Quiz 1
Total marks: 10
Student ID: _____ **Duration: 20 minutes** CSE331

You have to use the designated spaces for your answers. No extra pages will be provided.

Problem 1: Designing DFAs (10 points)

Let $\Sigma = \{0, 1\}$. Consider the following languages over Σ.

$$L_1 = \{w : w \text{ contains either both or neither of the substrings } 01 \text{ and } 11\}$$
$$L_2 = \{w : w \text{ contains } 01 \text{ as a substring}\}$$
$$L_3 = \{w : w \text{ contains } 11 \text{ as a substring}\}$$

(a) Give the state diagram for a DFA that recognizes L_2. (2 points)

(b) Give the state diagram for a DFA that recognizes L_3. (2 points)

(c) Using your answers from (a) and (b), and a construction similar to the one shown in class, show how you can get a DFA that recognizes L_1. (6 points)