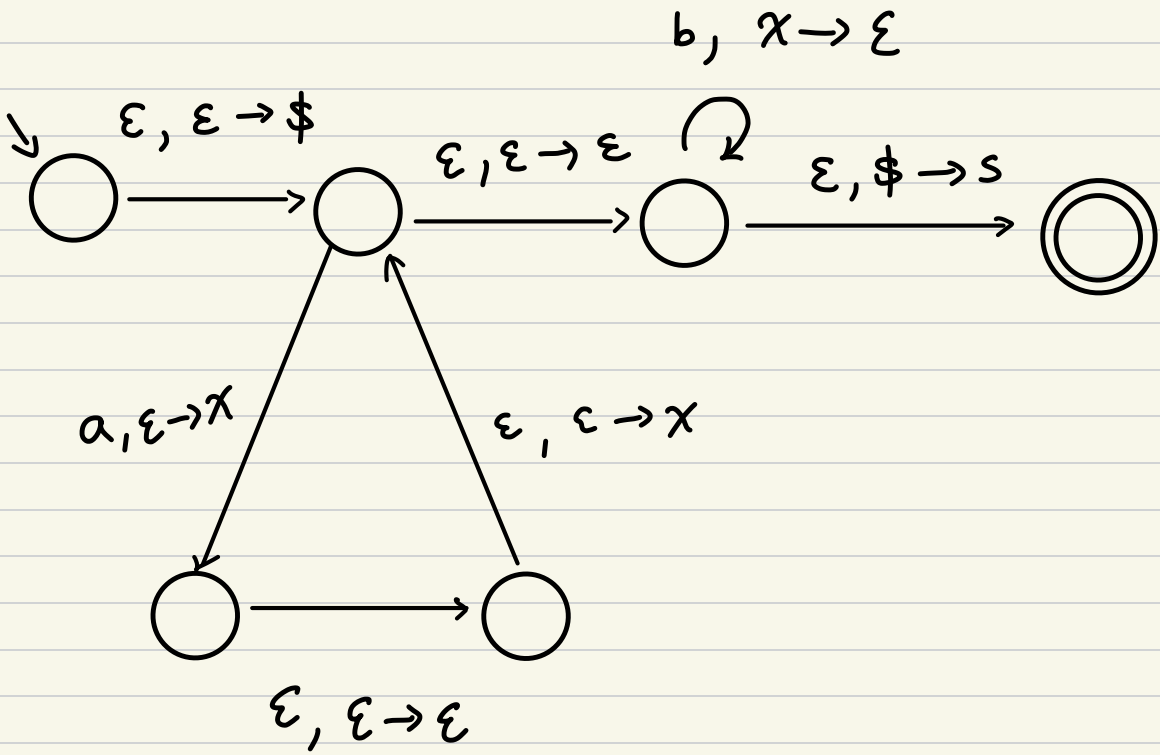
1)

a. This language of PDA is that the set of strings which have the number of b's as twice as a's.

$L = \{ \varepsilon, abb, aabbbb, aaabbbbbb, \cdots \}$

1. PDA starts with q_0 state and empty stack
2. First, push $ at the bottom of stack
3. When it processes a in the string. push two X in the stack
4. when it processes b in the string. pop X on the top of stack
5. If the end of the string can transition to accepted state. it means that this string belongs to this language. vice versa

b.



2) a. This language of PDA is that the set of strings which the total number of a and b is equal to the number of c

$L = \{ \varepsilon, abcc, aabccc, aabbcccc, \ldots \}$

1. PDA starts with 90 state and empty stack
2. First, push $ at the bottom of stack
3. When it processes a in the string. push one X in the stack
4. When it processes b in the string. push one X in the stack
5. When it processes c in the string. pop X on the top of the stack

6. If the end of the string can transition to accepted state. it means that this string belongs to this language. vice versa.

b.