Cairo University
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Sheet 6: Syntactic Parsing

1) What language does the following CFG generate?

$S \rightarrow X1X1X1X$ | 1X1X1X | X11X1X|X1X11X

$X \rightarrow 0X \mid 1X \mid \epsilon$ | 0 | 1 generate any binary string which contains at least 3 ones.

2) Convert the following CFG into a grammar in CNF:

$S \longrightarrow ASB$

$A \longrightarrow aASA \mid a \mid \epsilon$

$B \longrightarrow SbS \mid A \mid bb$

1- S producing another S, S` -> S ...
2- remove any nullable object
3- remove any unit production A -> B , B -> z } A -> z
4- convert any long production into shorter one , A -> BCDF -> A -> EM
5- A->mD , A -> MD , M -> m

3) Given the following grammar:

S -> AB
A -> CD | CF
B -> c | EB
C -> a
D -> b
E -> c
F -> AD

a) For the sentence "aaabbbcc" apply CKY parsing algorithm to determine whether the sentence can be derived by the given grammar or not. If it can be derived, show its parse tree(s).

b) For the sentence "ababca" apply CKY parsing algorithm to determine whether the sentence can be derived by the given grammar or not. If it can be derived, show its parse tree(s).

2 -> 1,1

3 -> 1,2 | 2,1

4 -> 1,3 | 2,2 | 3,1

5-> 1,4 | 2,3 | 3,2 | 4,1

6 -> 1,5 | 2,4 | 3,3 | 4,2 | 5,1

7 -> 1,6 | 2,5 | 3,4 | 4,3 | 5,2| 6,1

EE
EB
BE
BB