Tutorial Questions Week 3

1.1 In representing a picture, one-bit and eight-bit-deep frame buffers allow only two and 256 colors, respectively. How many bits does a full-color system allow?

Answer: In full-color systems, there are 24 bits (or more) per frame buffer.

1.2 In computer graphics, objects such as spheres are usually approximated by simpler objects constructed from flat polygons (polyhedra). Using lines of longitude and latitude, define a set of simple polygons that approximate a sphere centered at the origin. Can you use only quadrilaterals or only triangles?

Answer:

It is not able to use only quadrilaterals or triangles to approximate a sphere because adding longitude and latitudes to the sphere result in polygons at the poles as triangles and the rest as quadrilaterals.

1.4 Consider the clipping of a point in two dimensions against a circular clipping window. Show that you require only the coordinate of the point and the center and radius of the circle to determine whether the point is not clipped, or is clipped out completely.

Answer:
The point is inside the clipping window if length to the point is smaller than the radius
The point is clipped if it is greater.

1.5 For a line segment, show that clipping against the top of the clipping rectangle can be done independently of the clipping against the other sides. Use this result to show that a clipper can be implemented as a pipeline of four simpler clippers.

In Exercise 1.4, we saw that we could intersect the line of which the
line segment is part independently against each of the sides of the window.
We could do this process iteratively, each time shortening the line segment
if it intersects one side of the window.