lecture 20:- "CONTEXT FREE GRAMMAR"

1- Terminals. Can't be replaced.

2- Non terminals. Can be replaced.

CFG → CFL (Context free language).

CFL :- Set of all the strings of terminals that can be produced from the start using substitutions.

Ex1 :- CFL.

Terminal = {a}.

$L = \{\lambda, a, aa, \dots\} = a^*$

R1 :- S → aS.

R2 :- S → λ.

"aaa".
"aa"
"a"
"λ".

"λ"

S
λ R2.

"a"

S
aS R1.
aλ R2
a

"aa"

S
aS R1.
aaS R1.
aaλ R2.
aa

Ex2 :- Terminal = {a}.

⇒ a^*. HW.

R1 S → SS
R2 S → a
R3. S → λ.

Multiple Derivations for the same String.

S → SS R1.
→ aS R2
→ aa R3.

S → SS. R1
→ SSS. R1.
→ SaS. R2.
→ SaSS R1.
→ Saas R2
→ λaas R3.
→ λaaλ R3.
→ aa.

for a single Regex we can have multiple CFL's

CFL $(a+b)^*$.

Terminals = {a, b}.

R1 S → aS
R2 S → bS.
R3. S → λ

"λ" $S \to \lambda$ R3

"a" $S \to aS$. R1
$\to a\lambda$. R3.
$\to a$.

"ab" $S \to aS$. R1.
$\to abS$ R2.
$\to ab.\lambda$ R3.
$\to ab$.

"abbab":

CFL $(a+b)^+$

$S \to aS$
$S \to bS$
$S \to a$
$S \to b$.

$(a+b)^+ a$.

Quiz # 6 27-10-2022.

10:34am – 10:40am.

$ab(a+b)^*$.