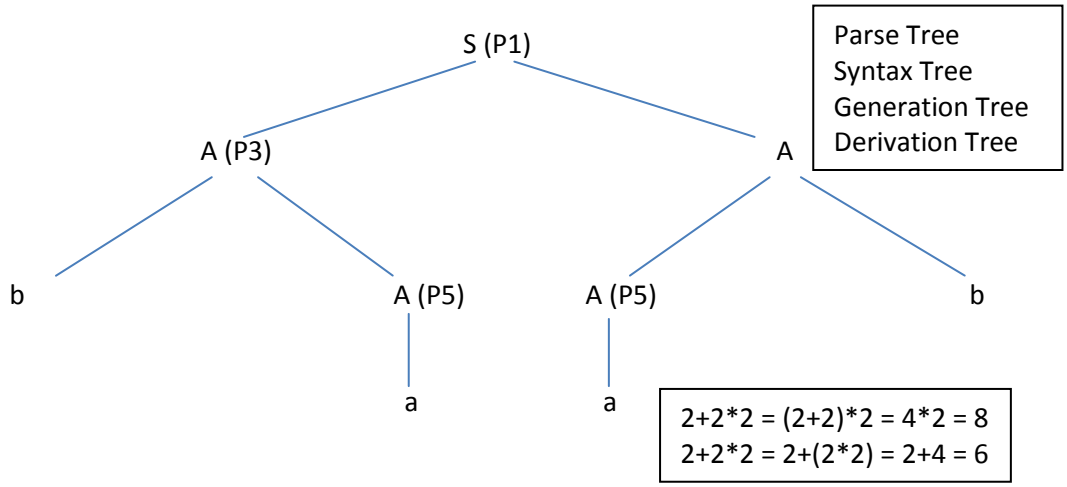
Parse Trees:

Σ = {a,b}
Productions:
1. S -> AA
2. A -> AAA
3. A -> bA
4. A -> Ab
5. A -> a

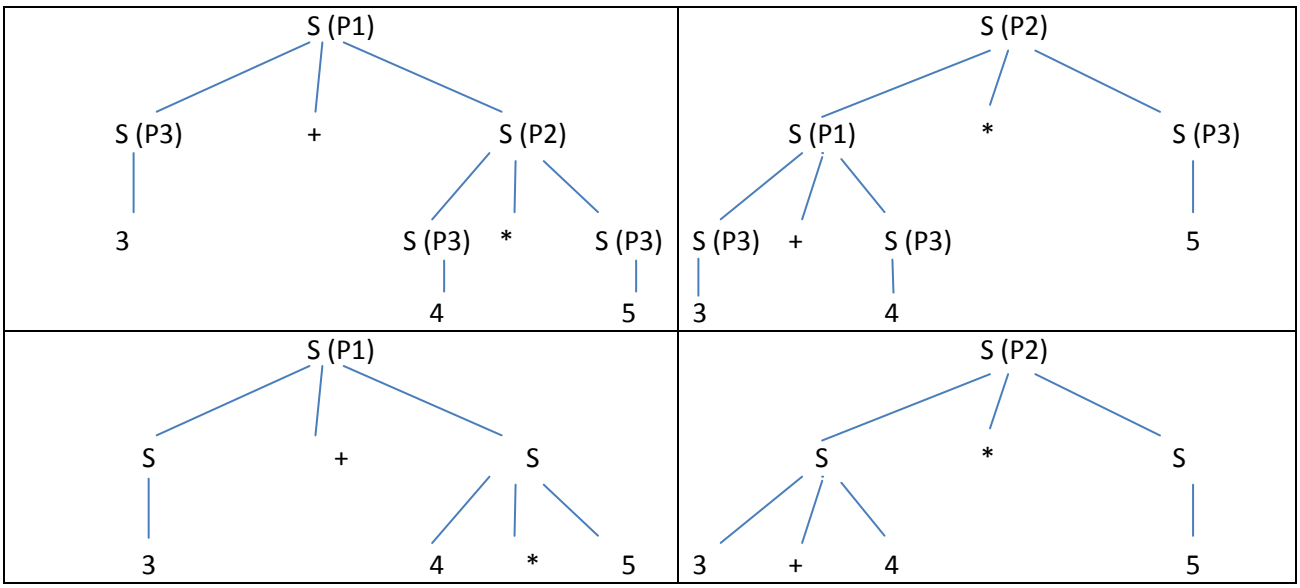
1. S -> AA
2. A -> AAA | bA | Ab | a

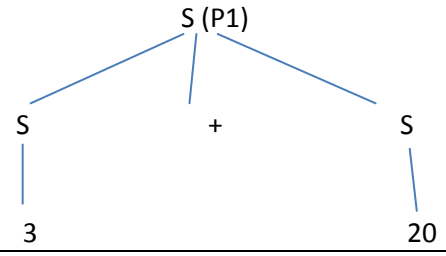
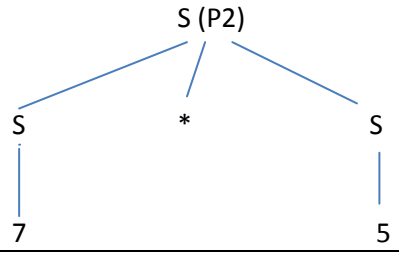
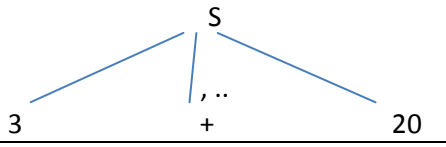
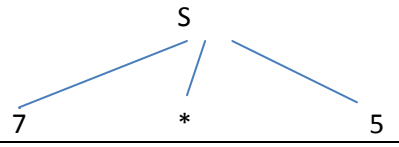
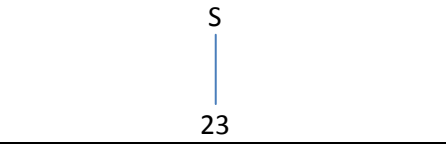
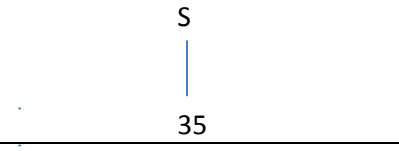
String: baab

Derivation:
S – P1 – AA – P3 – bAA – P5 – baA – P4 – baAb – P5 – baab ---------- **Leftmost Derivation**



S -> S+S | S*S | number P1,P2,P3
Expression: 3+4*5, (3+4)*5=35 **OR** 3+(4*5)=23



	
	
	
23	35

D -> 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 — D – Digit

N -> D^+ — N – Number

RE: $(0 \mid 1 \mid 2 \mid 3 \mid 4 \mid 5 \mid 6 \mid 7 \mid 8 \mid 9)^+$

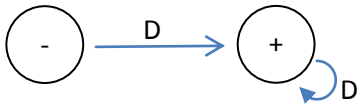
$D^0 = \{\lambda\}$

$D^1 = \{0,1,2,3,4,5,6,7,8,9\}$

$D^2 = \{00,01,02,03,04,05,06,07,08,09,10,11,12,13,14,15,16,17,18,19, 20,21,22,23,24,25,26,27,28,29, ….,99 \}$

…

$N = D^+ = D^1 \cup D^2 \cup D^3 \cup D^4 = \{0,1,2,3,4, ….\}$ — N – Unsigned Number

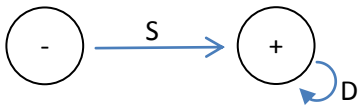


Number:

S -> + | - | λ

D -> 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 — D – Digit

N -> SD^+ — N – Signed/Unsigned Number



Task: Give the CFG, RE and DFA of Variable Name.

Rules:

- First character can be Alphabets or Underscore
- Rest of the characters can be Alphabets, Numbers and/or Underscore