Lab 4

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Implicit Solids

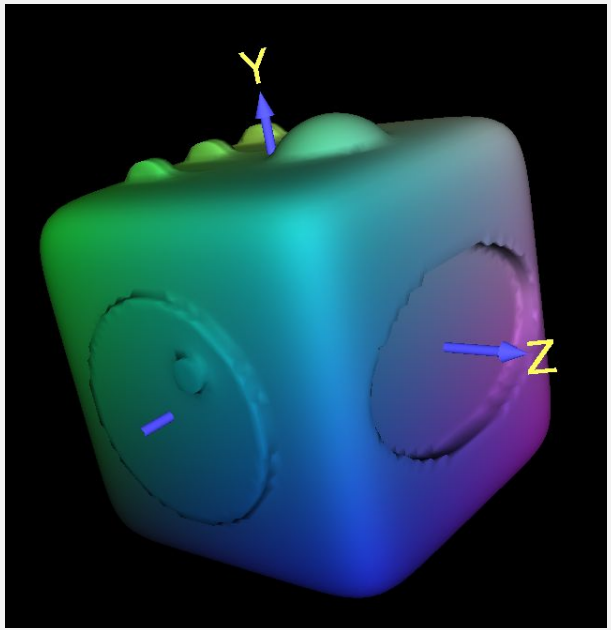
(a) fidget-cube

Fidget Cube

In this project, the fidget cube (left) was used as an design inspiration and the solid created is modelled after it.

Do note that the components at some sides are simplified, and the ordering of the sides varies from the image on the left as the image was purely for referencing purposes.

(b) fidget-cube



The solid is formed by having a cube as a base object, and components on each side are added through union and subtraction.

In order for the solid object to load within 5 seconds, the bounding box size is set at **2 2 2** to ensure that the entire solid can be seen. On the other hand, the resolution is set to **[80 60 60]** which is sufficient in rendering the components of the solid.

bboxCenter **0 0 0**
bboxSize **2 2 2**
resolution **[80 60 60]**

In addition, the colour of the solid is rendered using the following formulas, which gives it a beautiful rainbow color rendering throughout the solid.

diffuseColor:
r = (u+1)/2; g = (v+1)/2; b = (w+1)/2;

(c) fidget-cube

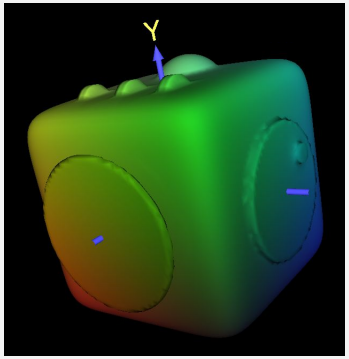


Fig 1

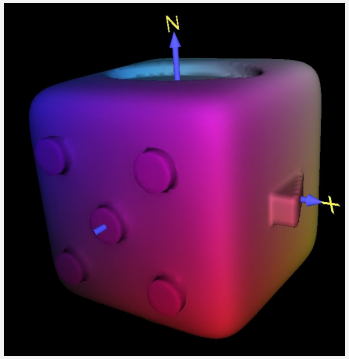


Fig 2

Side 1 is made by first making a disc-like object that hovers over the cube, and is connected to the cube through a small stem (Fig 1).

Side 2 is made by creating 5 studs, and added to the cube individually through union (Fig 2).

(d) fidget-cube

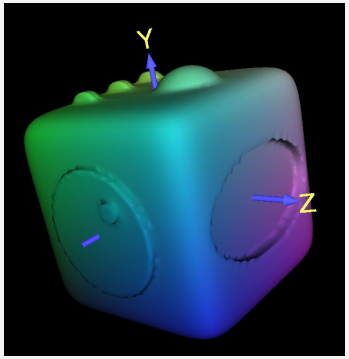


Fig 3

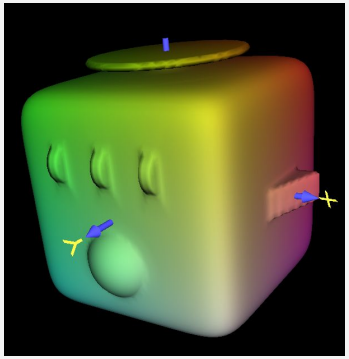


Fig 4

Side 3 is created by first adding a disc-like object to the cube, then adding a smaller disc-like object on top of it (Fig 3).

Side 4 has 4 separate components to it: 1 hemisphere and 3 semi-circle disc. (Fig 4) The hemisphere is added to the cube, and the 3 semi-circle discs actually belongs to a tube-like object that has been sliced across to give 3 semi-circle disc of the same size.

(e) fidget-cube

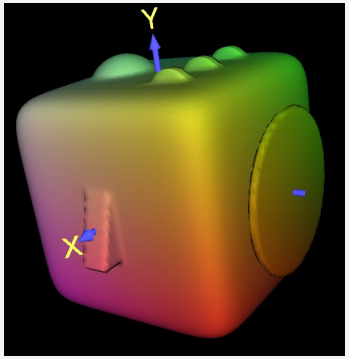


Fig 5

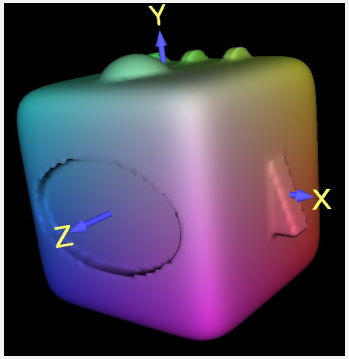


Fig 6

Side 5 is made by adding a 3D-triangle, that is made by creating the lines of the hypotenuse, height and length. (Fig 5)

Side 6 is the only component made by first creating a 3D ellipse cone, and then making a “dent” on the base cube using subtraction. (Fig 6)