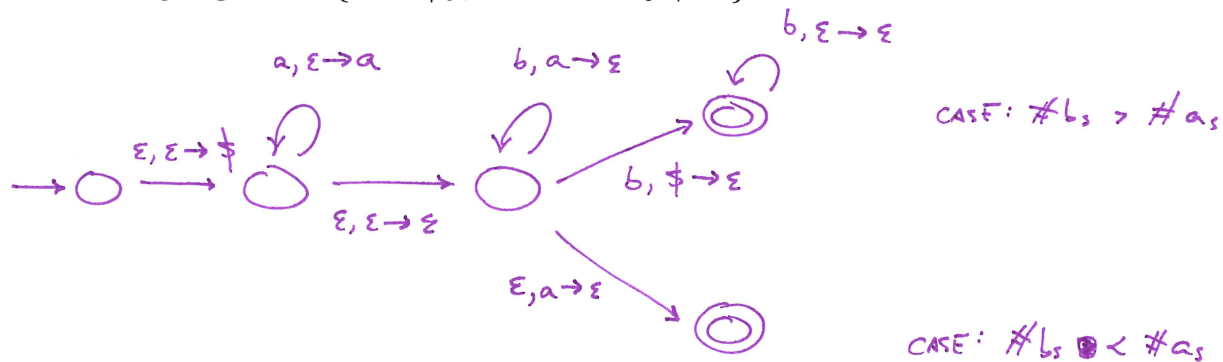


Name: Key

CS301 Q6

1. (/4 pts) Provide the state diagram of a PDA which recognizes the language $A = \{a^j b^k \mid j, k \geq 0 \text{ and } j \neq k\}$.



2. (/3 pts) Give an *informal English description* of a PDA which recognizes the language $B = \{a^r b^s a^t \mid r, s, t \geq 0 \text{ and } r + s = t\}$.

Loop over the initial substring $a^* b^*$, pushing a special symbol $\#$ onto the stack, until reaching the end of the bs. From here, loop over all remaining as, popping $\#$ off the stack each time. If stack is empty at the end, accept. If stack empties prematurely or never empties, reject.

3. (/3 pts) Convert the CFG $E \rightarrow EE \mid (E) \mid a \mid b$ to an equivalent PDA.

