

(1)

K18-0363 Wajahat

TOA Final

Wajahat Ali

K18-0363

Section D

Q1. i) $\{L = a^i b^i \mid i \geq 1000 \text{ & } i \leq 500\}$

let pumping length, $P = 2000$.
 $x y^k z$.

Case 1:

~~gopal kumar~~ $\underbrace{a}_{n} \underbrace{a^{P-2}}_{y} \underbrace{a}_{z} \underbrace{b^{3P}}_{b}$ \Rightarrow on $k=2, y = a^{2P-2}$
 $\neq a^{P} b^{3P}$

Case 2: $\underbrace{a^P}_{n} \underbrace{b^{2P}}_{y} \underbrace{b^P}_{z}$ \Rightarrow on $k=2, y = b^{4P} \Rightarrow a^P b^{5P}$
 $\neq a^P b^{3P}$

Case 3: $\underbrace{a}_{x} \underbrace{a^{P/2-1}}_{y} \underbrace{a^{P/2}}_{y} \underbrace{b^{P/2}}_{z} \underbrace{b^{2.5P}}_{b}$ \Rightarrow on $k=2, y = a^{P/2} b^{P/2} a^{P/2} b^{P/2}$
 $\Rightarrow a^{P/2} b^{P/2} a^{P/2} b^{P/2} b^{2.5P}$
 $\neq a^P b^{3P}$

No other way to divide.

None of the above ~~conditions~~ ^{conditions} satisfy the conditions

= Not a regular language.

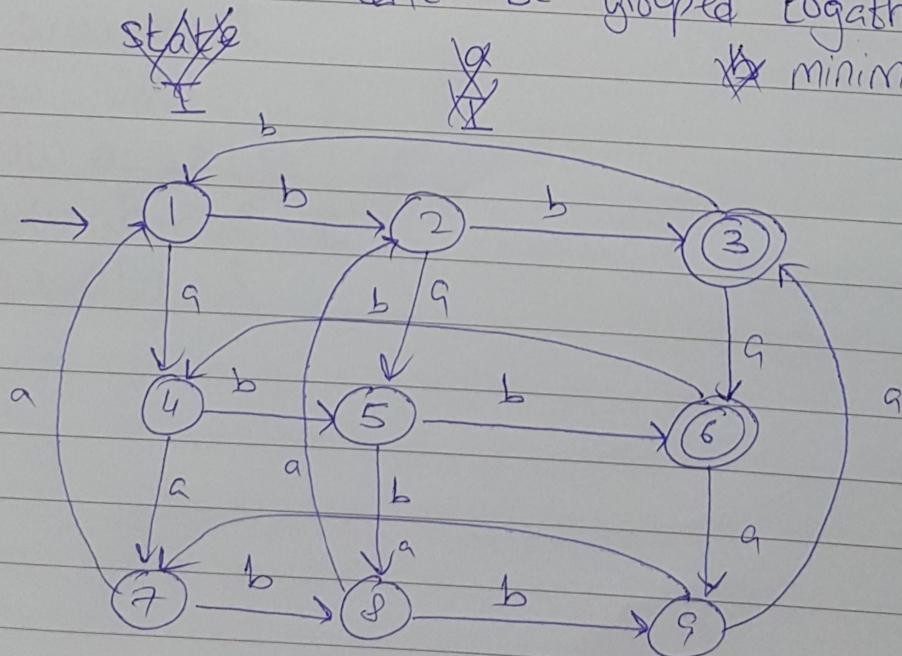
(2)

18K-0363, Meghal

ii)

State	a	b	
1	4	2	*
2	5	3*	
3*	6*	1	
4	7	5	*
5	8	6*	
6*	9	4	
7	1	2	*
8	2	9	
9	3*	7	

~~states~~ grouping {14, 25, 66} No 2 states are similar so can't be grouped together. This is the ~~minimized~~ minimized form.



(3)

18K-0363, Majedk

Q2. i) Naihat A

alphabet $\Sigma = \{w, t, a, \$\}$ ii) $S \rightarrow T\$$ ~~T~~ $\rightarrow wUi | wTi$ ~~U~~ $\rightarrow VEVaV | VaVEV$ ~~V~~ $\rightarrow VaV | VEV | VwV | VVwV | \epsilon$

iii) let string be wwataii \$

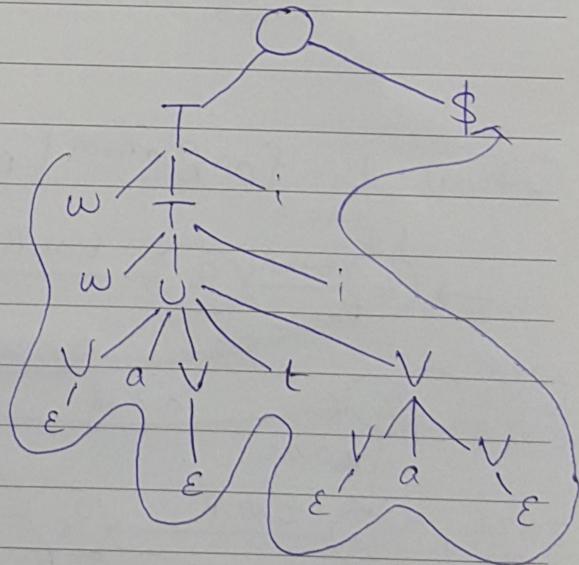
 $\Rightarrow T\$$ ~~wT~~ \$

wwUi \$

ww VaEV \$

ww ~~E~~ a ~~E~~ t VaV \$wwat ~~E~~ a ~~E~~ ii \$

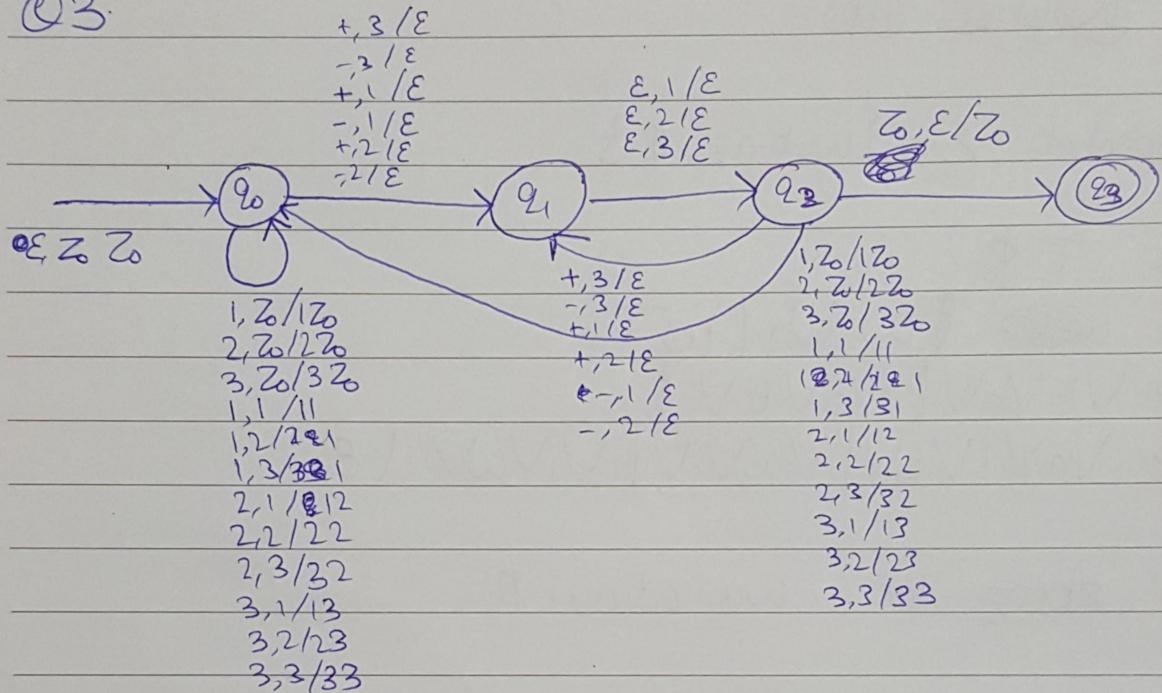
wwata ii \$



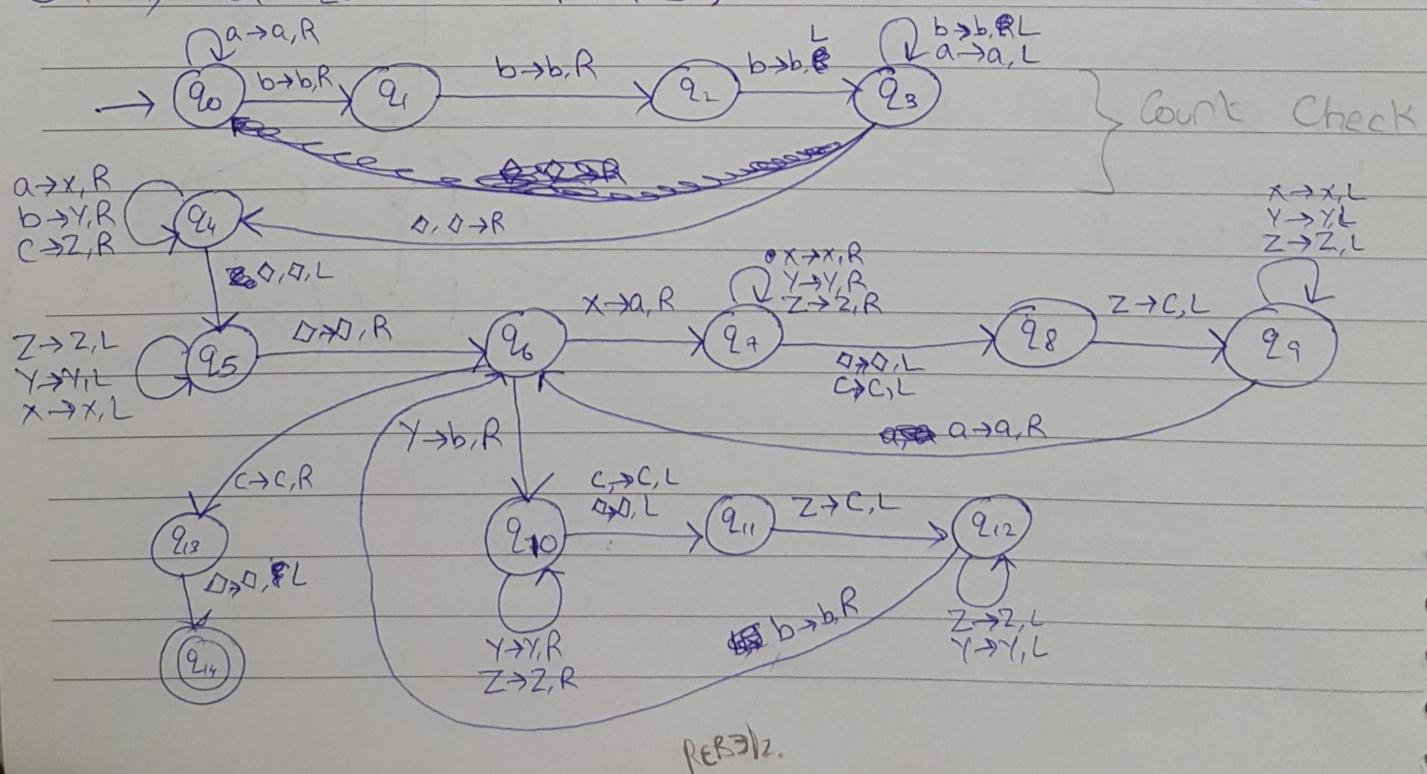
(4)

K18-0363, Majedet

Q3.

Q4. i) $L_i = \{a^n b^m c^{n+m} \mid m \geq 3, n > 0\}$

$$0363/10 = 3$$



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18K-0363

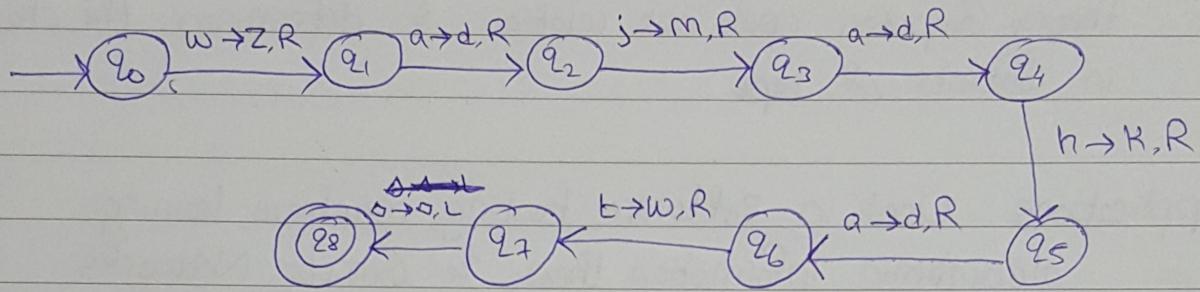
Wajahat

ii)

Name: Wajahat

roll #: 0363

n = 3



Q5.

i) Motivation: Introduced to be used in Complexity & Complexity theory. Computer's input out relation & determines the changes in contents of tape

Applications: Used in software testing, machine learning, algorithmic information theory & Computer Networks

Capabilities: has unlimited memory, can replace common computers, enumerable languages can be modeled recursively.

Limitations: Cannot model concurrency well & don't model the strengths of a particular arrangement well.

ii)	q_0	q_1	q_2	O	I	B
	I	II	III	I	II	III
	L	R				
	I	II				

$$[q_0, I] = [q_0, O, R] = 10110101011$$

$$[q_0, O] = [q_0, I, R] = 10101011011$$

$$[q_0, B] = [q_1, B, L] = 10111011011101$$

$$[q_1, O] = [q_0, O, L] = 11010110101$$

$$[q_1, I] = [q_1, I, L] = 1101101101101$$

$$[q_1, B] = [q_2, B, R] = 1101110111011011$$