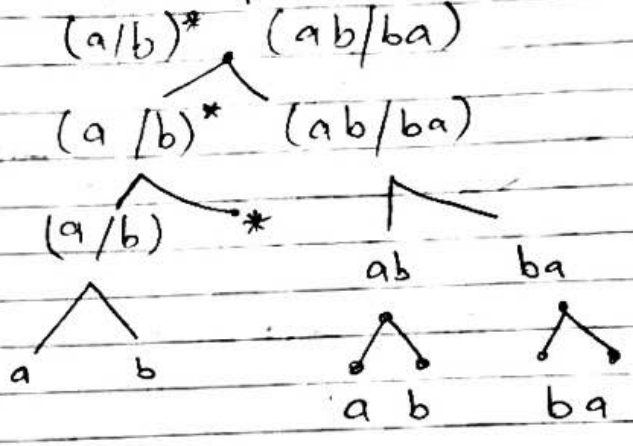
Name : Mian Taimoor Shah

ID . . . : 13829

Q1:: $(a/b)^*.(ab/ba)$

=> parsing



∴ => NFA For As a;

→ ① —a→ ⑤ → ①

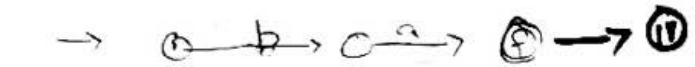
=> NFA For As b;

① —b→ ⑤ → ⑪

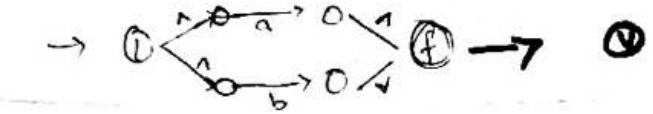
∴ Now NFA For ab;
Connecting ① and ②

→ ① —a→ ○ —b→ ⑤ → ⑪

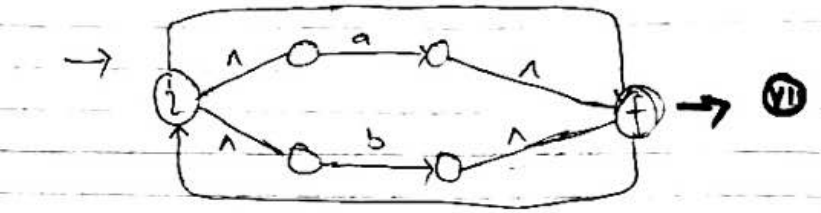
∴ Now NFA for ba;



∴ Now NFA for a/b

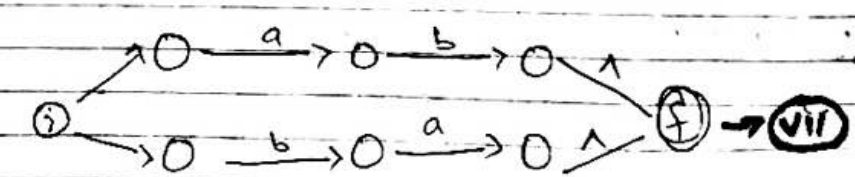


∴ Now NFA for (a/b)*

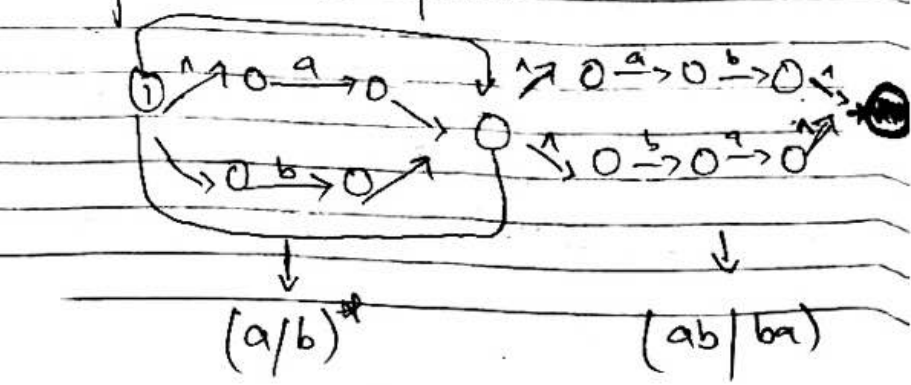


∴ Now NFA for ab|ba)

Coming (III) & (IV)



Major NFA (VI) & (VII)



Q2: Design Regular Expression.

(1) RE for word over {ab}

Sol:

$(a/b)^*$

(i) {a b} with even number of "a"

Solution:

$b^*(a\,b^*a)\,b^*$

(ii) {a b} with odd number of "a"

Sol:

$b^*a(b^*ab^*ab^*)^*$

Q3:

→ Proove that

$a^* b^* \neq (a/b)^*$

Sol:-

fn: $a^* b^*$

$a^0 b^0 = 1 = \Lambda$

$a^1 b^0 = a$

$a^1 b^1 = ab$

$a^0 b^1 = b$

$a^* b^* \{\Lambda, a, ab, b, bc \cdots\}$

fn: $(a/b)^*$

$(a/b)^*$

$(a/b)^0 = \Lambda$

$(a/b)^1 = a \text{ or } b, a, b$

$(a/b)^1 = aa, ab, ba, bb$

So $(a/b)^* = \{\Lambda, a, b, aa, ab\}$

∴ So from the final result we conclude that

$a^* b^* \neq (a/b)^*$

Q3

(b) Devise language description for the following RE

(i) $(a/b)(a/b)(b(a/b)^*$

language for words that start $\{a, b\}$ which starts with aa or a^b followed by b and end with any letter

(ii) $(a/b)^* b(a/b)(a/b)$

$L = \{a, b\}$ where string starts with any letter followed by "b" and ends with any letter. "aa" or "ab" or "ba" or "bb".

(iii) $(a/b)^* (aa/bb)$

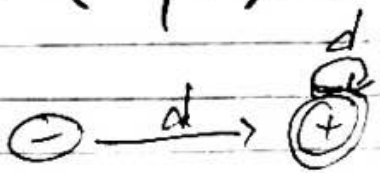
$L = \{a, b\}$ where last symbol must be two as or b's

(iv) $(aa/bb)(a/b)^*$

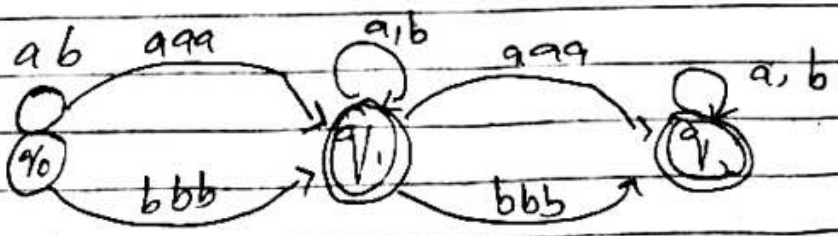
$L = \{a, b\}$ where first symbol must be $\begin{matrix} a \\ a \end{matrix}$ string must start with "aa" or "bb"

Question 4:

(i) $(+/-)d^+$



(ii) $(a/b)^*(aaa/bbb)(a/b)^*$



a, b.