

$(ab+ba)(a+bb)$
baaa

$(a+b)(a+b)^*$

SELF-TEST

Choose the correct answer to Questions 1-10.

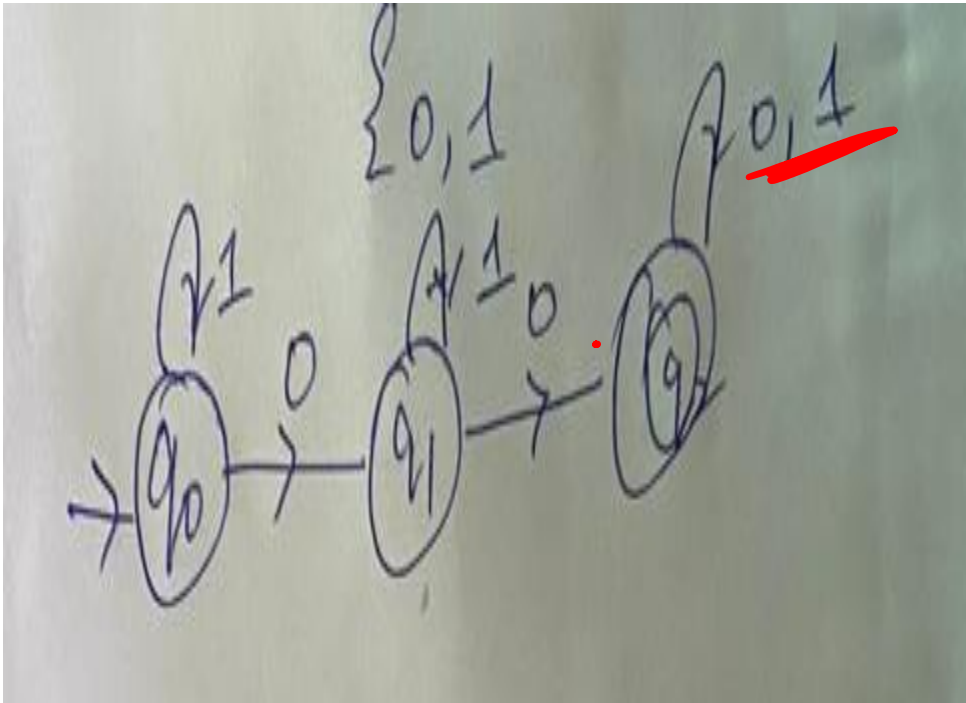
- The set of all strings over $\{a, b\}$ of even length is represented by the regular expression
 (a) $(ab + aa + bb + ba)^*$ (b) $(a + b)^*(a^* + b)^*$
 (c) $(aa + bb)^*$ (d) $(ab + ba)^*$
- The set of all strings over $\{a, b\}$ of length 4, starting with an a is represented by the regular expression
 (a) $a(a + b)^*$ (b) $a(ab)^*$
 (c) $(ab + ba)(aa + bb)$ (d) $a(a + b)(a + b)(a + b)$
- $(0^*1^*)^*$ is the same as
 (a) $(0 + 1)^*$ (b) $(01)^*$
 (c) $(10)^*$ (d) none of these.
- If L is the set of all strings over $\{a, b\}$ containing at least one a , then it is not represented by the regular expression
 (a) $b^*a(a + b)^*$ (b) $(a + b)^*a(b + a)^*$
 (c) $(a + b)^*ab^*$ (d) $(a + b)^*a$
- $\{a^n \mid n \geq 1\}$ is represented by the regular expression
 (a) $(aa)^*$ (b) a^*
 (c) aa^*a (d) a^*a^*
- The set of strings over $\{a, b\}$ having exactly 3b's is represented by the regular expression
 (a) a^*bbb (b) $a^*ba^*ba^*b$
 (c) ba^*ba^*b (d) $a^*ba^*ba^*ba^*$
- The set of all strings over $\{a, b\}$ having $abab$ as a substring is represented by
 (a) a^*ababb^* (b) $(a + b)^*abab(a + b)^*$
 (c) $a^*b^*ababa^*b^*$ (d) $(a + b)^*abab$

$(a+b)^* \underline{a}$

ab
 $aa b b$

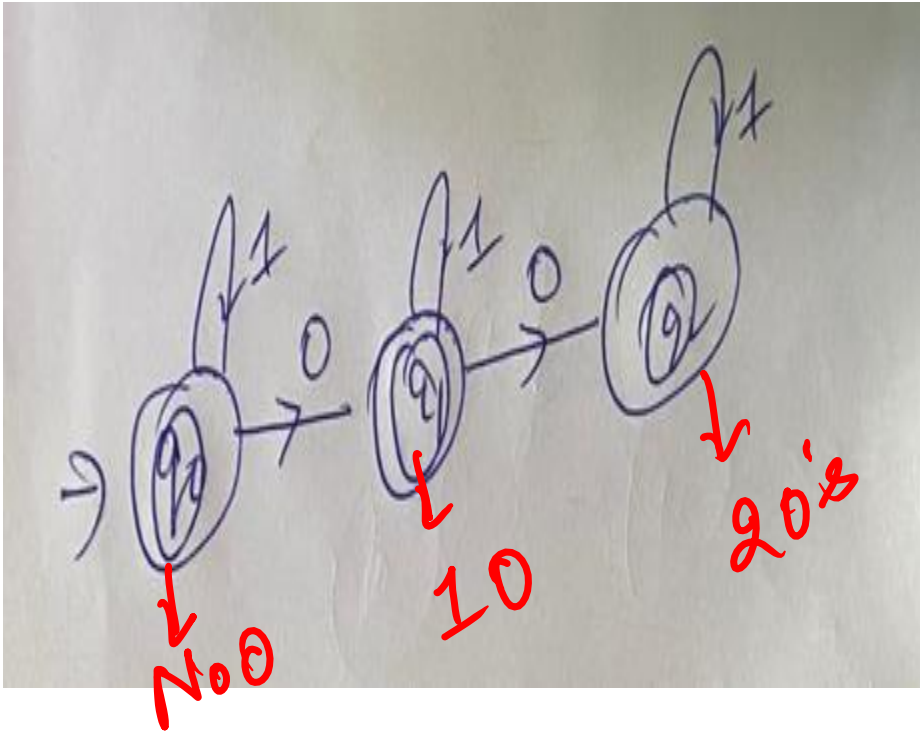
$abbb a$

Identify the Language of Finite Automata accepting $\{0,1\}$



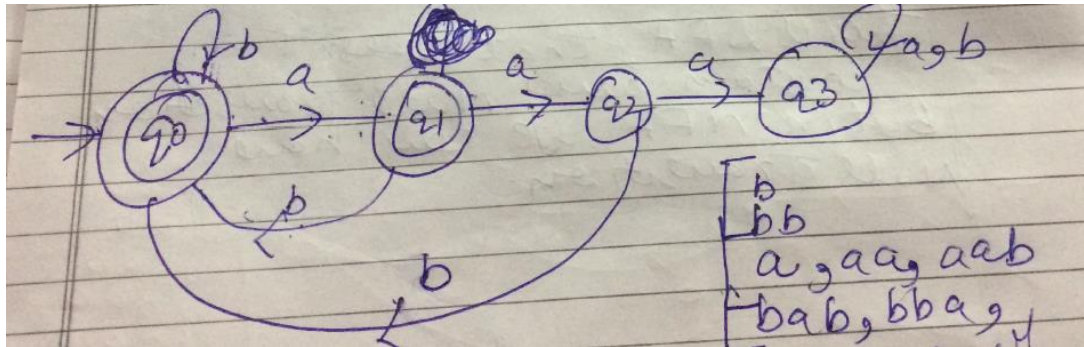
- a. Even number of 0's
- b. Exactly 2 0's
- c. Atleast 2 1's
- ☒ d. Atleast 2 0's

Identify the Language of Finite Automata accepting $\{0,1\}$



- a. Atleast 2 0's
- b. Exactly 2 0's
- ☒ c. Atmost 2 0's
- d. Even 0's

Identify the Language{a,b}- here q0,q1,and Q2 are final accepting states

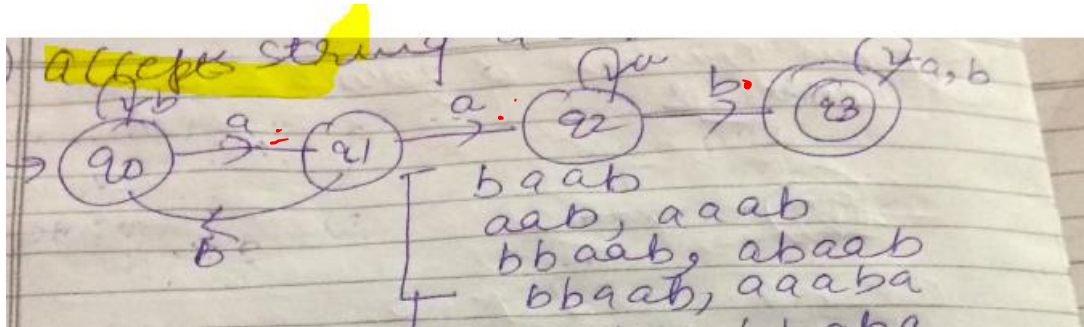


- Language ending with aaa
- Language contains aa
- ✓ Language that does not contain 3 consecutive a's
- Language ending with b

Find the appropriate answer {a,b}

- Accepts ab
- Accepts aaab
- Ending with b

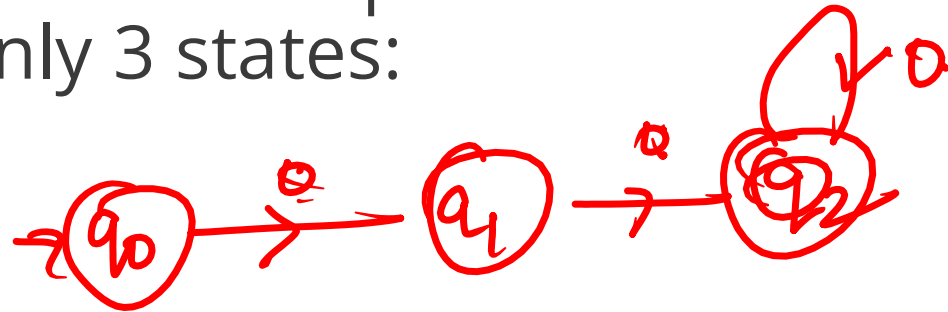
✓ Accepts aab



- Predict the number of transitions required to automate the following language using only 3 states:

$L = \{w \mid w \text{ ends with } 00\}$

- ☒ a) 3
- b) 2
- c) 4
- d) Cannot be said

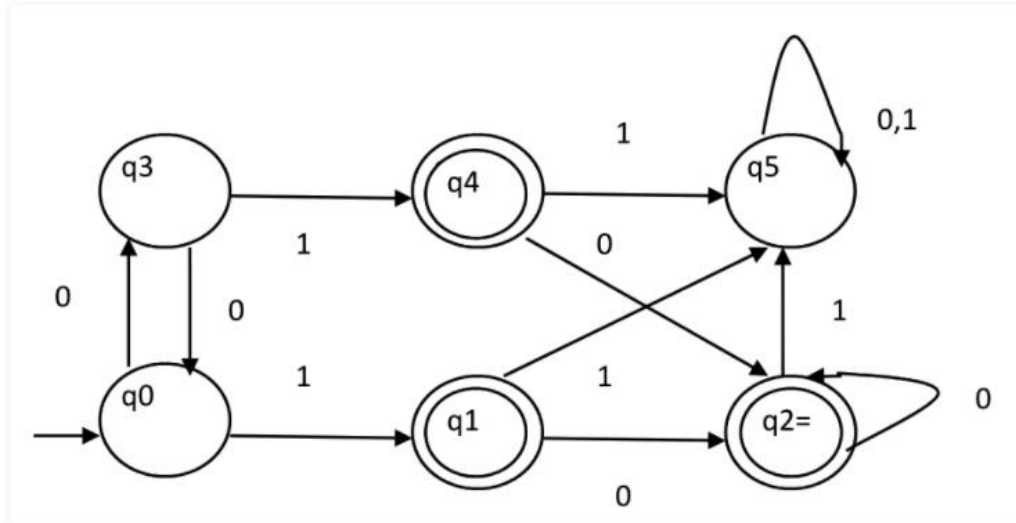


$$NFA \geq DFA$$

- What is the relation between NFA-accepted languages and DFA accepted languages?

- ~~a) $>$~~
- ~~b) $<$~~
- ☒ c) $=$
- ~~d) $<=$~~

How many states will be formed when minimized DFA will be constructed

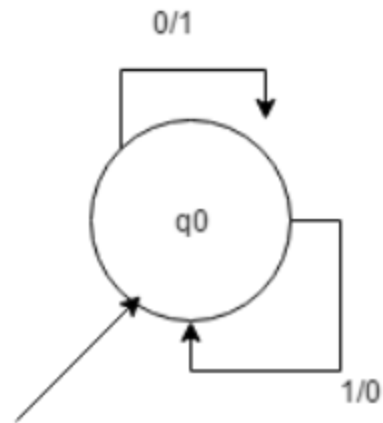


- ✓
- 3
 - 4
 - 5
 - 6

$\{q_0, q_3, q_5\}$ $\{q_1, q_2, q_4\}$
 $\{q_0, q_3\}$ $\{q_5\}$ $\{q_1, q_2, q_4\}$
1 2 3

O/P depends upon Transition
↓
State → ~~Transition~~ not ~~not~~

- In mealy machine, the O/P depends upon?
 - a) State
 - b) Previous State
 - ✓ c) State and Input
 - d) Only Input



- a) 9's Complement
- b) 2's Complement
- ✓ c) 1's Complement
- d) 10's Complement



Moore machine
↳ $|I| + 1$

3. For a give Moore Machine, Given Input='101010', thus the output would be of length:

- ☒ a) $|Input| + 1$
 - b) $|Input|$
 - c) $|Input - 1|$
 - d) Cannot be predicted
-

$$3I|A \rightarrow \underline{3|0|1}$$

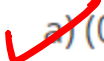
$$\underline{\cancel{3}1}$$

$$\cancel{3}$$

- The ratio of number of input to the number of output in a mealy machine can be given as:

- ☒ a) 1
- b) $n: n+1$
- c) $n+1: n$
- d) none of the mentioned

2. Which of the following is true?

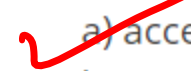
 a) $(01)^*0 = 0(10)^*$

b) $(0+1)^*0(0+1)^*1(0+1) = (0+1)^*01(0+1)^*$

c) $(0+1)^*01(0+1)^*+1^*0^* = (0+1)^*$

d) All of the mentioned

3. A language is regular if and only if

-  a) accepted by DFA
- b) accepted by PDA
- c) accepted by LBA
- d) accepted by Turing machine

- How many strings of length less than 4 contains the language described by the regular expression $(x+y)^*y(a+ab)^*$?
 - a) 7
 - b) 10
 - c) 12
 - d) 11

- ANSWER 12

6. Which of the following is not a regular expression?

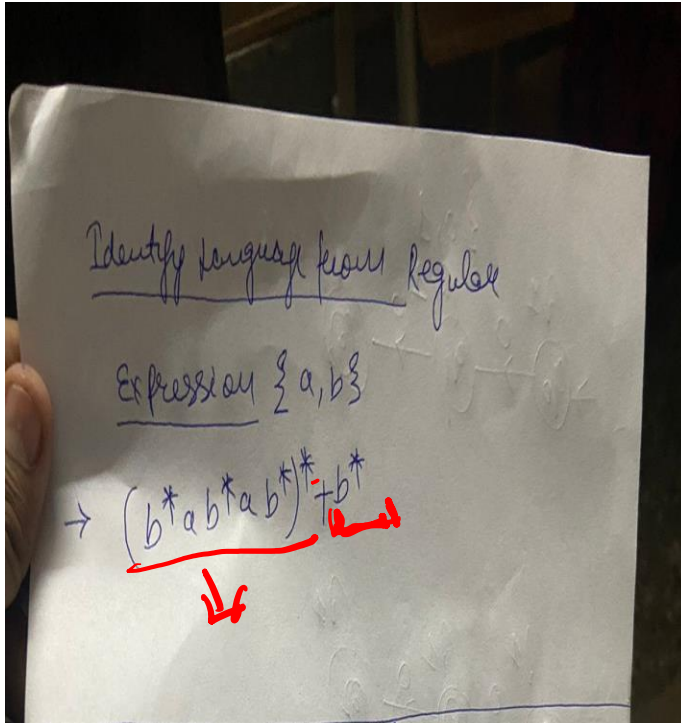
☒ a) $[(a+b)^* \cdot (aa+bb)]^*$

☒ b) $[(0+1) \cdot (0b+a1)^*(a+b)]^*$

☒ c) $(01+11+10)^*$

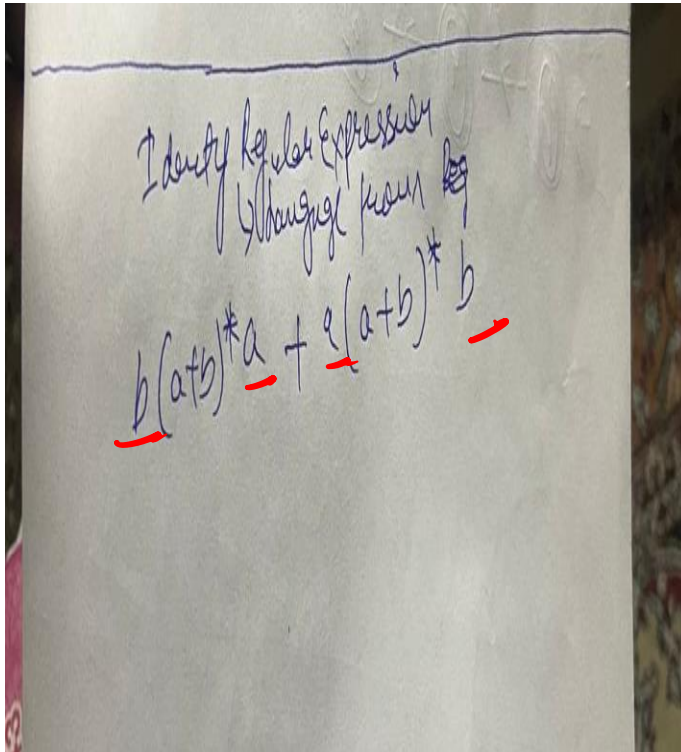
☒ d) $(1+2+0)^*(1+2)^*$

Identify the language



- Atleast 2 a's
- ✓ • Even a's
- Atmost 2 a's
- Exactly 2 a's

Identify the language



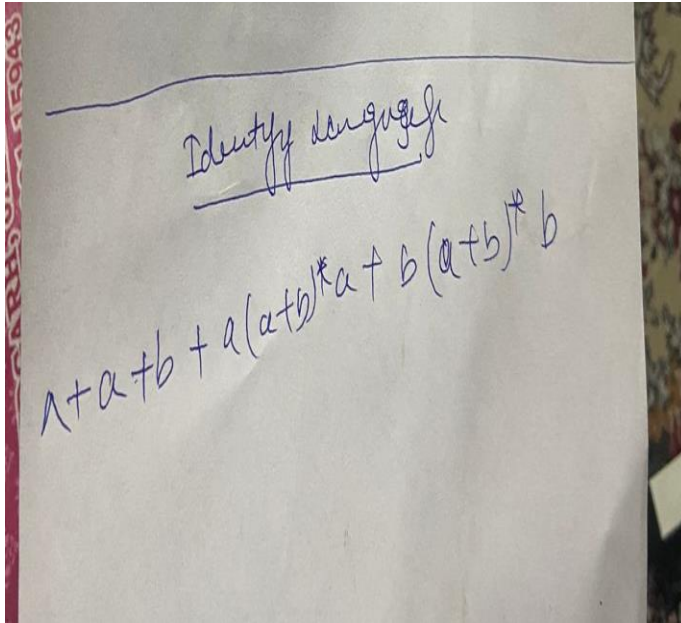
- Starts with a

- Ends with a

- ~~• Starts and ends with same symbol~~

- ~~• Starts and ends with different symbol~~

Identify the language



- Starts with a
- Ends with a
- ~~Starts and ends with same symbol~~
- Starts and ends with different symbol

NFA containing null moves

- What is the second step in removing null moves between 2 vertices(v_1 and v_2)
 - A. copy all transitions from v_1 to v_2
 - B. remove null move directly
 - Make v_1 as initial state
 - none
- What is the Last step in removing null moves between 2 vertices(v_1 and v_2)
 - copy all transitions from v_1 to v_2
 - B. remove null move directly
 - Make v_1 as final state if v_2 is final state
 - none

1. By using Arden's Theorem, the equation $q_1 = q_1(ab + ba) + \epsilon$ can be written as,

- a. $q_1 = (a + b)^*$
- b. $q_1 = (abba)^*$
- c. $q_1 = (ab + ba)^*$
- d. $q_1 = (ab)^*$

1. The regular expression corresponding to the equation $q_2 = 0^*1 + q_2(1)$ when an Arden's Theorem is applied is _____

- a. $(0^*1)1^*$
- b. $(00)^*$
- c. $(11)^*$
- d. 0^*1^*

- How many strings of length less than 4 contains the language described by the regular expression $(x+y)^*y(a+ab)^*$?
- a) 7
- b) 10
- c) 12
- d) 11

- . If $\Sigma = \{a,b\}$ and given productions are
 - $S \rightarrow XaaX$
 - $X \rightarrow aX \mid bX \mid \Lambda$
- Then the above grammar defines the language expressed by _____ regular expression
 - a. $(a+b)^*aa(a+b)^*$
 - b. $(a+b)^*a(a+b)^*a$
 - c. $(a+b)^*aa(a+b)^*aa$
 - d. $(a+b)^*aba+b)^*$

- Which of the following strings do not belong to the given regular expression?

(a)*(a+cba)

a) aa

b) aaa

c) acba

d) acbacba

- A grammar $G = (V, T, P, S)$ in which T is

- a) Set of variables

- b) Set of terminals

- c) Set of variables and terminals

- d) None of these

- A context sensitive language is accepted by
- a) Finite automata
- b) Linear bounded automata
- c) Both (a) and (b)
- d) None of these

- A grammar $G = (V, T, P, S)$ in which T is
- a) Set of variables
- b) Set of terminals
- c) Set of variables and terminals
- d) None of these

- Which of the following is more powerful?
- a) PDA
- b) Turing machine
- c) Finite automata
- d) Context sensitive language

- Which of the following relates to Chomsky hierarchy?
 - a) Regular < CFL < CSL < Unrestricted
 - b) CFL < CSL < Unrestricted < Regular
 - c) CSL < Unrestricted < CF < Regular
 - d) None of the mentioned

- A language is accepted by a push down automata if it is:
 - a) regular
 - b) context free
 - c) both (a) and (b)
 - d) none of the mentioned

- Which of the following strings do not belong the given regular expression?
 $(a)^*(a+cba)$
 - a) aa
 - b) aaa
 - c) acba
 - d) acbacba

- The symbols in a grammar that must be replaced by other Symbols are called:

- a. Productions
- b. Terminals
- c. Non-terminals
- d. None of given

- While applying Pumping lemma over a language, we consider a string w that belong to L and fragment it into _____ parts.

- a) 2
- b) 5
- ✓ • c) 3
- d) 6

- If we select a string w such that $w \in L$, and $w = xyz$. Which of the following portions cannot be an empty string?

- a) x
- ☒ b) y
- c) z
- d) all of the mentioned

- Question 3: There exists a language L . We define a string w such that $w \in L$ and $w = xyz$ and $|w| \geq n$ for some constant integer n . What can be the maximum length of the substring xy i.e. $|xy| \leq ?$

- ☒ a) n
- b) $|y|$
- c) $|x|$
- d) none of the mentioned



- : Answer in accordance to the third and last statement in pumping lemma:

- For all _____ $xyiz \in L$

- a) $i > 0$

- b) $i < 0$

- c) $i \leq 0$

- ✓ • d) $i \geq 0$