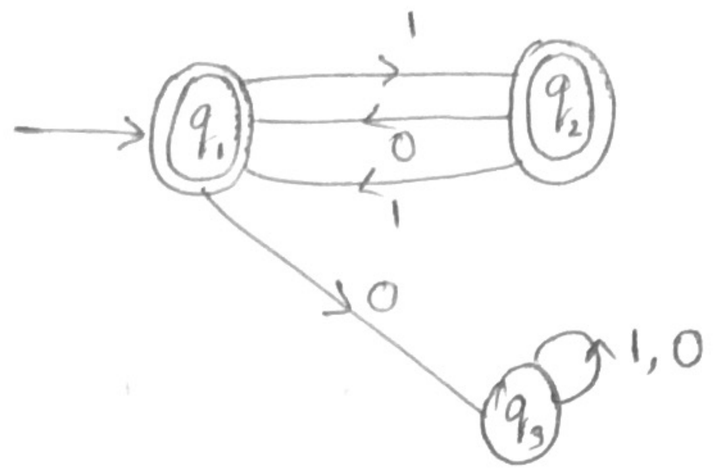
1. Draw a State diagram for DFA's that realize the following languages. Assume $\Sigma = \{0,1\}$.

E = {x | every odd position of x is 1}.

F = {x | x contains even number of 0's}

1.E)



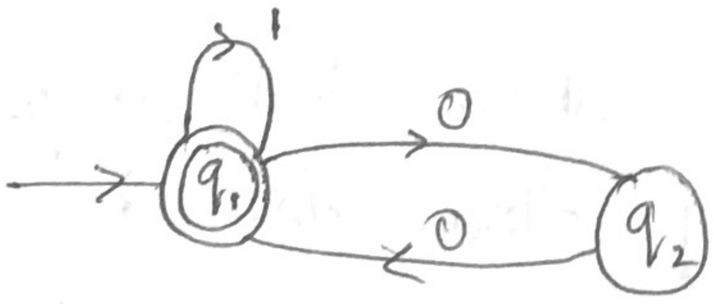
This is the State diagram for DFA for x|every odd position of x is 1. Assume $\Sigma = \{0,1\}$. Let's consider few example string's to see the above languages satisfies the following strings or not. The string flows from initial state q_1 and should end at final state q_1, q_2. Strings are : 10101011 0 - rejected.

11 1010111 - accepted

100110101 - rejected

10101110 - accepted.

1.F)



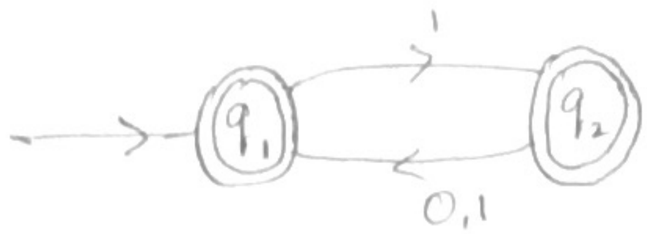
The above is the state diagram for DFA for x|x contains even number of 0's. Assume $\Sigma = \{0,1\}$. By considering few strings to check the above state diagram is valid for the language we considered. Here the string flows from initial state q_1 and should end at final state q_1. Strings are : 01010100 - rejected, 00100110 0 - accepted, 11010101 0 - accepted, 10101010 00 - accepted.

2. For each of the languages, draw the simplest state diagram of a NFA that realizes it.

E = {x | every odd position of x is 1}

F = {x | x contains even number of 0's}.

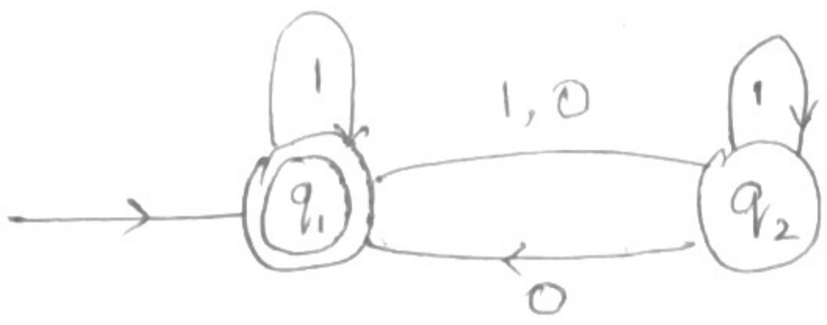
2.E)



This state diagram represents NFA for x|every odd position of x is 1. By considering some strings to show the above state diagram is valid for language we considered. The string flows from initial state q_1 and should end at final state q_1, q_2.

String's taken are : 1111111111 - accepted, 010101010 - rejected, 101010101 - accepted, 101011101 - accepted.

2,F)



This state diagram indicates NFA for x|x contains even number of 0's. By taking few strings to show the above state diagram is valid for language we considered. The strings flows from initial state q_1 and should end at finial state q_1. Strings considered are:

1101000 - accepted.

111110 - rejected.

00101001 - rejected.

01010101 - accepted.