CSIE 2344: Discussion (Unit 14)

1 Derivation of State Graph

A sequential circuit has one input and one output. The output becomes 1 and remains 1 thereafter when at least two 0's and at least two 1's have occurred as inputs, regardless of the order of occurrence. Draw a state graph (Moore type) for the circuit (nine states are sufficient). Your final state graph should be neatly drawn with no crossed lines.

2 Derivation of State Graph and Table

A Moore sequential circuit has one input and one output. The output is 1 if and only if both of the following conditions are met: (a) The input sequence contains exactly two groups of 1's, and (b) each of these groups contains exactly two 1's. Each group of 1's must be separated by at least one 0. A single 1 is considered a group of 1's containing one 1. For example, the sequence

$$X = 0110001101110$$

satisfies both conditions after the first two pairs of 1's. However, when more 1's appear, condition (a) is no longer satisfied. Therefore, the output sequence should be

$$Z = (0)0000000110000$$

On the other hand, the sequence

$$X = 10110110$$

never satisfies condition (b), because the first group of 1's contains only one 1. Besides, after the second pair of 1's, (a) is no longer satisfied because the input sequence contains three groups of 1's. Therefore, the output should always be 0.

$$Z = (0)00000000$$

Derive a state graph and table.