Homework 4

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1 Problem 1: Triangle

Let G = (V,E) be a graph with a set V of vertices and a set E of edges. We then determine all the possible triples (u,v,w) with vertices u,v,w V and u < v < w, and then decide if all 3 edges (u, v), (v, w) and (u, w) are in E. To find all of the triples takes O(—V —3) time and deciding if all 3 edges are in E takes O($|E|$) time. The total time is O($|$V $|$3 $|E|$). This is polynomial in the length of the input G so Triangle is a subset of P.

2 Problem 2: Graph Encodings

a) G = $1&2 : 2&3 : 2&6 : 2&7 : 3&4 : 3&5

   b) In order to prove that G1 = G2, the number of edges on each one must be the same. The edge must also be the same for each transition.

3 Problem 3: DFA Encodings

a) M = $1&0&2&0&0&2:0:0

   b)