PES UNIVERSITY, Bangalore

(Established under Karnataka Act No. 16 of 2013)

Department of Computer Science & Engineering

Automata Formal Languages & Logic

Question Bank - Unit 3

Questions from the Prescribed Textbook

Topic	Exercise No.	Question No's
Chomsky Normal Form	**6.1** **6.2**	**1,6-11, 17, 19** **1-5**
Greibach Normal Form	**6.2**	**10-13**
CYK Algorithm	**6.3**	**1-4**
CFG to PDA	**7.1**	**1-4, 6-8,**

Extra Questions

Chomsky Normal Form

Convert the following grammar to Chomsky Normal Form

1) S → abS | baS | λ
2) $S \rightarrow a \mid aA \mid B \mid C,\ A \rightarrow aB \mid \lambda, B\ Aa,\ C \rightarrow cCD,\ D \rightarrow$ add
3) $S \rightarrow A \mid aB \mid \lambda, A \rightarrow aA \mid B, B \rightarrow bB \mid C, C \rightarrow c \mid A$
4) $S \rightarrow BAB, B \rightarrow bba, A \rightarrow Bc$
5) S → ASA|aB, A → B |S , B → b| ε

Greibach Normal Form

Convert the following grammar to Greibach Normal Form

1) S → Sab | Sba | λ
2) $S \rightarrow AB, A \rightarrow aA \mid bB \mid b, B \rightarrow b$
3) $S \rightarrow abSb \mid aa$
4) $S \rightarrow aSb \mid ab$
5) $S \rightarrow A\ , A \rightarrow a\ B\ a \mid a\ , B \rightarrow b\ A\ b \mid b$

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CYK Algorithm

Apply CYK - algorithm to verify the given string (s) can be derived from the below grammar

1) $S \rightarrow 00S11 \mid 11S00 \mid \lambda$, $w = 00111100$
2) $S \rightarrow 0S1 \mid 1S0 \mid SS \mid \lambda$, $w = 00011110$
3) $S \rightarrow AB, A \ BB \mid a, B \ AB \mid b$, $w = aabbb, aabb, aabba, abbbb$
4) $S \rightarrow AB, A \ BB \mid a, B \ AB \mid b$, $w = aabbb$
5) S → AB | BC , A → BA | a , B CC | b , C AB | a , w is baaba
   (https://web.cs.ucdavis.edu/~rogaway/classes/120/winter12/CYK.pdf)

CFG to PDA

Convert the following CFG to PDA

1) S → aSA | λ, A → bB, B → b
2) S → 0S1 | A, A →1A0 | S | λ
3) S → aA, A → aABC | bB | a, B → b, C → c. Show how aaabc is accepted.
4) S → 0AA, A → 0S | 1S | 0
5) S → aA | bB | cC, A → Sa, B → Sb, C → λ