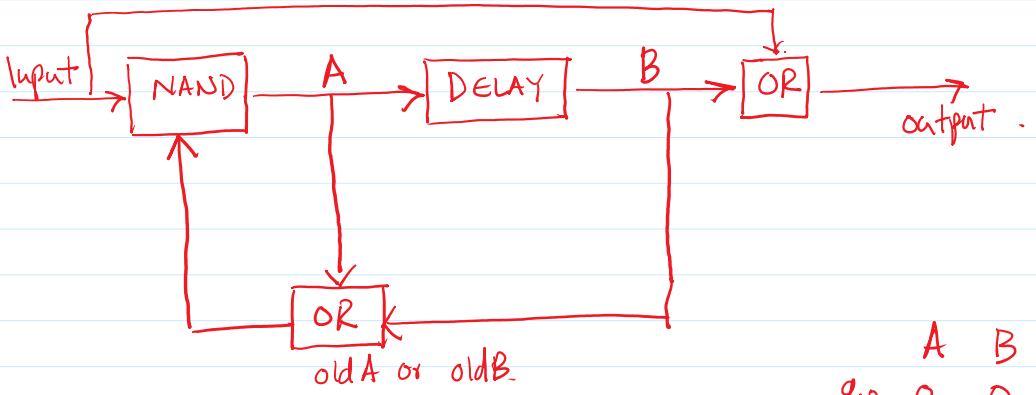
# Lecture 17 :- Finite Automata In Sequential Circuits. (Mealy Machine).




| | A | B |
|---|---|---|
| $q_0$ | 0 | 0 |
| $q_1$ | 0 | 1 |
| $q_2$ | 1 | 0 |
| $q_3$ | 1 | 1 |

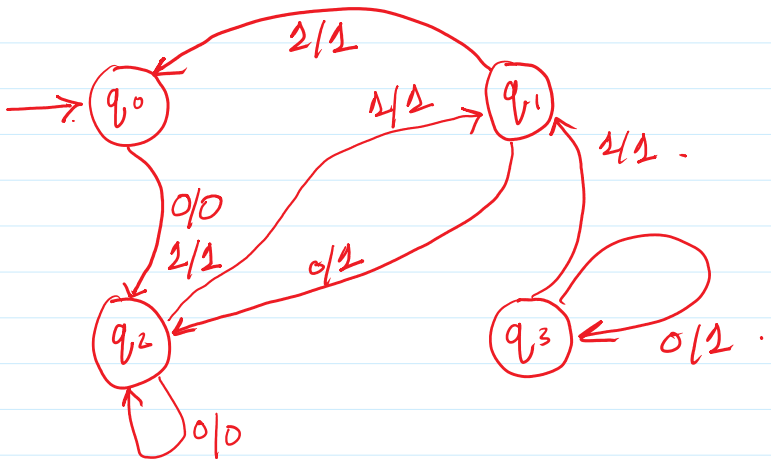
New B = old A

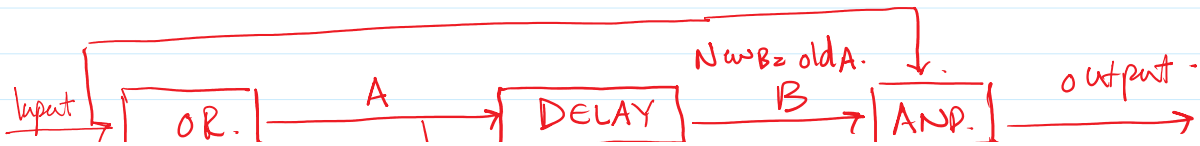
New A = Input NAND (old A or old B)

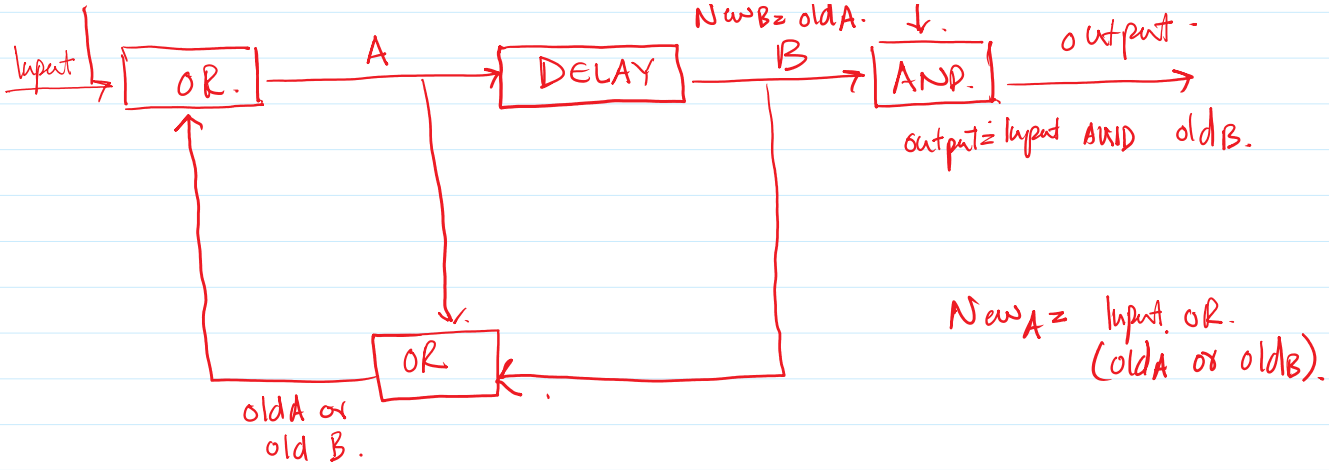
output = Input or old B.

| | Input 0 | | | | Input 1 | | | |
|---|---|---|---|---|---|---|---|---|
| | old State | | New State | | output | New State | | output |
| | old A | old B | New A | New B | | New A | New B | |
| $q_0$ | 0 | 0 | 1 | 0 ($q_2$) | 0 | 1 | 0 ($q_2$) | 1 |
| $q_1$ | 0 | 1 | 1 | 0 ($q_2$) | 1 | 0 | 0 ($q_0$) | 1 |
| $q_2$ | 1 | 0 | 1 | 0 ($q_2$) | 0 | 0 | 1 ($q_1$) | 1 |
| $q_3$ | 1 | 1 | 1 | 1 ($q_3$) | 1 | 0 | 1 ($q_1$) | 1 |

| A | B | A and B | A NAND B |
|---|---|---|---|
| 0 | 0 | 0 | 1 |
| 0 | 1 | 0 | 1 |
| 1 | 0 | 0 | 1 |
| 1 | 1 | 1 | 0 |






$New_A$ = Input OR. (old A or old B).

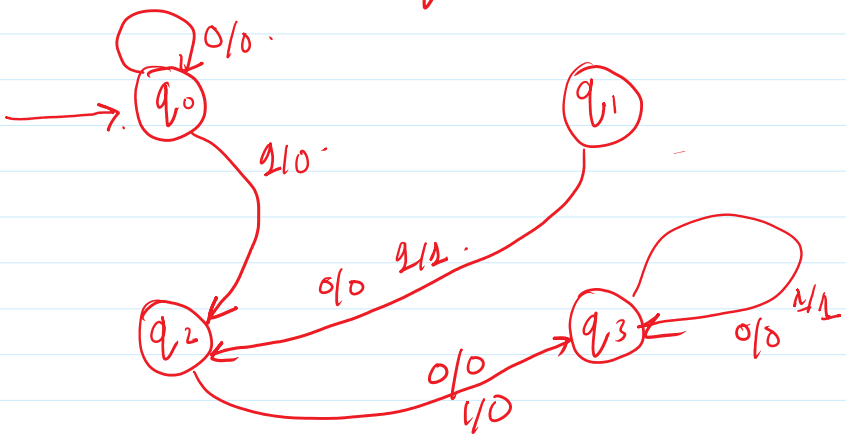
$New_A$ = input or (old A or old B).

$New_B$ = old A

output = input AND. old B.

| | A | B. |
|---|---|---|
| $q_0$ | 0 | 0 |
| $q_1$ | 0 | 1 |
| $q_2$ | 1 | 0 |
| $q_3$. | 1 | 1. |

| | Old State | | INPUT 0 New State | | Output | INPUT 1. New State | | Output |
|---|---|---|---|---|---|---|---|---|
| | old A | old B | New A | New B | | New A | New B. | |
| $q_0$ | 0 | 0 | (0 | 0) $q_0$ | 0 | (1 | 0) $q_2$ | 0 |
| $q_1$ | 0 | 1 | (1 | 0) $q_2$ | 0 | (1 | 0) $q_2$. | 1. |
| $q_2$ | 1 | 0 | (1. | 1) $q_3$ | 0 | (1. | 1) $q_3$ | 0 |
| $q_3$. | 1 | 1. | (1 | 1) $q_3$ | 0 | (1. | 1) $q_3$. | 1. |




REGULAR LANGUAGES :-

A language is called Regular if ∃ a Regular Expression defining the Language.

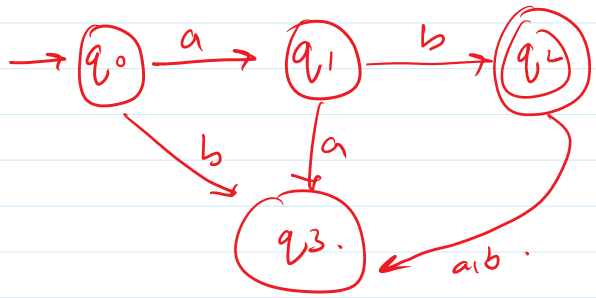
palindrome.

Properties :-
1- closure.
2- Complement & Intersection.

FA, let FA' be the Complement.
FA' = All the words that are not accepted by FA.

Procedure for determining a Complement.
1- change all final states to Non final.
2- change all non final to final.

FA.




ab.

FA'.