Quiz 1
Total marks: 10
Student ID: _____ **Duration: 25 minutes** CSE331

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

Problem 1: Regular Languages and DFAs (10 points)

The *symmetric difference* of the languages L_1 and L_2, denoted by $L_1 \triangle L_2$, is defined in the following way.

$$L_1 \triangle L_2 = \{w : w \text{ is in exactly one of } L_1 \text{ and } L_2\}$$

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

$$A = \{w : \text{the length of } w \text{ is greater than or equal to 3 but less than or equal to 5}\}$$
$$B = \{w : \text{the length of } w \text{ is greater than or equal to 2 but less than or equal to 4}\}$$
$$C = \{w : \text{the length of } w \text{ is odd}\}$$

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

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

(c) Give the state diagram for a DFA that recognizes $A \triangle B$. (2 points)

(d) If you use the construction from class to get a DFA for the language $(A \triangle B) \cup C$, how many states will it have? (1 point) _____.

(e) Give a 5-state DFA that recognizes $(A \triangle B) \cup C$. (3 points)

Intentionally left blank. Feel free to use this space to do scratch work.