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 in P.

2 Problem 2: Graph Encodings

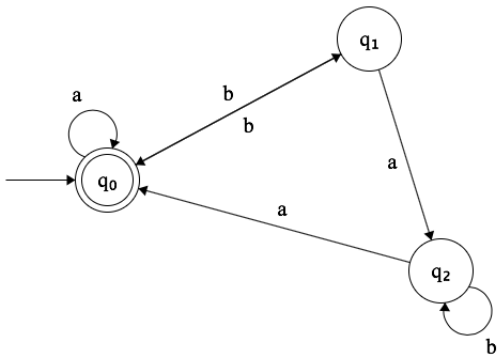
a) G = \$1&2 : 2&3 : 2&6 : 2&7 : 3&4 : 3&5

b) Let $\langle G_1 \rangle = \langle G_1 \rangle$. We need to show that $G_1 = G_2$. Two encodings are the same implies that they have the same number of characters and the same position of each character. The edges will then be the same for both graphs if this condition is true. Therefore $G_1 = G_2$.

3 Problem 3: DFA Encodings

a) $\langle M \rangle$ = \$1&0&2&0&0&2 : 0 : 0

b)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