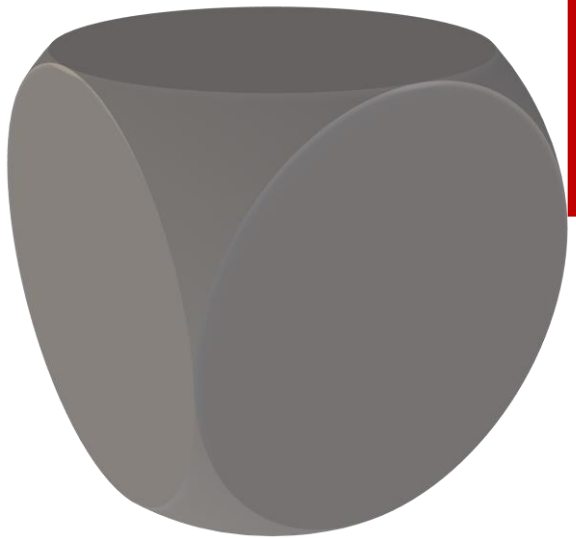


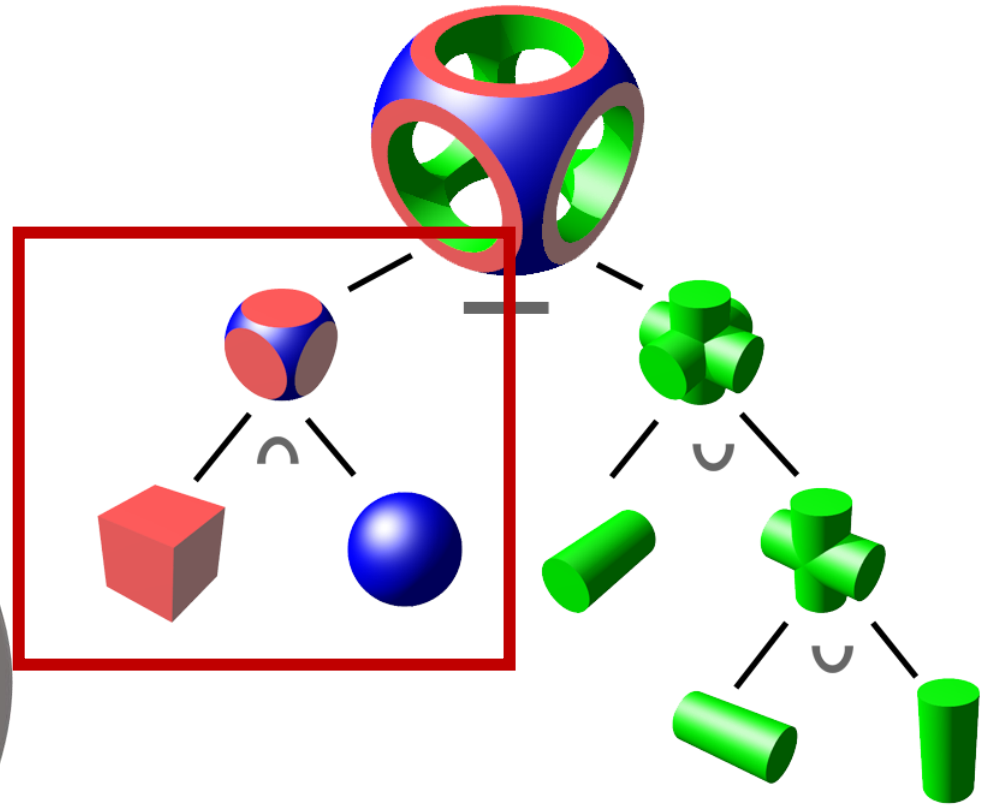
ETC

- **resolution = 1000**
  - Polygon 정밀도 결정
- **interact(list(axes,OOO,OOO,...));**
  - 임시로 결과를 보고 싶을 때 활용
- **save("*FILENAME*", *VARIABLE*);**
  - VARIABLE에 있는 데이터를 FILENAME으로 저장.
  - 확장자에 따라 저장 방식 달라짐
    - .itd : IRIT 파일
    - .stl : STL 파일
    - .obj : obj 파일
- **exit();**
  - 종료

Constructive Solid Geometry

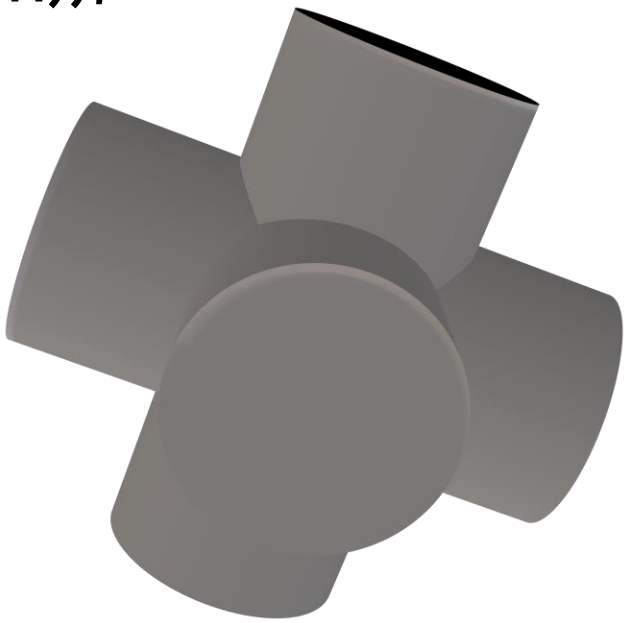
```
b1 = box(vector(0,0,0),1,1,1);
s1 = sphere(vector(0.5,0.5,0.5),sqrt(2)/2.0);
itst1 = s1 * b1;
itst1 = itst1 * tx(-0.5) * ty(-0.5) * tz(-0.5);
interact(list(axes,b1,s1));
interact(list(axes,itst1));
save("mid0.obj",itst1);
```

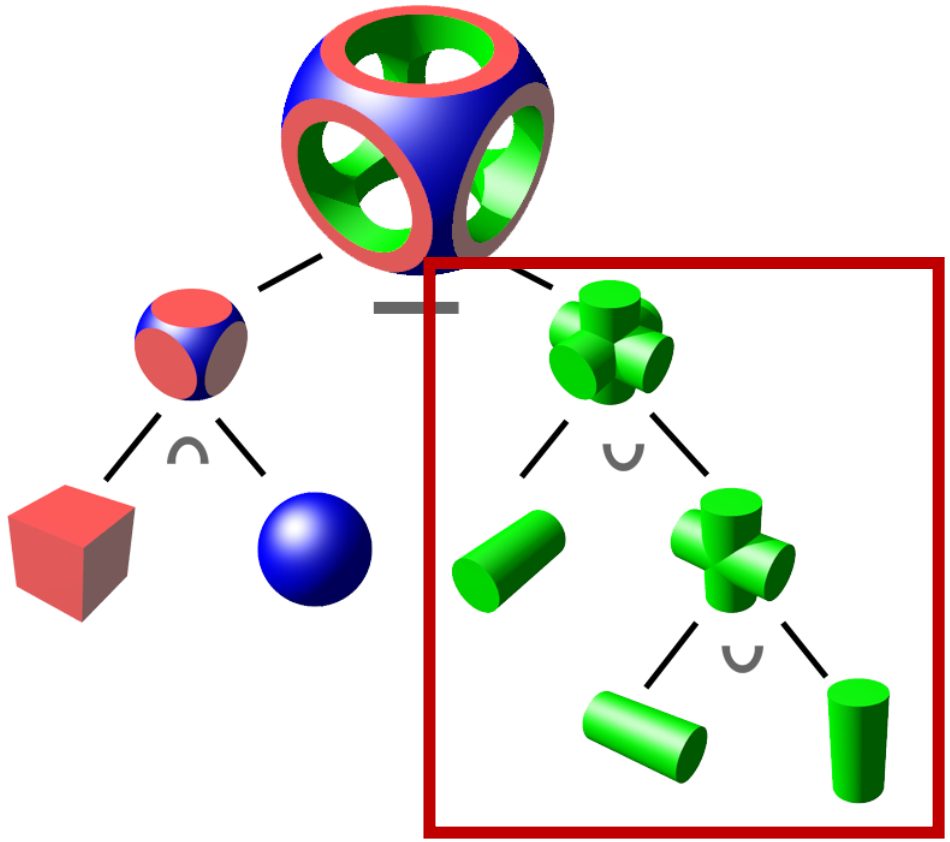




Constructive Solid Geometry

```
s1 = cylin(vector(0,0,-1), vector(0,0,2), 0.45, 3);
s2 = cylin(vector(0,-1,0), vector(0,2,0), 0.45, 3);
s3 = cylin(vector(-1,0,0), vector(2,0,0), 0.45, 3);
sum1 = s1 + s2 + s3;
interact(list(axes,itst1, sum1));
save("mid1.obj",sum1);
```

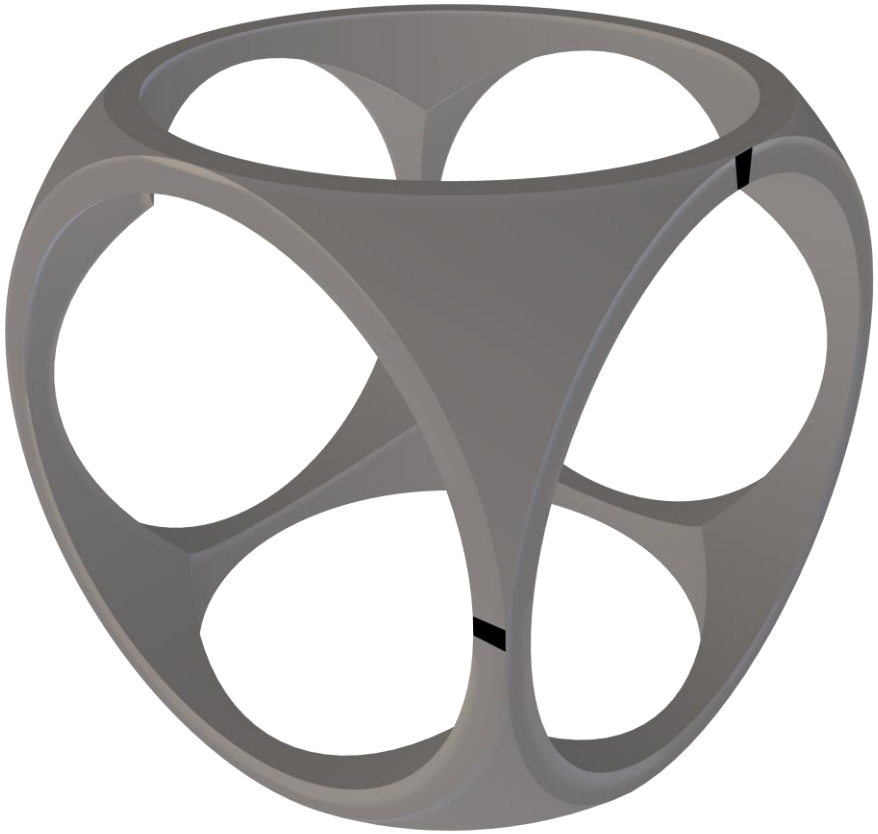


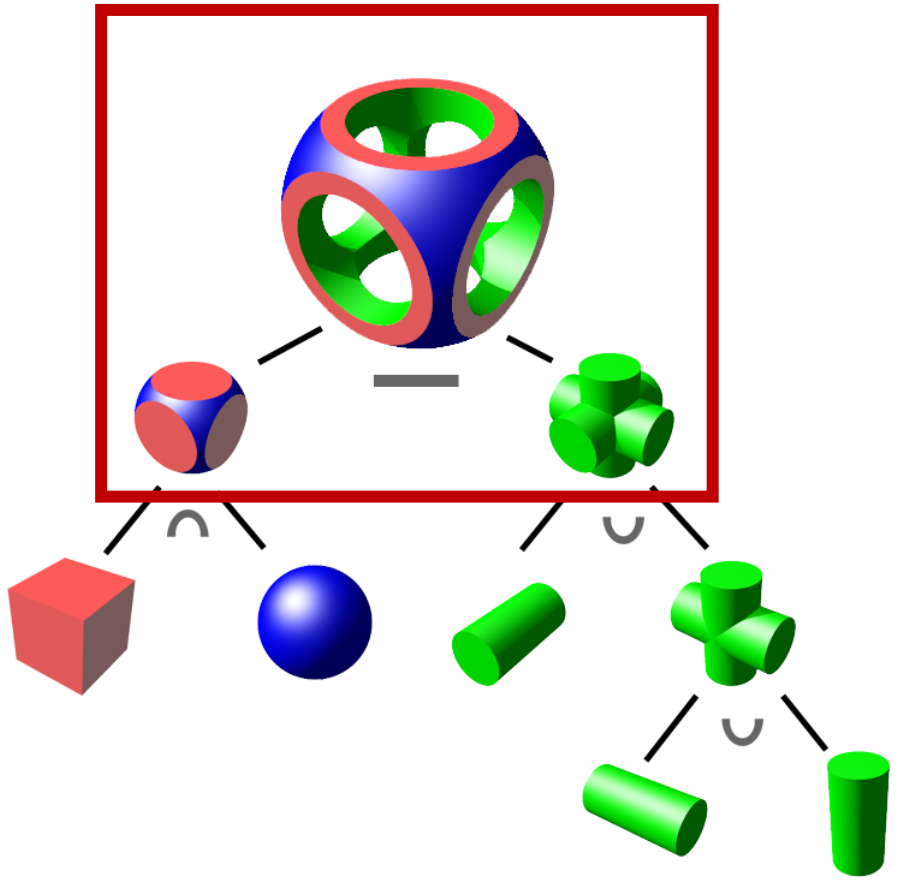


Constructive Solid Geometry

```
result = itst1 - sum1;

interact(list(axes,result));
```





[과제] 방 꾸미기

1. Geometry.irt 파일 확인
2. 생성되는 room.itd, room.obj 파일 확인
3. 모니터를 올릴 수 있는 책상 생성하기
4. 방에 어울리는 물체를 (자유롭게) 하나 디자인하기
   - 바닥
   - 스마트폰
   - 다른 모양의 의자
   - 침대
   - ...

마감기한 : 5/3(금) 23:59

Any Questions?

Enjoy the Festival!