Assignment IV

CS1010: Discrete Mathematics for Computer Science

Instructions:
Submit the assignment by the beginning of the class on 24.03.2014.

1. Let G be a connected graph of maximum degree 2. Prove that G must be a path or a cycle.
2. Show that any graph of minimum degree at least k must contain a path of length k.
3. For each kind of graph described below, give an example.

   (i) A 3-regular graph on 5 vertices;

   (ii) A 3-regular graph on 100 vertices;

   (iii) A connected 5-regular graph on 100 vertices;

   (iv) A bipartite 4-regular graph;

   (v) A graph of minimum degree equal to 2 and diameter 4;

   (vi) A tree of diameter 3.
4. There are exactly two graphs on 2 vertices, upto isomorphism - namely the empty graph on 2 vertices and the graph consisting of one edge.

   (i) List all graphs on 3 vertices, upto isomorphism.

   (ii) List all 2-regular graphs on 6 vertices, upto isomorphism.
5. Let G be a tree on n vertices and suppose that every vertex of G has degree 1 or 5. How many leaves does G have?
6. Let G be a connected graph such that every vertex of G has even degree. Show that G does not have any bridges.