GIS data models and representation II: worksheet

1. Describe in your own words why storing only the arrays of vertices, edges and faces in a planar map may not be sufficient.

2. Estimate the size of a winged-edge structure function of v, e and f (the number of vertices, edges and faces, respectively). Assume 3D points (x,y,z) which are floats, and pointers are 8 bytes.

3. Same as problem 2 but for a half-edge data structure.

4. Assume we have a mesh of 1 million points, 2 million edges and 2 million faces. Estimate how much space it takes to store it as a topological structure in memory.
   a. winged-edge
   b. half-edge

5. Assume we have a mesh stored with a winged-edge structure.
   a. Given a pointer to a face, write code that traverses and prints all edges on this face.
b. Given a pointer to a vertex, write code that traverses and prints all edges incident to this vertex.

6. Assume we have a mesh stored with a half-edge structure.
   a. Find the two faces that border a half-edge e

   b. Let f be a pointer to a face. Write code that iterates through all edges on this face.

   c. Let v be a pointer to a vertex. Write code that iterates through all edges incident to this vertex.

   d. Find the vertices of a half-edge e