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**AUTOMATA THEORY ASSIGNMENT 3**



S🡪aXbX

X🡪aY|bY

Y🡪X|c

**Step 1:**

No start symbol appears on the right, so we move to step 2

**Step 2:**

It has no null productions, so we move to step 3

**Step 3:**

Remove the Unit production Y🡪X

S🡪aXbX

X🡪aY|bY

Y🡪aY|bY|c

**Step 4:**

Remove productions with more than 2 variables on the right-hand side**.**

S🡪aXbX

S🡪EF

X🡪aY|bY

Y🡪aY|bY|c

E🡪ax

F🡪bx

**Step 5:**

Remove productions with one terminal and variable together.

X🡪ay X🡪by Y🡪aY Y🡪bY E🡪aX F🡪bX

S🡪EF

X🡪AY|BY

Y🡪AY|BY|c

E🡪Ax

F🡪Bx

A🡪a

B🡪b

1. a) Left most derivation

E

🡪E \* E

🡪F \* E

🡪a \* E

🡪a \* (E)

🡪a \* (E + E)

🡪a \* (F + E)

🡪a \* (aF + E)

🡪a \* (abF + E)

🡪a \* (ab + E)

🡪a \* (ab + F)

🡪a \* (ab + 1F)

🡪a \* (ab + 10F)

🡪a \* (ab + 10)

b) Parse tree