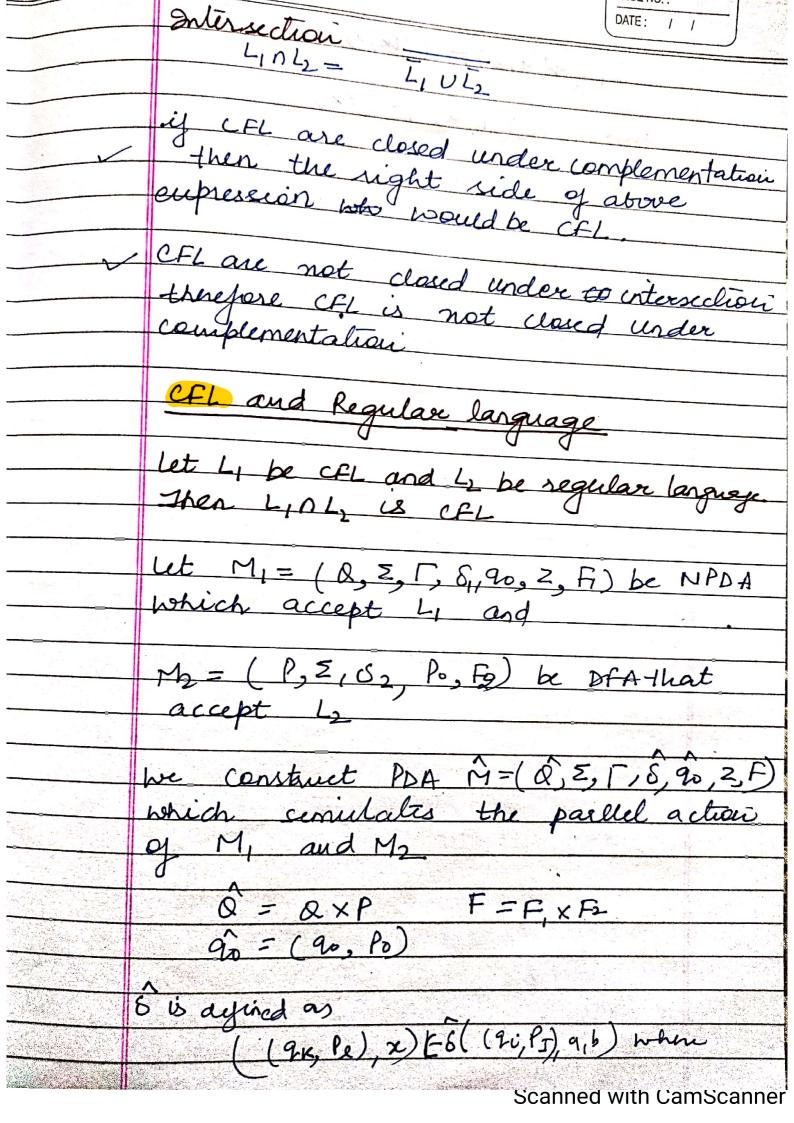
closure proporties of CFL Let L1 and L2 be two CFL generated by CFG G1 = (V1, T1, S1, P1) and G2 = (V2, T4, S6) G1 = G1UG2 G = G1. G2 G = G4. S \Rightarrow 5, S2 S \Rightarrow 5, S2 CFG are closed under union, kleene closure and concatenation CFL are not closed under intersection and complementation: L1 = \(\frac{1}{2} \) and \(\frac{1}{2} \) \	
G_= G_1UG_2 G=G_1.G_2 G=G_1* S \rightarrow S_1 S_2 S_1 S \rightarrow S_1 S_2 S_1 S \rightarrow S_1 S_2 S_1 S_1 S_1 S_2 S_1	closure properties of CFL
S S S S S S S S S S	
CFG are closed under union, kleene closure and concotenation CFL are not closed under intersection and complementation: $L_1 = \{a^n b^n c^m : m_70, m_7, 0\}$ and $L_2 = \{a^n b^m c^m : m_70, m_7, 0\}$ $L_2 = \{a^n b^m c^m : m_70, m_7, 0\}$ which is not cfGq. Ex.2 $L_1 = a^b b^n c^m d^p, m_1 m_1 p_70$ $L_2 = a^m b^k c^p d^p m_1 k_1 p_70$ $L_3 = a^m b^k c^p d^p m_1 k_1 p_70$ $L_4 = L_1 n L_1 = a^n b^n c^m d^m m_1 m_7, 0$ which is CPL	
CFL are not closed under intersection and complementation Li = {a^n b^n c^m : m, 0, m, 0} Li = {a^n b^m c^m : m, 0, m, 0} ext L = LinL2 = {a^n b^n c^n : m, 0} which is not cf. Ex.2 Li = a^h b^n c^m d^h, m, m, b, 0 Li = a^m b^n c^m d^h, m, m, b, 0 Li = a^m b^n c^m d^h, m, m, b, 0 Li = a^m b^n c^m d^h, m, m, b, 0 Li = a^m b^n c^m d^h, m, m, b, 0 Li = LinL2 = a^n b^n c^m d^h, m, m, m, n,	and and an all the state of the
CFL are not closed under intersection and complementation Li = {a^n b^n c^m : m, 0, m, 0} Li = {a^n b^m c^m : m, 0, m, 0} ext L = LinL2 = {a^n b^n c^n : m, 0} which is not cf. Ex.2 Li = a^h b^n c^m d^h, m, m, b, 0 Li = a^m b^n c^m d^h, m, m, b, 0 Li = a^m b^n c^m d^h, m, m, b, 0 Li = a^m b^n c^m d^h, m, m, b, 0 Li = a^m b^n c^m d^h, m, m, b, 0 Li = LinL2 = a^n b^n c^m d^h, m, m, m, n,	CCG and closed under union klern
CFL are not closed under intersection and complementation: L_1 = \{a^n b^n c^m : m_{70}, m_{70}\} and L_2 = \{a^n b^m c^m : m_{70}, m_{70}\} Ext L=L_1 nL_2 = \{a^n b^n c^n : m_{70}\} which is not cf. Ex.2 L_1 = a^n b^n c^m d^n, m_{1m}, \(\phi_{70}\) L_2 = a^m b^w c^p d^n m_{1m}, \(\phi_{70}\) L=L_1 nL_2 = a nb^n c^m d^m m_{1m}, \(\phi_{70}\) L=L_1 nL_2 = a nb^n c^m d^m m_{1m}, \(\phi_{70}\) which is CPL	to the state of th
and complementation $L_{1} = \begin{cases} a^{n}b^{n}c^{m} : m_{7}0, m_{7}0 \end{cases}$ and $L_{2} = \begin{cases} a^{n}b^{m}c^{m} : m_{7}0, m_{7}0 \end{cases}$ $Ex = \begin{cases} L = L_{1}nL_{2} = \begin{cases} a^{n}b^{n}c^{n} : m_{7}0 \end{cases}$ which is not cfG. $Ex \cdot 2$ $L_{1} = a^{n}b^{n}c^{m}d^{n}c^{$	closure and concatenation
and complementation $L_1 = \begin{cases} a^n b^n c^m : m_{7,0}, m_{7,0} \end{cases}$ and $L_2 = \begin{cases} a^n b^m c^m : m_{7,0}, m_{7,0} \end{cases}$ $Ex = \begin{cases} 1 \\ 1 \\ 1 \end{cases}$ $Ex = \begin{cases} 1 \\ 1 \\ 1 \end{cases}$ $Ex = \begin{cases} 1 \\ 1 \\ 1 \end{cases}$ $Ex = \begin{cases} 1 \end{cases}$ $Ex $	
and complementation $L_1 = \begin{cases} a^n b^n c^m : m_{7,0}, m_{7,0} \end{cases}$ and $L_2 = \begin{cases} a^n b^m c^m : m_{7,0}, m_{7,0} \end{cases}$ $Ex = \begin{cases} 1 \\ 1 \\ 1 \end{cases}$ $Ex = \begin{cases} 1 \\ 1 \\ 1 \end{cases}$ $Ex = \begin{cases} 1 \\ 1 \\ 1 \end{cases}$ $Ex = \begin{cases} 1 \end{cases}$ $Ex $	10 10 00 00 00 00 00 00 00 00 00 00 00 0
and complementation $L_1 = \begin{cases} a^n b^n c^m : m_{7,0}, m_{7,0} \end{cases}$ and $L_2 = \begin{cases} a^n b^m c^m : m_{7,0}, m_{7,0} \end{cases}$ $Ex = \begin{cases} 1 \\ 1 \\ 1 \end{cases}$ $Ex = \begin{cases} 1 \\ 1 \\ 1 \end{cases}$ $Ex = \begin{cases} 1 \\ 1 \\ 1 \end{cases}$ $Ex = \begin{cases} 1 \end{cases}$ $Ex $	~ CFL are not closed under intersection
L ₁ = $\frac{1}{2}a^{n}b^{n}c^{m}$: $\frac{1}{2}m^{2}n^{2}$ and L ₂ = $\frac{1}{2}a^{n}b^{m}c^{m}$: $\frac{1}{2}m^{2}n^{2}n^{2}$ Which is not cfG. Ex.2 L ₁ = $\frac{1}{2}a^{n}b^{n}c^{m}d^{n}$, $\frac{1}{2}m^{2}n^{2}$ L ₂ = $\frac{1}{2}a^{n}b^{n}c^{m}d^{n}$, $\frac{1}{2}m^{2}n^{2}$ L ₃ = $\frac{1}{2}a^{n}b^{n}c^{m}d^{n}$, $\frac{1}{2}m^{2}n^{2}$ $\frac{1}{2}a^{n}b^{n}c^{m}d^{n}$ $\frac{1}{2}m^{2}n^{2}$ Which is CPL	and complementation
and $L_{2} = \left\{ a^{n}b^{m}c^{m} : n7,0, m7,0 \right\}$ $Ext = L_{1}nL_{2} = \left\{ a^{n}b^{n}c^{n} : m7,0 \right\}$ $which is not cffq.$ $Ex.2$ $L_{1} = a^{n}b^{n}c^{m}d^{p}, m_{1}m, p>0$ $L_{2} = a^{m}b^{k}c^{p}d^{p}, m_{1}k, p>0$ $L_{3} = a^{m}b^{k}c^{p}d^{p}, m_{1}k, p>0$ $L_{4} = a^{n}b^{n}c^{m}d^{n}, m_{3}m>0$ $L_{5} = a^{n}b^{n}c^{m}d^{n}, m_{3}m>0$ $L_{6} = a^{n}b^{n}c^{m}d^{n}, m>0$ $L_{7} = a^{n}b^{n}c^{m}d^{n}c^{m}d^{n}, m>0$ $L_{7} = a^{n}b^{n}c^{m}d^{n}c^{m$	
L ₁ = {a ⁿ b ^m c ^m : n ₇ ,0, m ₇ ,0} Ex.2	1 - 5 - N/N - M - M > 0 M > 0?
Ly = { anb m cm : n7,0, m7,0} Ex.2 Li = anb m cm df, m, m, p, p Ly = am b k cf df m, m, k, p > p L=L, nLy = anb m cm dm m, m7,0 Which is CPL	
L=L ₁ nL ₂ = $\frac{1}{2}$ anb $\frac{1}{2}$ cr : $\frac{1}{2}$ which is not cfG. Ex.2 L=a ⁿ b ⁿ c ^m d ^p , $\frac{1}{2}$, $\frac{1}{2}$ anb $\frac{1}{2}$ cr dp $\frac{1}{2}$ m ₁ K ₁ b ² / ₂ o L=L ₁ nL ₂ = a ⁿ b ⁿ c ^m d ^m d ^m $\frac{1}{2}$ m ₂ M ₂ / ₂ o Which is cpl	and some me
Which is not cfG. Ex.2 Li= abb m cm dp, mim, p>,0 Lz= am b w cp dp min, p>,0 L= Linlz = anbh cm dm m, m>,0 Which is CPL	- = [a"b" c": n7,0, m7,0}
Which is not cfG. Ex.2 Li= abb m cm dp, mim, p>,0 Lz= am b w cp dp min, p>,0 L= Linlz = anbh cm dm m, m>,0 Which is CPL	
Which is not cfG. Ex.2 Li= abb m cm dp, mim, p>,0 Lz= am b w cp dp min, p>,0 L= Linlz = anbh cm dm m, m>,0 Which is CPL	L=L11/2 = Sanbran m2.02
$Ex.2$ $L_1 = a^{h}b^{h}c^{m}d^{h}, m_1M, p>0$ $L_2 = a^{m}b^{k}c^{p}d^{p} m_1M, p>0$ $L=L_1nL_2 = a^{n}b^{h}c^{m}d^{m} m_1M>0$ which is CPL	
$Ex.2$ $L_1 = a^{h}b^{h}c^{m}d^{h}, m_1M, p>0$ $L_2 = a^{m}b^{k}c^{p}d^{p} m_1M, p>0$ $L=L_1nL_2 = a^{n}b^{h}c^{m}d^{m} m_1M>0$ which is CPL	Which is not CEG
L= anb m m d , m, m, b > 0 L= am b k c d p m, m, b > 0 L= L, n L_2 = anb m, m m, m > , 0 Which is cel	
L= anb m m d , m, m, b > 0 L= am b k c d p m, m, b > 0 L= L, n L_2 = anb m, m m, m > , 0 Which is cel	
$L = a^{m}b^{n}c^{r}d^{p} \qquad m_{1}M_{1}b^{2}\delta$ $L = L_{1}nL_{2} = anb^{n}c^{m}d^{m} \qquad m_{1}M_{2}\delta$ $below constant as cell$	EX.Z
$L = a^{m}b^{n}c^{r}d^{p} \qquad m_{1}M_{1}b^{2}\delta$ $L = L_{1}nL_{2} = anb^{n}c^{m}d^{m} \qquad m_{1}M_{2}\delta$ $below constant as cell$	Lj= abb c d, M,M, \$2,0
L=4,04 = angh_m_m m,m>,0 Which is CPL	
which is CPL	111,778
which is CPL	L=LIDL= anlw mim
which is CPL	0, M, M>, 0
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	Scanned with CamScann



DATE: 1 1 S, (9i, 9, b) + (9k,x) and 82 (B, a) + (PK) Thurspose a strong is accepted by M if and only if it is accepted by M, and M2 that is if it is (M,) 0 L(M) = 1,012 ex. Show that L=anbn: n>,0, n +100 Proof let L = a 100 6100 Lis finte so it is regulare L= (anbo n>, 100) 1 L,

	Decidable properties of context free language - a problem is decidable of three escent a solution to solve
والمراجعة	language - a problem is decidable of three
where the same was a state of the same of	exust a solution to solve
hearm 1.	Given a CFG G=(V,T,S,P) there exist
	an algorithm for deciding
	an algorithm for deciding. Whether L(G) is empty or not
Proof.	Assume that $\Lambda \notin L(G)$ I Find uscless symbol if S (start) is found to be uscless than $L(G)$ is cupty
4	-> Find uscless symbol if 5 (start)
100	is found to be uscless than
	L(61) is curpty
theorm2	L(G) is inferite
Proof.	Create a dependency of Non-Jerminal based
7	The description
	ou une purinte
	is a self constant cuele than LCM is
4	if graph contain cycle than LCO) is injurile else it is finite
	ufine ell a s
	6y-2
	C - AN
VALUE AND VALUE	
	$B \rightarrow c \mid d \mid B \rightarrow b A \mid d$
	s cycle so
	S cycle co cifuile
	7-76
1	Joseph
	Vo cycle
	e fints

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	Decidable properties jos Regulas language
1	L(G) is infinite
	11
->	If there exist a cycle in the potte from utial state to final state than Las infinite
	inteal state to final state than La)
	is infinite in the work with the
	well Assume made A = Lugar
2.	L(G) = \$ Johnson
	Lis emply if there evest no fath from
	Lis emply if there exist no fath from untial to final state
	voint L(G) is criminal