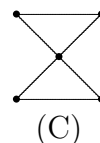
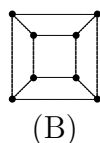
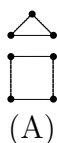


1.



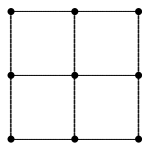
For each of the three graphs above state (Yes/No) whether

- a) it is connected (A)_____ (B)_____ (C)_____
- b) it has an Eulerian circuit (A)_____ (B)_____ (C)_____
- c) it has a Hamiltonian circuit (A)_____ (B)_____ (C)_____

2. For each of the following types of problem, state whether the best solution would be given by (A) an Eulerian circuit, (B) a Hamiltonian circuit, or (C) a minimal spanning tree.

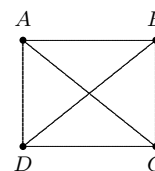
- a) Supplying electricity to several cities. _____
- b) Restocking several supermarkets from a warehouse. _____
- c) Sweeping leaves from the paths in a city park. _____

3.



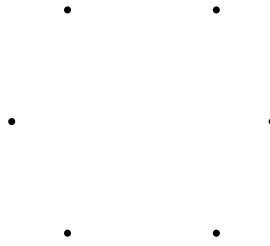
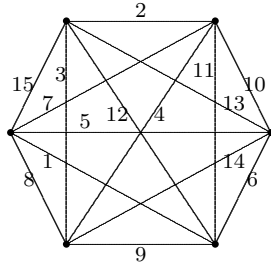
- a) Does the graph above have an Euler circuit? Explain your answer.
- b) If not, duplicate as few edges as possible so that it does have an Euler circuit.
- c) Find an Euler circuit in the graph from b).

4. Consider the situation in which there are 4 cities: A, B, C and D. The distance from A to B is 8 miles; A to C is 14 miles, A to D is 9 miles, B to C is 10 miles, B to D is 7 miles and C to D is 17 miles.

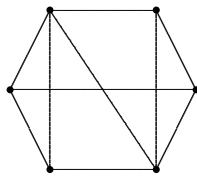


- a) Represent this information on the above diagram.
- b) Find a solution to the travelling salesman problem using the sorted edges algorithm.
- c) Find a solution to the travelling salesman problem using the method of trees, starting at A.

5. Find a minimum cost spanning tree for the following graph.



6. Color the vertices of the following graph with the minimum number of colors so that neighboring vertices receive distinct colors. How many colors are required?



_____ colors

7. In a complex process consisting of tasks T_1 through T_8 , the tasks take times 8,7,6,5,10,9,10,3 respectively. T_1 and T_4 precede T_2 . T_2 precedes T_3 . T_4 and T_7 precede T_5 . T_5 precedes T_6 . T_7 precedes T_8 .

- a) Represent this information on a graph.
- b) What is the earliest completion time?
- c) Use Critical Path Scheduling to find a priority list for this process.
- d) Schedule the process using the above list and 2 processors.

8. Schedule independent tasks of lengths 6, 7, 3, 8, 2 on two processors using

- a) the list-processing algorithm with the priority list in the order given above,
- b) the decreasing-time list processing algorithm.
- c) Are either of your answers in a) or b) optimal? Why?