Exercise 6

Pushdown Automata

Q 1: Design a PDA to accept the language L over Ʃ = {a,b} consisting of all the string with equal number of a’s and b’s.

Q 2: Design a PDA corresponding to the following CFGs.

1. S -> 0S0 | 1S1 | A A -> 2B3 B -> 23|31
2. S -> bX|aY A -> bXX|aS|a Y -> aYY |bS|b
3. S -> 0Y|1X X -> 0S|1XX|0 Y -> 1S|0YY|1

Classify these PDA into deterministic and nondeterministic categories.

Q 3: Why cannot the following language be implemented on PDA?

L={ambm|m>=1} U {amb2m|m>=1}

Q 4: Design a top-down parser to implement the following CFG and parse the string 0102313010

S -> 0S0|1S1|A A -> 2B3 B -> 23|31

Q 5: Convert the following grammar to LL(a) type.

S -> S+A S -> A A -> A/B A -> B B -> a1|a2|a3

Where {a,1,2,3,+,/} is the set of terminals.

Q 6:

1. The production of the type A -> Aα involves
2. Left recursion
3. Right recursion
4. Left factoring
5. Right factoring
6. The production of the type A -> αβ|αg|αδ involves
7. Left recursion
8. Right recursion
9. Left factoring
10. Right factoring
11. Shift process in shift-reduce parsing involves
    1. Popping of a terminal from pushdown store
    2. Popping of a nonterminal from pushdown store
    3. Pushing of a nonterminal from pushdown store
    4. Pushing of a terminal from pushdown store
12. The language L={anbn|n>=1}
    1. Cannot be accepted by a PDA
    2. Can be accepted by a PDA of null store type only
    3. Can be accepted by a PDA of final state type only
    4. Can be accepted by a PDA of both types, null store and final state type.