

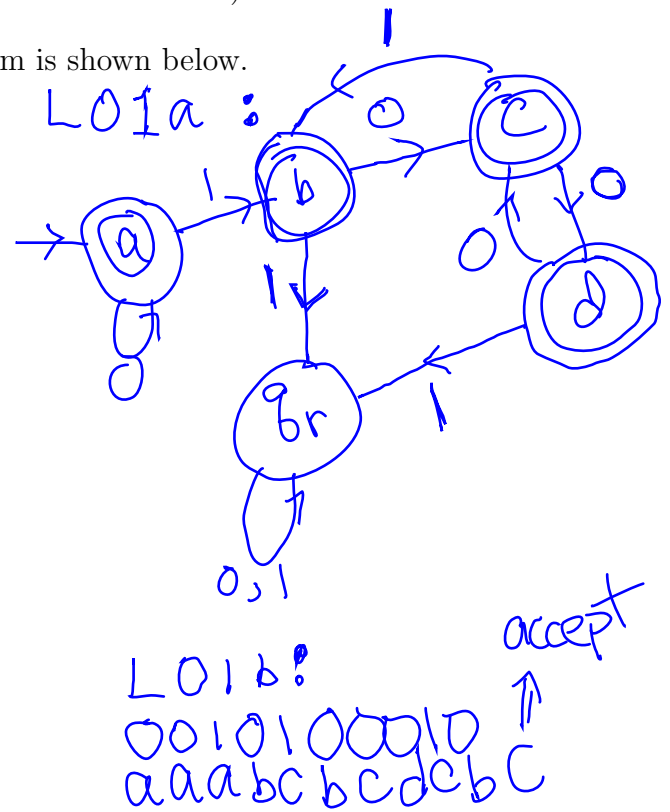
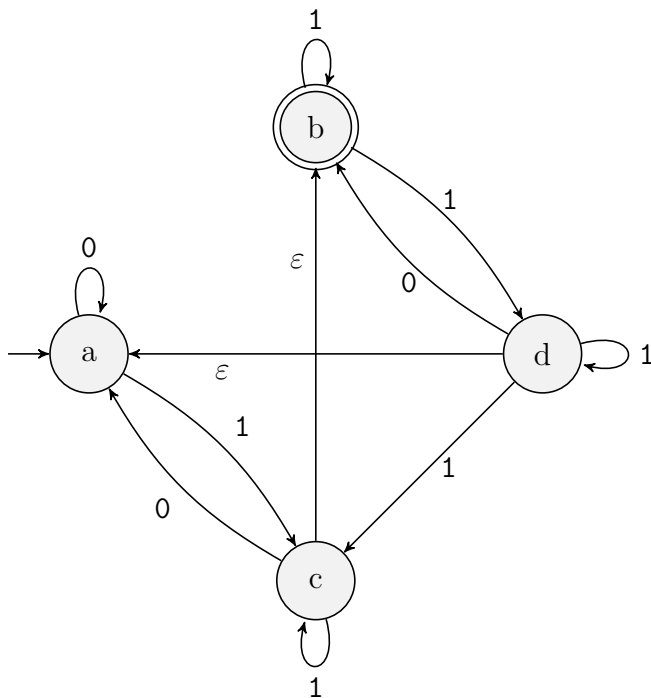
NO NOTES, BOOKS, ELECTRONIC DEVICES, OR INTERPERSONAL COMMUNICATION ALLOWED. Submit each solution on a separate sheet of paper.

Problem

LO1. Do the following.

- (a) Provide the state diagram of a DFA M that accepts exactly those binary words w for which either i) w has at most one 1 bit or ii) between any two 1 bits of w there is exactly an odd number of 0 bits.
- (b) Show the computation of M on input i) $w = 0010100010$ and ii) $w = 00100001$.

LO2. Do the following for the NFA N whose state diagram is shown below.



- (a) Provide a table that represents N 's δ transition function.

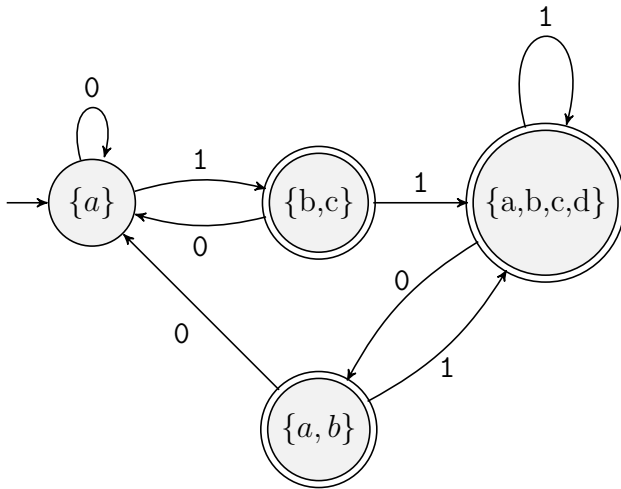
Solution.

$Q \setminus \Sigma$	0	1
a	{a}	{b,c}
b	\emptyset	{a,b,d}
c	{a}	{b,c}
d	{b}	{a,b,c,d}

LO1b: 00100001
 aaabCdcdr
 reject

- (b) Use the table from part a to convert N to an equivalent DFA M using the method of subset states. Draw M 's state diagram.

Solution.



- (c) Show the computation of M on input $w = 001010$.

Solution.

Input Symbol Read	Current State
0	{a}
0	{a}
1	{a}
0	{b,c}
1	{a}
0	{b,c}
Rejecting State:	{a}