#4a

\[ A = \lambda + Ab = b^* \]
\[ B = Aa + Cb + Ba \]
\[ C = Bb + Ca \]
\[ C = Bba^* \]
\[ B = b^*a + Bba^*b + Ba \]
\[ = b^*a(ba^*b + a)^* \]

look different than
\[ b^*a^+(ba^*ba^*)^* \]

but can be shown to describe same regular set
#5

Remove B

Remove C

Remove A

SAME AS REMOVE C, B, A
Recast 8(c) in F18 Example

Show \( \exists a_i b_j c_k | k \geq \max(i,j), i,j \geq 0 \) is not a CFL.

ME: L is a CFL
PL: PROVIDE N > 0
ME: \( a \cdot b \cdot c^{n+1} \in L \) NOTE \( |a \cdot b \cdot c^{n+1}| > N \)
PL: \( a \cdot b \cdot c^{n+1} = u \cdot w \cdot x \cdot y, |u \cdot w \cdot x| \leq N, |x| > 0 \)
     \( q \cdot x > 0 \) \( u \cdot w \cdot x \cdot y \in L \)

ME:

Case 1: \( u \cdot w \cdot x \) contains no c's. As \( |x| > 0 \),
\( u \cdot w \cdot x \) contains at least one 'a' or at least one 'b', but no c's.
Let \( l = 2 \), then \( u \cdot n^2 \cdot w \cdot x^2 \cdot y \) contains
either more than \( n \) a's or more than \( n \) b's (or more than \( n \) of both), in all cases, the max \( \#a', \#b' \) > \( n \) but
\( \#c' = n+1 \), so \( \#c' \) does not exceed max and \( u \cdot n^2 \cdot w \cdot x^2 \cdot y \notin L \)

Case 2: \( u \cdot w \cdot x \) contains at least one c. As
\( |u \cdot w \cdot x| \leq N \), \( u \cdot w \cdot x \) cannot contain c's.
Let \( l = 0 \), then \( u \cdot n^0 \cdot w \cdot x^0 \cdot y \) contains at most \( n \) c's and exactly \( n \) a's, so
\( \#c' = \max(\#a', \#b') \) and \( u \cdot n^0 \cdot w \cdot x^0 \cdot y \notin L \)

As all cases need to a contradiction,
L is not a CFL.