#4a

![Diagram with nodes and edges labeled a, b, and c.]

\[ A = \lambda + A b = b^* \]
\[ B = A a + C b + B a \]
\[ C = B b + C a \]
\[ C = B b a^* \]
\[ B = b^* a + B b a^* b + B a \]
\[ = b^* a (b a^* b + a)^* \]

Look different than \( b^* a + (b a^* b a^*)^* \)

but can be shown to describe same regular set
SAME AS Remove C, B, A

Remove C

Remove A

Remove B

#5

Allocate Exam #1 Sampler (F.18)
Recast 8(c) in F/18 example

Show \( L = \{a^i b^j c^k \mid k \geq \max(i, j), i, j \geq 0 \} \) is not a CFL.

**Me:** L is a CFL.

**Pl.:** Provide \( N > 0 \).

**Me:** \( \forall n \in N, n+1 \in L \) Note \( \forall n \in N, \max(n, n+1) = n+1 \), \( \forall n \in N, |n| > 0 \) 

\( \forall i \geq 0 \) \( u^n v^x y^z \in L \) \( u^n \leq v \) \( u^n \leq y^z \)

**Me:**

**Case 1:** \( u^n v^x \) contains no c's. As \( |n| > 0 \),

\( u^n v^x \) contains at least one 'a' or at least one 'b', but no c's.

Let \( i = 2 \), then \( u^n w x^2 y \) contains either more than \( n \) a's or more than \( n \) b's (or more than \( n \) of both), in all cases, the \( \max(\#a's, \#b's) > n \) but \( \#c's = n+1 \), so \( \#c's \) does not exceed \( \max \) and \( u^n w x^2 y \in L \)

**Case 2:** \( u^n v^x \) contains at least one c. As \( |n| \leq n \), \( u^n \) cannot contain c's.

Let \( i = 0 \), then \( u^n w x^2 y \) contains at most \( n \) c's and exactly \( n \) a's, so \( \#c's \leq \max(\#a's, \#b's) \) and \( u^n w x^2 y \in L \)

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