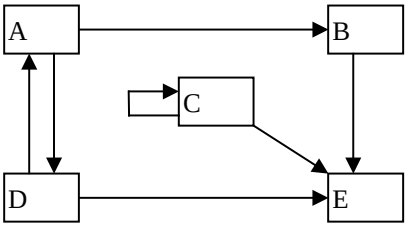
2. Consider the following graph G.



a) Give the incident edges of the node B.

b) Give the initiating node of the edge (A, B).

c) What is the out degree of A?

d) What is the degree of C?

e) What nodes are adjacent to C?

f) Is G complete?

g) Give the minimum path from D to B and its length.

h) Give the path relation for G.

i) Is D reachable from B?

j) Is the graph connected?

k) Is <E, B, A> a simple path in G?

l) Is <D, A, D, A, D> a cycle in G?

m) Give all simple cycles of G

n) Let H be the undirected graph having the same nodes and edges as G, but with only one edge between A and D. Consider the paths in H that begin and end with the same node:

i. Give one of these paths that should be a cycle for any cycle definition.

ii. Give one of these paths that should not be a cycle for any cycle definition.

g) Minimum path from D to B is <D, A, B> and length is 2

k) No, because there is no outgoing edge from E

l) Yes

m) 2 cycles:

- C to C
- A to D, D to A

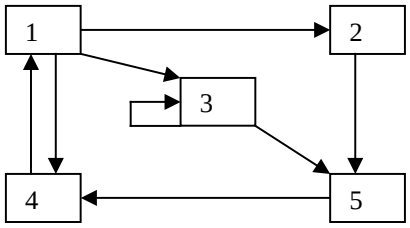
4. Let G be a graph with node set {1, 2, 3, 4, 5, 6, 7, 8} and edge set { {1, 2}, {1, 3}, {2, 5}, {2, 6}, {2, 7}, {3, 5}, {4, 5}, {4, 1}, {4, 7}, {6, 3}, {6, 4}, {7, 3} , {5, 1} }.

a) Is G Planar?

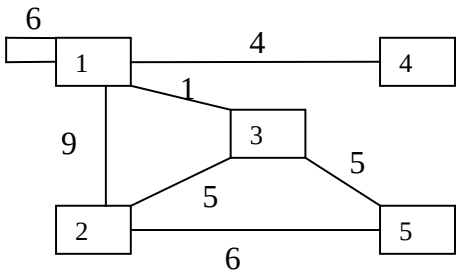
b) If so, draw it without crossing lines; if not, which subgraph does it contain: K_5 or B_3?

5. Give the adjacency list representation for the following graphs. (You may use the simple notation for adjacency lists that appears in the class notes.)

a)



b)



a)
V = { 1, 2, 3, 4, 5 }
E = { (1,2), (1,3), (1,4), (2,5), (3,3), (3,5), (4,1), (5,4), }

b)
V = { 1, 2, 3, 4, 5 }
E = { {1,1}, {1,2}, {1,3}, {1,4}, {2,3}, {2,5}, {3,5} }