Exercise on Graphs and Trees

1. Using figure 1, Identify whether the following graph is simple, cycle, or simple cycle.
   a) b, b
   b) e, d, c, b
   c) a, d, c, d, e
   d) d, c, b, e, d
   e) b, c, d, a, b, e, d, c, b
   f) b, c, d, e, d, b

2. Find all simple cycle in the figure 2 graph with path from x_1 to x_n with even length.

3. Using figure 3, find the degree of each vertex.

4. Verify that there are even number of vertices of odd degree in the graph of figure 4.

5. Can a graph exist with 15 vertices each of degree 5? Verify and explain your answer.

6. How many edges a graph have if it has vertices of degree 4, 3, 3, 2, 2? Explain.

7. Find the number of paths between c and d in figure 5 graph ___ of length. Is it possible? If possible, write the path to verify your answer.
   a) 2
   b) 3
   c) 4
   d) 5
   e) 6
   f) 7

8. Using figure 6 tree, which vertex/ices is/are …
   a) the Root?
   b) are internal?
   c) are leaves?
   d) are children of j?
   e) is the parent of h?
   f) are the siblings of o?
   g) are ancestors of m?
   h) are descendants of b?

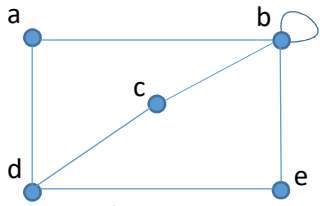

figure 1

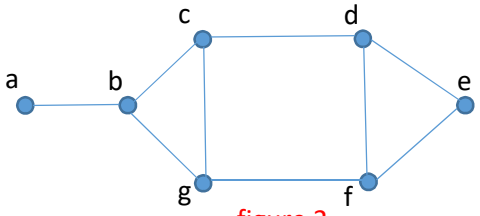

figure 2

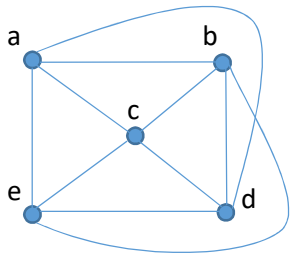

figure 3

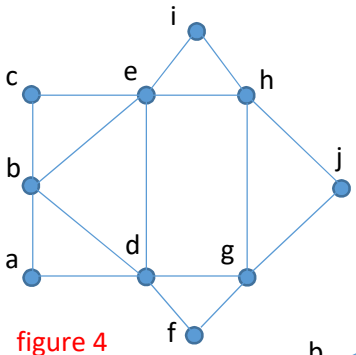

figure 4

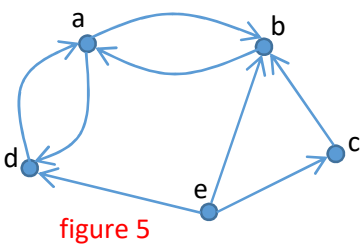

figure 5

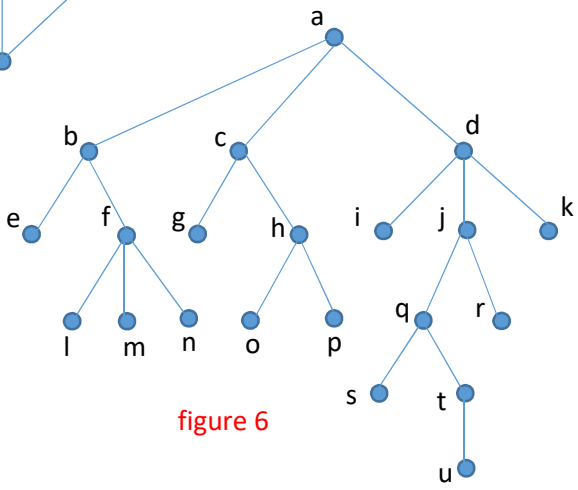

figure 6