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A discount of the second	THEORY OF COMPUTATION
	MC-304
	ASSIGNMENT- II
	FISSIGINIMEIN!
	0 1 0 0 0 14
	SUBMITTED BY: AIMAN SIDDIQUA
	2K18/MC/008
<b>(1)</b>	S-> 0S1 OA1
	A -> 1AO   10
	N Inc
	In order to obtain a terminal string we need the
	production A -> 10. Also in order to obtain A we
	production A -> 10. His in order as soint
	have to apply S -> OAI at some point.
	Before applying S -> OA1 we can apply S-> OS1
	n-1 times where n71.
	After applying S-> OAI we can apply A-> 1AO m-1
	times where m = 1. finally we apply A > 10 to obtain
140	a teaminal string.
	$S \xrightarrow{\text{n-1 times}} 0^{\text{n-1}} S \xrightarrow{1^{\text{n-1}}} 0^{\text{n-1}} \xrightarrow{\text{OA-1}} 0^{\text{n-1}} \xrightarrow{\text{oA-1}} 0^{\text{n-1 times}} \xrightarrow{1 \text{AO}}$
	0S1 1AO
	0 1 1 A 0 1 1 A + 10 On 1 m 0 m 1 n
	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
}	Hence the language generated by the grammare with given production rules is:
	with given production gules is:
	L(G) = 0 1 1 0 1 , n, m > 1

į.	
0	To construct a grammar accepting: $50^n 1^m 0^n   m, n > 1$ $0 \le 0^n 1^m 2^m   m, n > 1$
(2)	3 n 1 m 0 n m, n > 1? U Sania ani
سنستند	10 m,n > 18
	The greguired broductions are:
	S-> DAO OB
	A -> DAO C
	$C \rightarrow 1C   1$
	$\beta \rightarrow OB/D$
	$D \rightarrow 1D2   12$
(3.)	A type 2 headuction is a broduction of the form A -> a
- (3.)	A type 2 production is a production of the form $A \rightarrow \alpha$ where $A \in V_N$ and $\alpha \in (V_N \cup \Sigma)^*$ . In other words
	the LHS has no left context or night context.
	THE CIS THE THE COSE CONTROL OF
	for example $S \rightarrow Aa$ , $A \rightarrow a$ , $B \rightarrow abc$ , $A \rightarrow \Lambda$
	the 2 had offere
	are type 2 Broduction.
	1 and is collect a time of grammar if it contains
	A grammar is called a type 2 grammar if it contains only type 2 productions. It is also called a context
	free Igrammar.
	Let G be a context foce Goammar ouhose productions
	are: S-> SOS 1SOS
	S→ SOSOS1S
	S → S1SOSOS
	3→ Λ
	On abound , S-) 1 on the first three broduction we
	On applying · S -> 1 on the first three production we get 010, 001 and 100 respectively.

	is a hu form 30 where no
	Also every string in L is of the form 30 where n>1
	I for all strings of length 2.
	Let us assume the result for all strings of length 3n-3 Let well and let   w  = 3n, w will contain one of 010 001 or 100 as substrying. Let that substring be w,
	Let well and let   w = 30, w was substing he
College	001 or 100 as substring. Let that sound to
	w can be written as wawiws.
	$S \stackrel{*}{\Longrightarrow} W_2 S W_3 \longrightarrow W_2 W_1 W_3$
	Hence by induction its true.
	U
(4.)	A production of the form $A \rightarrow a$ or $A \rightarrow aB$ where $A, B \in V_N$ and $a \in \Sigma$ is called a type 3 broduction
	and a = I is called a type 3 production
	the state of the s
	A grammar is called a type 3 or Regular Grammar
	ic of its productions are type 3 productions. It productions
	S > 1 is also allowed in type of the state of the
	ase S does not appear on the right hand side of any
n-sk	froduction.
	A pregular grammas generating 5 (ab)", n > 1} consist  of the following productions:
	of the following productions:
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	$S \rightarrow aS_1$ , $S_1 \rightarrow bS_2$ , $S \rightarrow aS_2$ , $S_2 \rightarrow b$
	the many of the state of the same of the con-
	In order to obtain a terminal string we have to apply
	S-> as and S2 -> b consocutively. Belove that we
	can apply S-as, and S, -> bS any number of times (even sero).
	(even reso).
	1

(6.)	S-)051 0A 0 1B 1
(0)	1-1040
	$B \rightarrow 1B \mid 1$
	In order to derive 001100, 001010 or 01010
	In order to detate of ost as the first production we cannot use 5 > 051 as the first production
	we cannot use 37 031 as not we need 0 at as it will end in 1 always and we need 0 at as it will end in 1 always and we need 0 at
	$C \rightarrow C \rightarrow$
	so we cannot use those either.
	$C \rightarrow OO$ and $S \rightarrow 1B$ .
	Hence we are left with S > OA and S > 1B.
	As A - OA D any access 10 B -> 1B 1 will
	give or. Similarly S-> 2B / only give In as the terminal strings.
	only give I us me
	1 alata are not in the
	Mence 001200, of the grammag with given
	Mence 001100, 001010 and 01010 total language generated by the grammag with given broduction rules.
	DXDQUICQGII V
6	(a) Sat, as, as, }
	Ane: aa (aaa)*
	mi: aa (aa)
1.	(b) gan nis divisible by 2 or 3 or n=53
	Ans: (aa)* + (aaa)* + aaaaq
11	

	(c) The set of all strings over Saiby beginning and
	(c) The set of all strings over {a,b} beginning and ending with a.
	Ans: a(a+b)*a
	Wive vertical and the control of the
<u> </u>	L= {VWV: V, W & {a, b3*,  v =25
	The following regular expression represents the above language:
	aa (a+b)*aa + ab (a+b)* ab + ba (a+b)*ba+
	bb(a+b)*bb
	DB (410) 30
	Mence the language is negular.
6	C 2 124 1 1 1 2
<u></u>	L= { w, e \$0,13* : w has no pair of consecutive zeroes}
	Regular expression: (011*)*
(9.	To Leave
	To prove: $(a^*ab + ba)^*q^* = (a+ab+ba)^*$
	(daptou) of - (dido tou)
	LHS = (a*ab+ba) * a*
	Let $\tau 1 = (a*ab+ba)*$ and $\tau 2 = a*$
	Keeping at = E we obtain the US term as (ab+ba)*

	Now let 71=€, so 81*=€, hence CHS term is ordered
	to at
	마시 경기 전 : [1] - [2] - [
	Hence the overall expression considering the above 2
	is already obtained and using at one can get any
	cases can be briefed as: (4 of 4 ba) as (46 + ba) as (46 + ba) as already obtained and using at are can get any combination of a so it can be inside (a+ab+ba)*
	Hence the two expressions given are equivalent.
	2 2 4 7
(10)	L= {awa: w e {a1b3* } is
	aulant stion
	We can constauct the following regular expression for the given language:
	for the given language:
	a(a+b)*a
1046	Hence the language is regular.
, , , , , to	The first to the total of the first
-	TARE (orleans)
	ky to know k ( by language) - hr "
	on and the opening that the the terms of the contract of the c