CFG Rules:

1)

S → aSbS | bSaS | ε

2)

S → ε | aSbbS | bbSaS | aSbb | abSb | bSab | baSb | bSba | bbSa

3)

S → aAb | bAa | aSb | bSa | aSa | bSb

A → aA | bA | ε

4)

S → aaaB

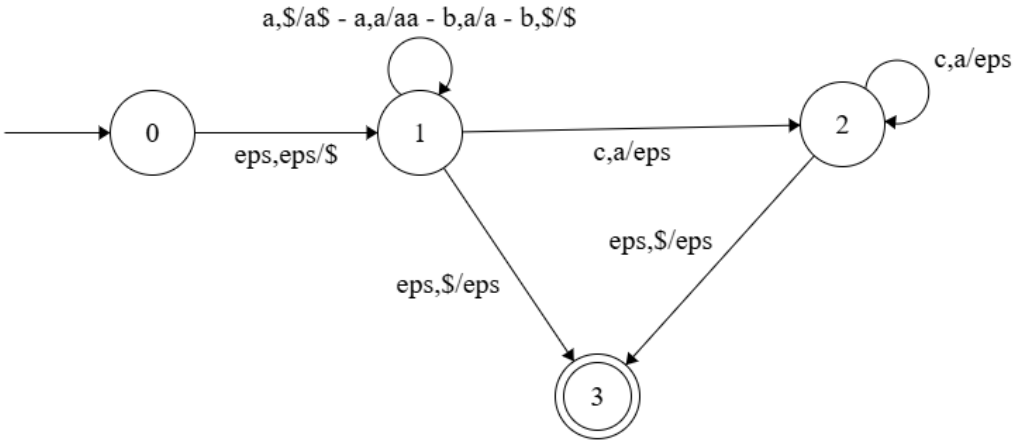
B → aaBb | ε

5)

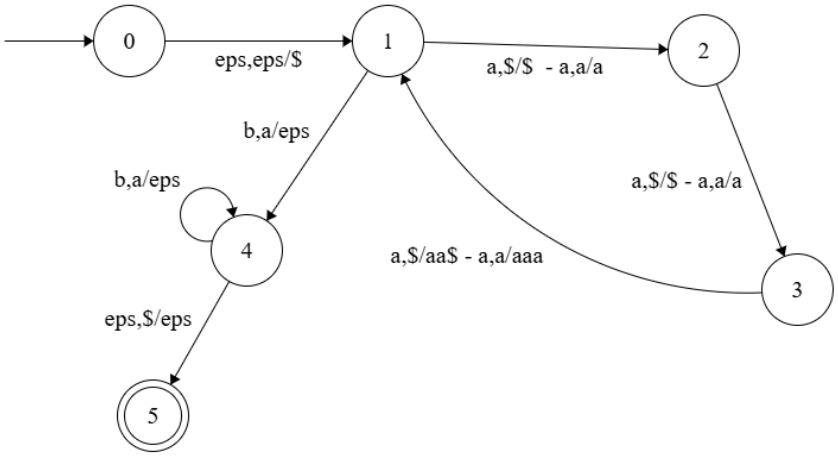
S → aS | aSb | a

PDA Diagrams:

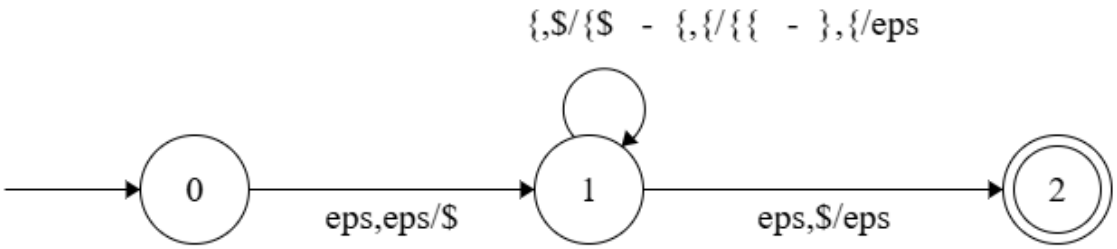
Problem 1



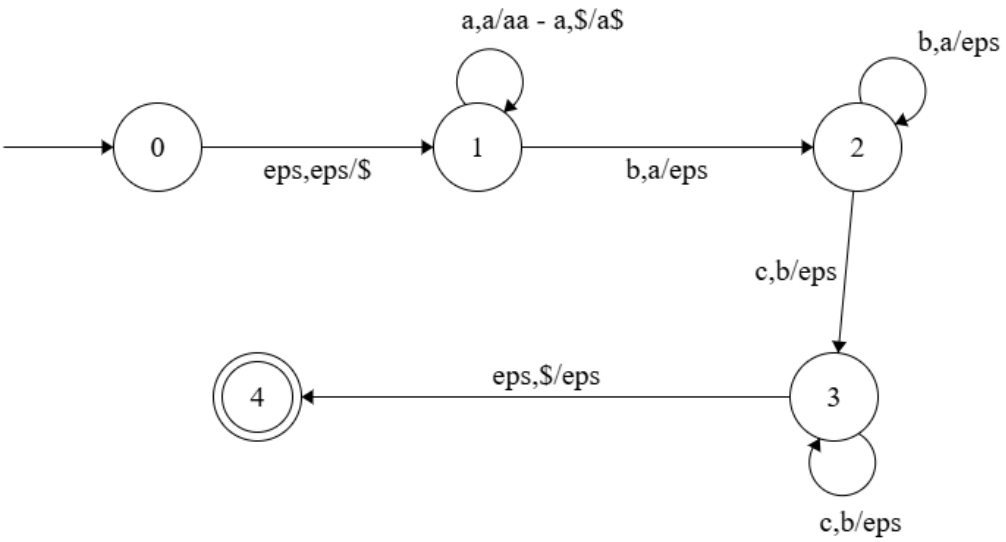
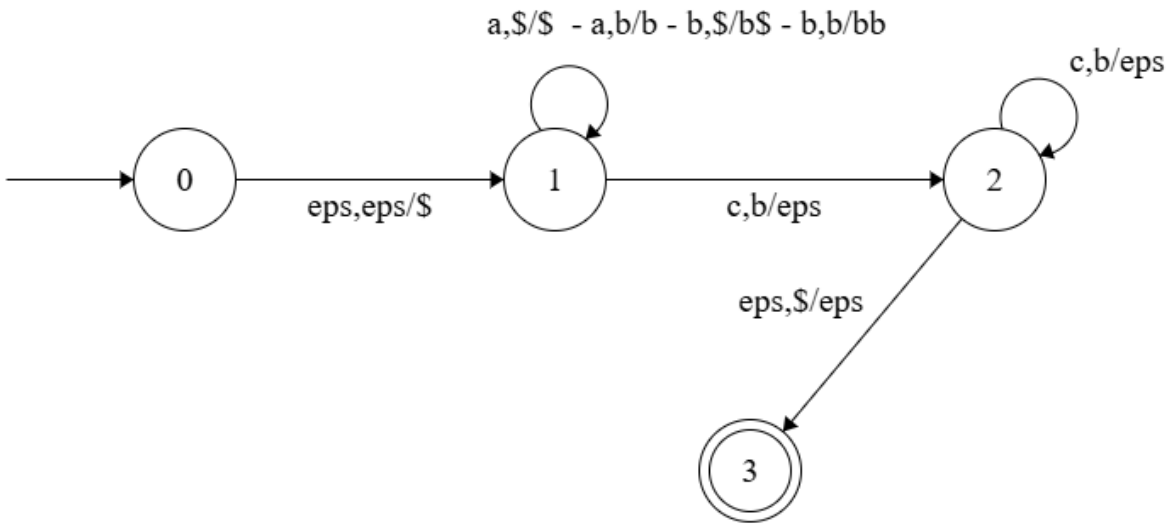
Problem 2



Problem 3



Problem 4



Problem 5