Lab #1

Task 1:

Construct a schema for a Markov Normal Algorithm to reverse a word in the alphabet {a, b}. For example, for the word "abaa", the result will be "aaba". Provide the computation protocol for the word "bbab".

Rules of the algorithm:
1: #a → A
2: #b → B
3: Aa → aA
4: Ab → bA
5: Bb → bB
6: Ba → aB
7: #A → aX
8: #B → bX
9: XA→aX
10: XB→bX
11: X →
12: → #

Computation protocol for the word: bbab

1. bbab
   → 12 → #

   #bbab
2. #b → 2 → B
   Bbab
3. Bb → 5 → bB
   bBab
4. Ba → 6 → aB
   baBb
5. Bb → 5 → bB
   babB

6. > 12→ #
   #babB
7. #b → 2 → B
   BabB
8. Ba → 6 → aB
   aBbB
9. Bb → 5 → bB
   abBB
10. > 12 → #
    #abBB
11. #a → 1 → A
    AbBB
12. Ab → 4 → bA
    bABB
13. > 12 → #
    #bABB
14. #b → 2 → B
    BABB
15. > 12 → #
    #BABB
16. #B → 8 → bX
    bXABB
17. XA → 9 → aX
    baXBB
18. XB → 10 → bX
    babXB
19. XB → 10 → bX
    babbX
20. X → 11 →

    babb

Task 2:

Construct a schema for a Markov Normal Algorithm to sort the symbols in a word in the alphabet {a, b, c}. For example, for the word "bacbabc", the result should be "aabbbcc". Provide the computation protocol for the word "abcbab".

Rules of the algorithm:
1: cb → bc
2: ba → ab
3: ca → ac

Computation protocol for the word: abcbab

1. cb → 1 → bc
   abbcab
2. ca → 3 → ac
   abbacb
3. cb → 1 → bc
   abbabc
4. ba → 2 → ab
   ababbc
5. ba → 2 → ab
   aabbbc