

Worksheet X

Answer all the problems completely on a separate sheet of paper. Read all the problems closely, and ask if you have any questions on what a problem means. This worksheet is due at the start of class on Mon, Dec 08.

Problem 1 (4 pts)

Bounding volumes are one method of increasing the speed of a ray tracer.

- (a) What are the benefits of using an **axis-aligned bounding box** vs. a **object-oriented bounding box**? What are the costs?
- (b) What are the benefits of using an **axis-aligned bounding box** vs. a **bounding sphere**? What are the costs?

Problem 2 (7 pts)

Draw out the Constructive Solid Geometry (CSG) Tree for the below Lego brick. Assume you have primitives for *spheres*, *boxes/cubes*, and *cylinders*. (Note that you can also assume that the unshown bottom of the brick is solid).



Problem 3 (6 pts)

Consider the below *visual channels*. For each channel, explain its relative effectiveness for visualizing **nominal**, **quantitative**, and **ordinal** data.

- (a) Hue
- (b) Size
- (c) Glyphs

Problem 4 (6 pts)

According to the reading from Donald Norman's *Things that Make us Smart*, what are the characteristics of a “good” representation? Give your own explanation of why these characteristics are important.