

CECS 329, In Class Assignment 2, September 2nd, 2026, Dr. Ebert

Directions. All work should only be shown on this sheet of paper which is to be turned in before the end of class. Note: each student is awarded the same amount of points which is equal to the sum of all points earned on the sheet.

Student 1. Your name: _____

Student 2. Your name: _____

Student 3. Your name: _____

Problem. The goal for your group is to provide the state diagram for a DFA that **accepts the language of binary words for which, for every 0 in the word, it has a 1 immediately to its left, and a 1 immediately to its right.** (20 pts) For example, 1101011101 is in the language, but neither 0101 nor 1011001 is in the language. To construct the diagram, draw **a** as the initial state. Students then take turns completing a single row of the δ -transition table, by writing in the **next state**. If the **next state** already exists in the state diagram, then the student simply draws the corresponding edge that connects the current state to **next state**. On the other hand, if **next state** is a new state, then it should be labeled using alphabetical order in accordance with the δ -transition table as well as the State-Property table. In this case the student must i) add **next state** to the state diagram (making concentric circles if it is an accepting state), ii) draw the corresponding edge from the current state to **next state**, and iii) provide a statement in the **State Property** table that describes what must be true about any word that brings a computation to **next state**. The exercise ends once the state diagram has all the necessary edges leaving each of the states that you are using. **Important:** it is OK if you did not use all of the states provided in the table, so long as your DFA is complete. On the other hand, you should not need more than eight states.

δ -transition table

$Q \backslash \Sigma$	0	1	Initials
a			
b			
c			
d			
e			
f			
g			
h			

State Property Table

State	Property Description	Initials
a	the word must equal ε (i.e. the machine will never return to state a)	
b		
c		
d		
e		
f		
g		
h		