CSE331

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Section: 04

Given that,

$$a^n b^m c^k d^k e^m f^n \; ; \; n, m, k \geq 0$$

CFG:

$$P \to aPf \mid Q$$

$$Q \to bQe \mid R \qquad ; \; P \text{ is the start variable}$$

$$R \to cRd \mid \epsilon$$

Given that,

$$a^n b^m c^m d^k e^k f^n \; ; \; n \geq 0, m \geq 1, k \geq 2$$

CFG:

$$S \to aSf \mid AB$$

$$A \to bAc \mid bc \qquad ; \; S \text{ is the start variable}$$

$$B \to dBe \mid ddee$$

P->

The number of 0's is greater than the number of 1's.

Here start variable is P

$P \rightarrow 0P \mid 0 \mid 0Q \mid Q0$

$Q \rightarrow 0Q1 \mid 1Q0 \mid 01Q \mid 10Q \mid P \mid X \mid \epsilon$

$X \rightarrow 100X \mid 010X \mid 001X \mid Q$

Given that,

$$a^m b^n \; ; \; m > 2n \text{ and } m,n \geq 1$$

CFG:

$$S \rightarrow aa\,Sb \mid aS \mid a$$

Here, S is the start variable

Given that,

$$a^n b\, a^m b\, a^{n+m} \; ; \; m,n \geq 1$$

CFG:

$$A \rightarrow a\,Aa \mid P$$

$$P \rightarrow a\,Pa \mid bP \mid b$$

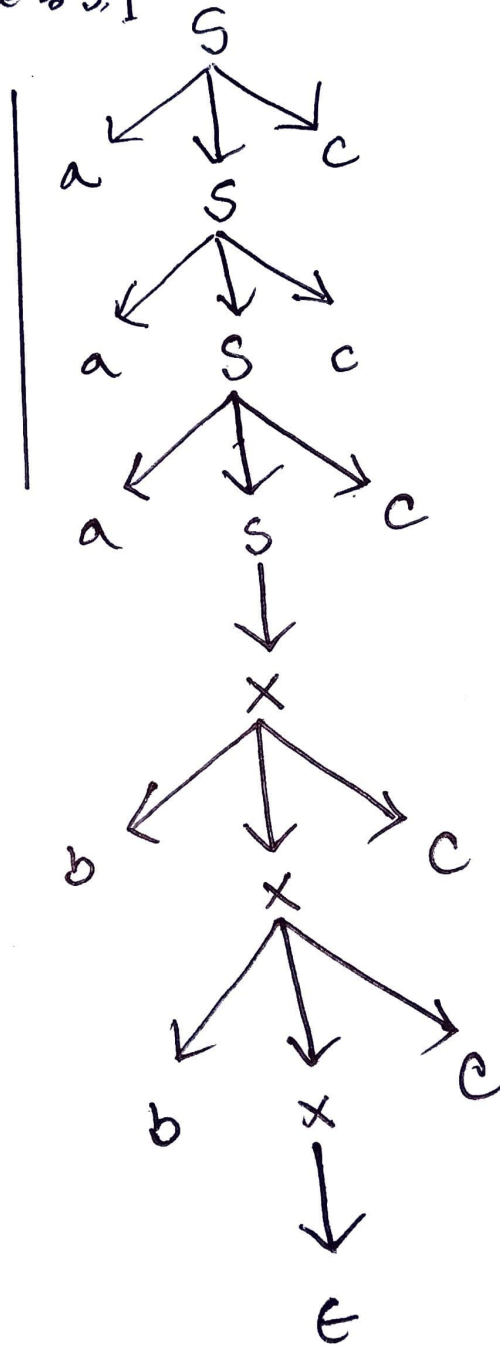Here, A is the start variable.

(a)

Left most parse tree:

[Here, start variable is S.]

$S \to aSc \mid X$

$X \to bXc \mid \epsilon$

Given String:

"aaabbccccc"

Right most Parse tree:

[Here, start variable is S]

Here,

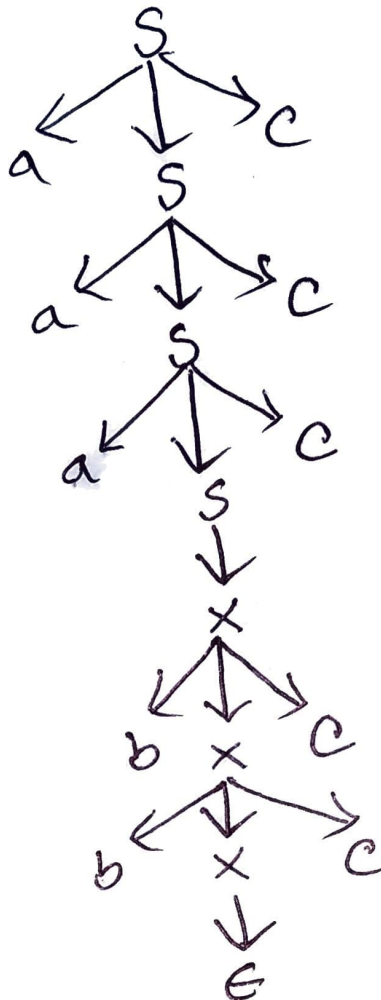S → aSC

X → bXc

Give string,

" aaabbccccc "

Given that,

$S \rightarrow XY | MN$

$X \rightarrow 0X1 | 01$

$Y \rightarrow 2Y | 2$

$M \rightarrow 0M | 0$

$N \rightarrow 1N2 | 12$

Here, the start variable is S.

@

/ Given String, "0001112"

Left Most Derivation:

S

$\Rightarrow XY$

$\Rightarrow 0X1Y$

$\Rightarrow 00X11Y$

$\Rightarrow 000111Y$

$\Rightarrow 0001112$

(b)

Given String " 0001112 "

S

$\Rightarrow xY$

$\Rightarrow X2$

$\Rightarrow 0x12$

$\Rightarrow 00x112$
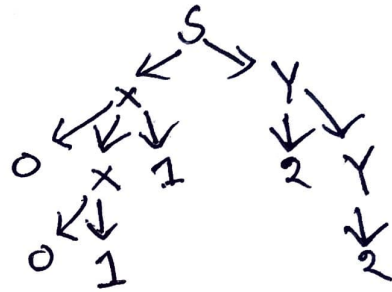
$\Rightarrow 0001112$

Let the string be:

"001122"

Now,

Left most derivation:

$$S$$
$$\Rightarrow XY$$
$$\Rightarrow 0X1Y$$
$$\Rightarrow 0011Y$$
$$\Rightarrow 00112Y$$
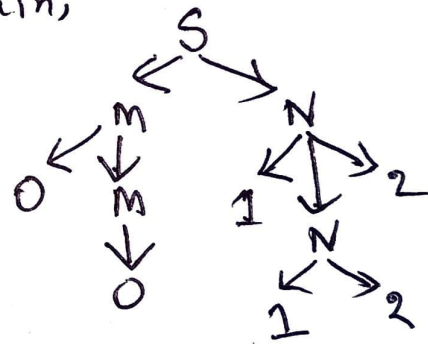$$\Rightarrow 001122$$

Again,

$$S$$
$$\Rightarrow MN$$
$$\Rightarrow 0MN$$
$$\Rightarrow 00N$$
$$\Rightarrow 001N2$$
$$\Rightarrow 001122$$

Left most Parse tree:

Again,

So, here we get more than one left most derivation and more than one left most parse tree for one string. So we say that the grammar is ambiguous.

[Showed]