CSC 315 - HW 1
Dr. A.J. Pounds
Fall 2007
(Due 5:00 p.m., September 10, 2007)

1. Describe the differences between **vector graphics** and **raster graphics**. For both vector and raster graphics, give an example of an application that is suited particularly well for each.

2. What is clipping? Describe the most inefficient form of clipping.

3. What is **antialiasing**? Why is it needed? *(Hint: a picture could help.)*

4. Describe the Cohen-Sutherland line clipping algorithm. How would you have to modify the algorithm to handle the clipping of lines in three dimensions.

5. One computes the position of a pixel on a 45° arc of a circle. If the circle is centered at $(0, 0)$, and the first pixel is drawn at (x, y), what are the other pixel positions that can be drawn without computation?

6. Describe the Sutherland-Hodgman algorithm for clipping polygons. How does it work? *(Hint: draw a polygon and the clip rectangle. Input/Output Arrays?)*

7. At what point do the following two lines intersect:

$$2 = 3x + 4y$$

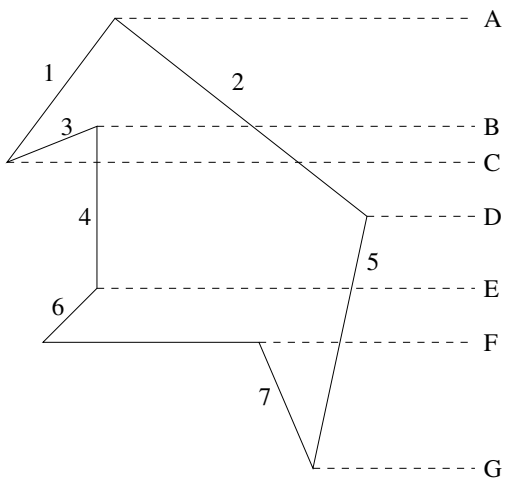
$$5 = 5x - 10y$$

8. How should you modify Program 3.5 so that it will work from any x-y point, and not just the origin?

9. Foley. p. 4.3

10. Derive expressions to convert general world coordinates between ($X_{\min}$,$Y_{\min}$), ($X_{\max}$,$Y_{\max}$) to device coordinates between (0,0), (1024,768) so that the maximum amount of display area is utilized.

–OVER–



11. When filling the polygon above with the scan-line algorithm it is necessary to keep the polygon line segments in three separate tables: the waiting table, the active element table, and the deleted element table. For enhanced performance, it is also necessary to modify the loop indices so that line segments in the deleted and waiting tables are minimally considered during the fill operation. For each blank below, list the elements in the waiting, active "< >" , and deleted "( )" tables. Use **D** as your guide.

A:

B:

C:

D: (1) (2) (3) < 4 5 > 6 7

E:

F:

G: