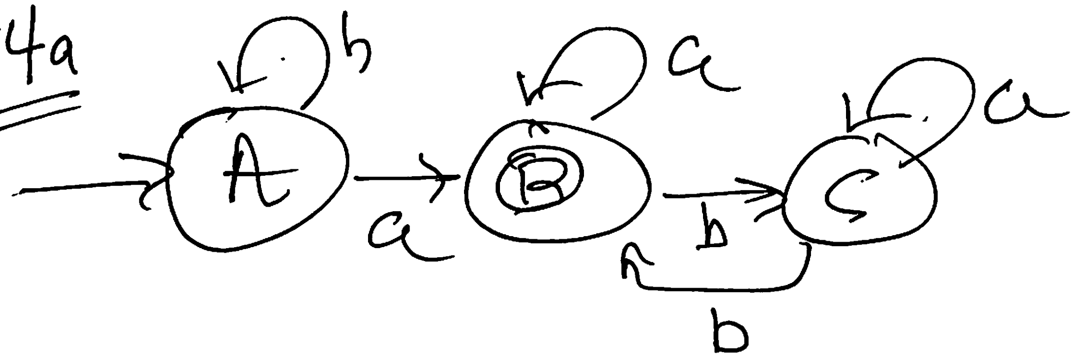
ALTERNATE EXAM #1 SAMPLE KEY (F'18)

#4a



$$A = \lambda + Ab = b^*$$

$$B = Aa + Cb + Ba$$

$$C = Bb + Ca$$

$$C = Bba^*$$

$$B = b^*a + Bba^*b + Ba$$

$$= \underline{b^*a(ba^*b+a)^*}$$

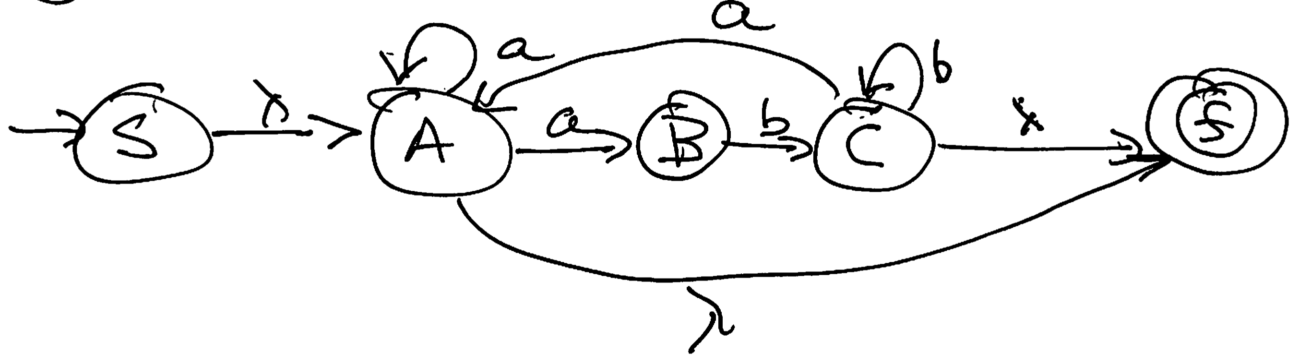
LOOK DIFFERENT THAN

$$b^*a^+(ba^*ba^*)^*$$

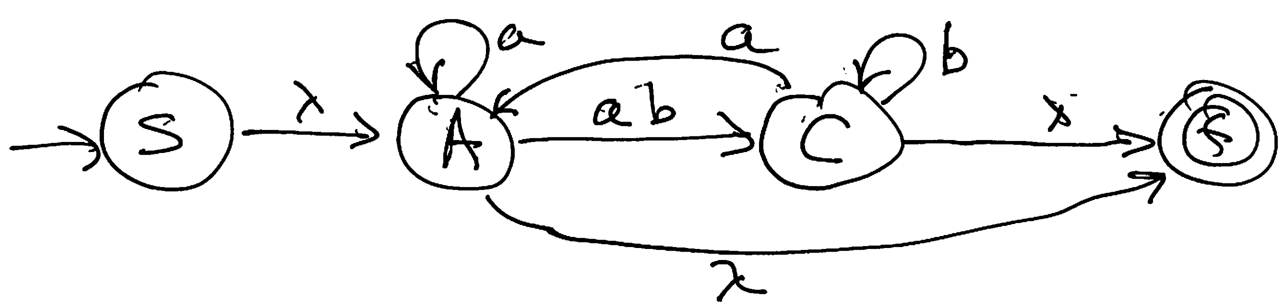
BUT CAN BE SHOWN TO DESCRIBE SAME REGULAR SET

Alternate Exam #1 SampleKey (F'18)

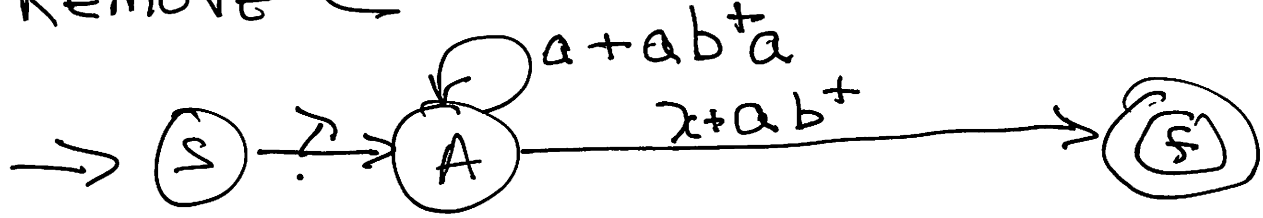
#5



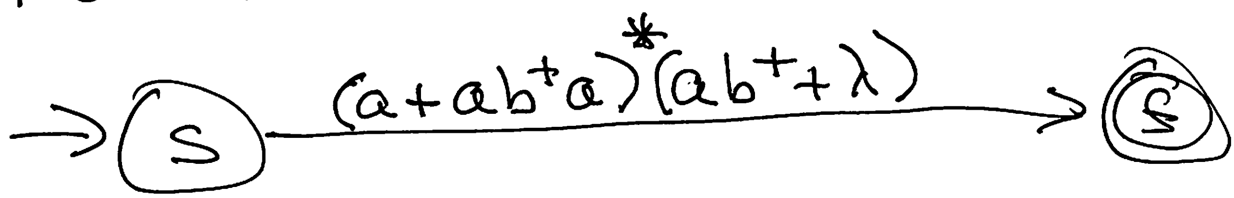
Remove B



Remove C



Remove A



Same as remove C, B, A

RECAST 8(a) IN F'18 ~~EXAM~~ #1

SHOW $L = \{a^i b^j c^k \mid k > \max(i,j),\ i,j > 0\}$
IS NOT A CFL

ME: L IS A CFL
P.L.: PROVIDE $N > 0$
ME: $a^N b^N c^{N+1} \in L$ NOTE $|a^N b^N c^{N+1}| \geq N$
P.L.: $a^N b^N c^{N+1} = uvwxy$, $|vwx| \leq N$, $|vx| > 0$
$\&\ \forall i \geq 0\ uv^iwx^iy \in L$

ME:
CASE 1: vwx CONTAINS NO C'S. AS $|vx| > 0$,
vx CONTAINS AT LEAST ONE 'a' OR AT
LEAST ONE 'b', BUT NO C'S.
LET $i = 2$, THEN uv^2wx^2y CONTAINS
EITHER MORE THAN N a's OR MORE THAN
N b's (OR MORE THAN N OF BOTH), IN
ALL CASES, ~~THE~~ $\max(\#a\text{'s}, \#b\text{'s}) \geq N$ BUT
$\#c\text{'s} = N+1$, SO $\#c\text{'s}$ DOES NOT EXCEED
MAX AND $uv^2wx^2y \notin L$ ✗

CASE 2: vx CONTAINS AT LEAST ONE c. AS
$|vwx| \leq N$, vx CANNOT CONTAIN a's.
LET $i = 0$, THEN uv^0wx^0y CONTAINS AT
MOST N c's AND EXACTLY N a's, SO
$\#c\text{'s} \leq \max(\#a\text{'s}, \#b\text{'s})$ AND $uv^0wx^0y \notin L$
✗

AS ALL CASES ~~NEED~~ TO A CONTRADICTION,
L IS NOT A CFL.