Graph Theory and Algorithms

Tutorial Sheet 5

(1) Is (3,3,2,2,1,1) graphic? If yes, then find all possible realization(s) of this sequence.

(2) If G is a digraph in which out-degree of every vertex is at least one, then prove that G contains a directed cycle.

(3) Describe a relation in the real world whose digraph has no directed cycles. Describe another that has directed cycles but is not symmetric.

(4) Up to isomorphism find all possible orientations of K_3 and K_4.

(5) Prove that every directed $u - v$ walk in a digraph contains a directed $u - v$ path.

(6) Prove or disprove: Every tournament contains a directed Hamiltonian path.

(7) Prove that every transitive tournament contains exactly one directed Hamiltonian path.