

Assignment 7

Discrete Mathematics - MTech CS 2018

All the problems marked with (*) are a bit hard and may need ideas not necessarily cover in the class so far. But you are encouraged to try the problems before the solutions are discussed in class.

1. Prove that if G is a simple planar graph on at least 11 vertices then G^c (the complement graph) is not planar.
2. Give an example of a graph on 8 vertices such that both G and G^c is planar.
3. Prove that the n -dimensional cube graph has a Hamiltonian path.
4. Prove or disprove: There exists a simple 4-regular maximal planar graph.
5. Prove or disprove: If G is a simple planar graph on ≤ 11 vertices, then G has a vertex of degree ≤ 4 .
6. Prove the Menger's theorem for vertices.
7. Prove that a graph with n vertices and $n + 2$ edges is planar.
8. If G is a bipartite graph with m nodes on each side. If each node has degree more than $m/2$ then prove that it has a perfect matching.
9. If every face of a planar graph has even number of edges then prove that the graph is bipartite.