Tutorial -6 (13/10/2020)

1. Build a PDA for language L = {wcw' | w={0, 1}*} where w' is the reverse of w.

2. Build a PDA for language L = $\{0^n1^m2^m3^n \mid n>=1, m>=1\}$

3. Given Grammar G1:
   S->aSb
   S->e
   Grammar G2:
   R->cRd
   R->e
   If L(G)=L(G1) U L(G2), the number of productions the new starting variable would have:
   a) 2
   b) 3
   c) 4
   d) 1

4. Let G= ({S,C} ,{a,b},P,S) where P consists of S->aCa , C->aCa |b. Find L(G).

5. Find L(G) where G= ({S} ,{0,1}, {S->0S1 ,S->Є },S)

6. Construct CFG without Є production from :
   S →a | Ab | aBa
   A →b | Є
   B →b |A

7. Consider the grammar P={S->aS | aSbS | Є } is ambiguous by constructing:
   (a) two parse trees
   (b) two leftmost derivation
   (c) rightmost derivation

8. Find the grammar for the language L={a^2n bc ,where n>1 }

9. What are the applications of Context free languages?

10. L exactly consists of all strings w ∈ Σ* such that w = reverse(w) and the length of w is divisible by 4 (i.e., w has length 4n for some n = 0, 1, 2, 3, . . .).

L defined over Σ falls into which one of the following categories:

(i) L is a regular language.
(ii) L is a context-free language, but not a regular language.
(iii) L is recursively enumerable, but not a context-free language.

Questions to be solved latest by Saturday (17/10/2020)

1. Construct a PDA for language L = $\{0^n1^m \mid n >= 1, m >= 1, m > n+2\}$

2. Let L = {a^3n b^2n : n = 0, 1, 2, . . .}
   Give a pushdown automaton that accepts L.

3. Let L = {a^2n : n ≥ 0}
   L defined over Σ falls into which one of the following categories. Give a proper justification of your answer.
   (i) L is a regular language.
   (ii) L is a context-free language, but not a regular language.
   (iii) L is recursively enumerable, but not a context-free language.

NOTE: *Upload your solutions only through the given link. Name your pdf file with the format* ***<rollno_name_tutorialno>****. Do not mail your solutions elsewhere.*
Link to upload the solutions:

https://docs.google.com/forms/d/e/1FAIpQLSdpnjMVnxzEUPuHsvplhykgwleCC5MgEYKXrKauEH8TF7Dkig/viewform?usp=sf_link