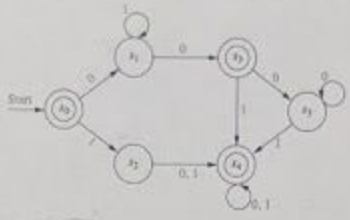
CSC 404 - Activity/Project 2 - Name: Chris Glanzer

Problem 1. Consider the following deterministic finite-state automaton (DFA).



a. Determine which of the following are accepted by the DFA. What state do they end at?

$w_1 = 101010\,(42!)$ $w_2 = 000111$ $w_3 = 011100$ $w_4 = 10100111001\,(1337!)$

b. Identify all bit-strings of length 3 that are accepted by the DFA.

000 001 010 011 100 101 110 111

c. Identify all bit-strings of length 4 that are accepted by the DFA.

0000 0001 0010 0011 0100 0101 0110 0111

1000 1001 1010 1011 1100 1101 1110 1111

d. Identify all bit-strings of length 5 that are accepted by the DFA.

00000 00001 00010 00011 00100 00101 00110 00111

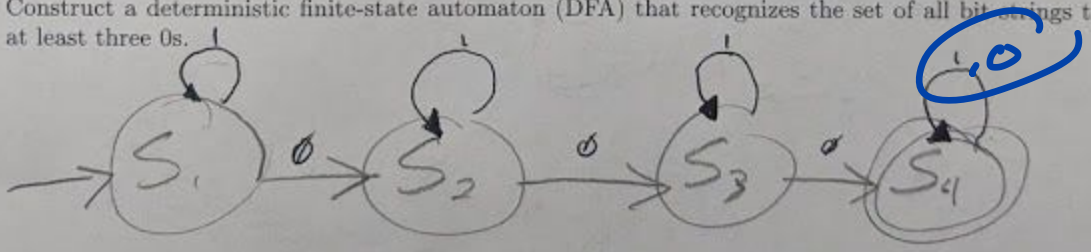
01000 01001 01010 01011 01100 01101 01110 01111

10000 10001 10010 10011 10100 10101 10110 10111

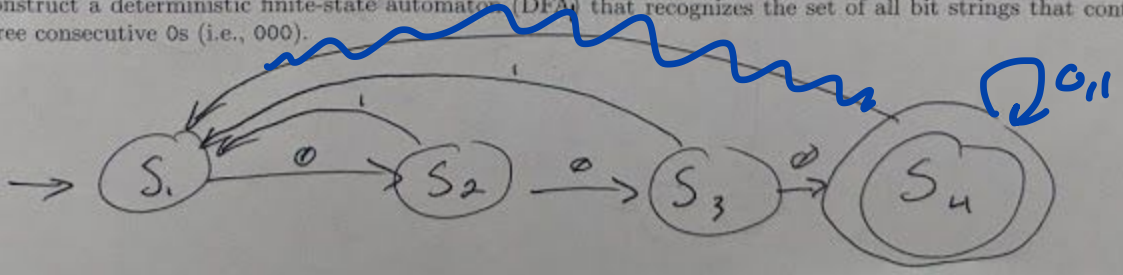
11000 11001 11010 11011 11100 11101 11110 11111

Problem 2.

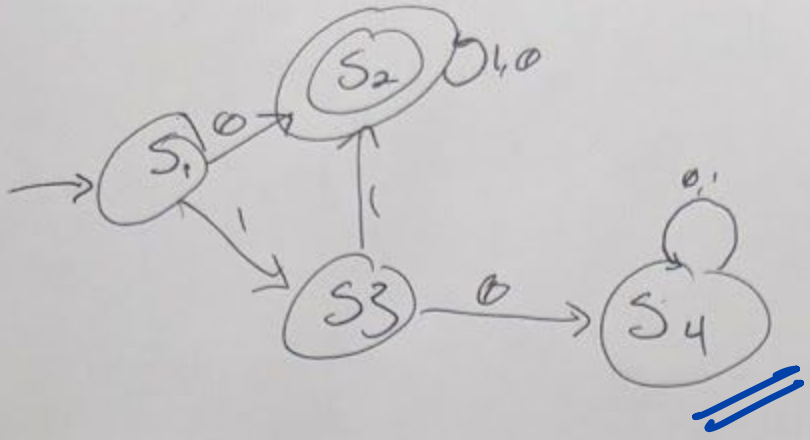
a. Construct a deterministic finite-state automaton (DFA) that recognizes the set of all bit strings that contain at least three 0s.



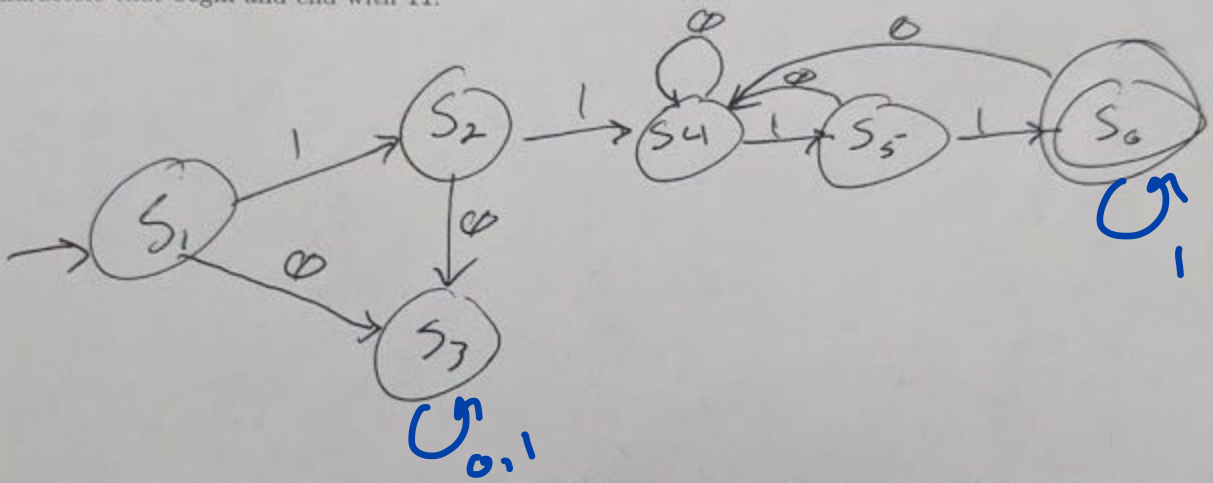
b. Construct a deterministic finite-state automaton (DFA) that recognizes the set of all bit strings that contain three consecutive 0s (i.e., 000).



a. Construct a deterministic finite-state automaton (DFA) that recognizes the set of all bit strings that begin with 0 or with 11.



b. Construct a deterministic finite-state automaton (DFA) that recognizes the set of all bit strings of at least 4 characters that begin and end with 11.



c. Construct a deterministic finite-state automaton (DFA) that recognizes the set of all bit strings that contain at least two 0s and at most one 1.