

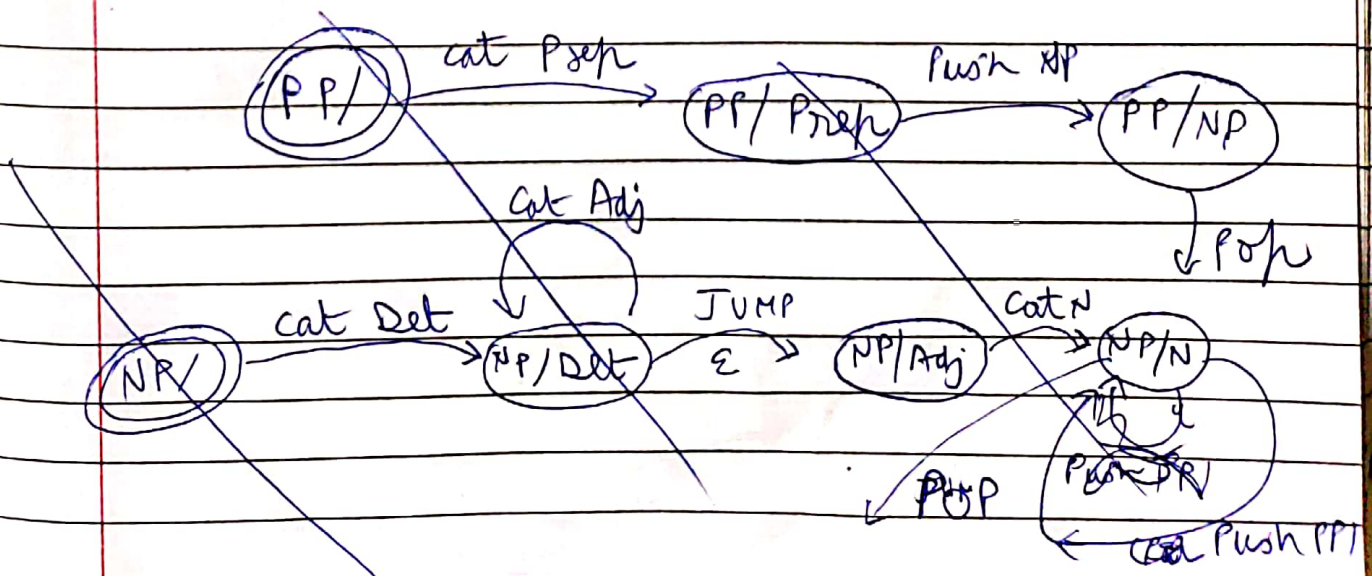
Class Test - III Natural Language Processing

Q1) For the given grammar

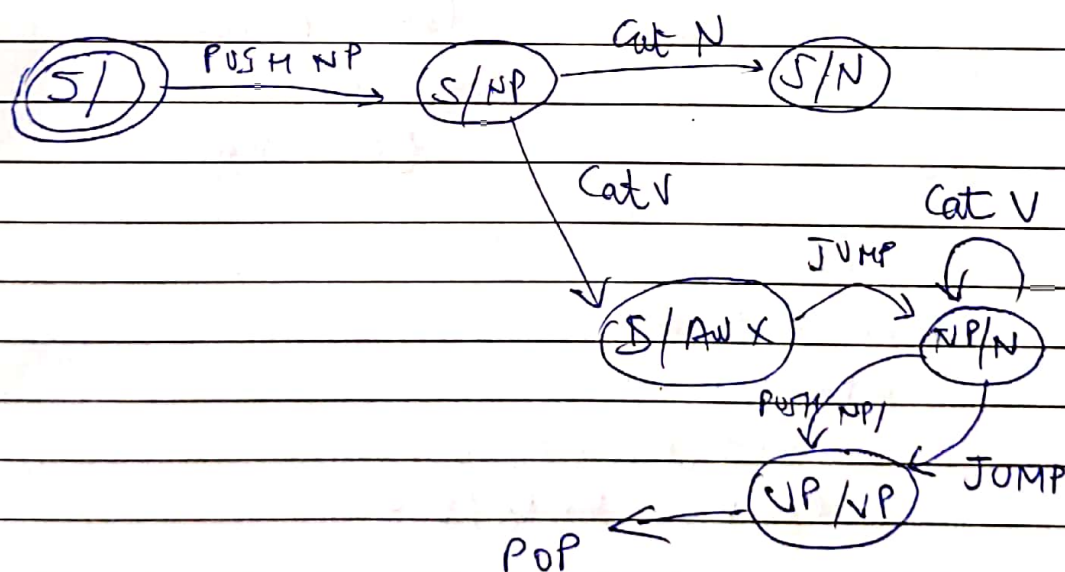
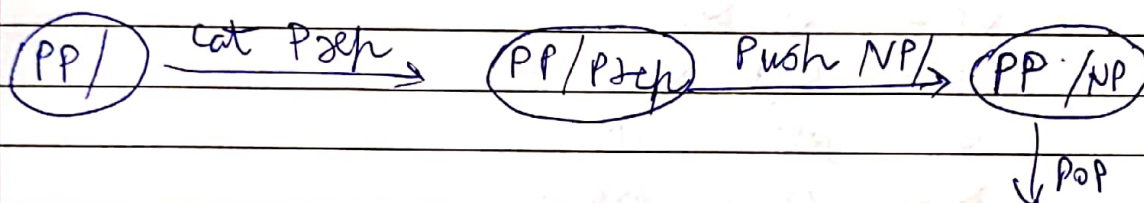
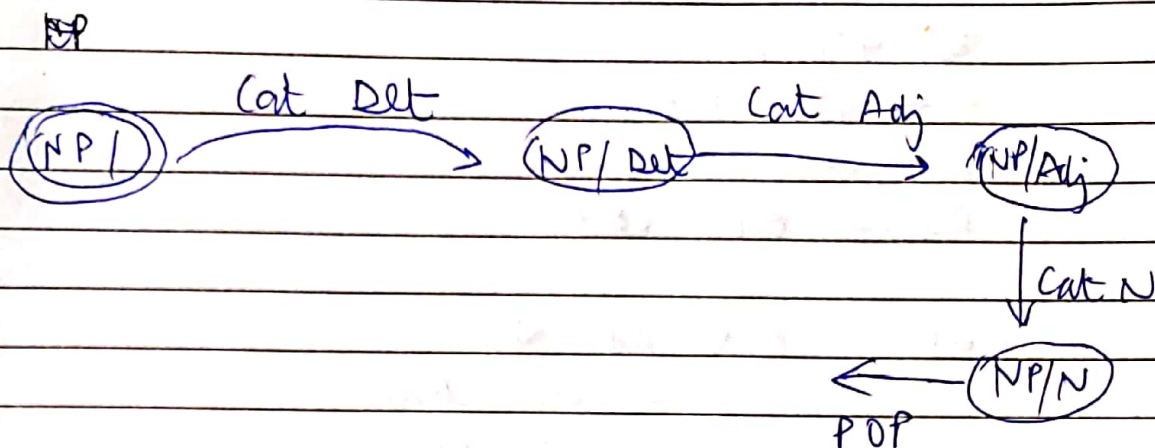
$J \rightarrow PP VP$
 $NP \rightarrow \text{Det Adj } N$
 $N \rightarrow \text{chair/ man}$
 $PP \rightarrow \text{Prep } NP$
 $VP \rightarrow V NP$
 $V \rightarrow \text{ate}$
 $NP \rightarrow \text{Det } N$
 $\text{Prep} \rightarrow \text{with/on}$
 $\text{Adj} \rightarrow \text{old}$
 $V \rightarrow \text{ate/sits}$

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 $N \rightarrow \text{chair/ man}$
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 $\text{Det} \rightarrow \text{the/ a}$
 $\text{Prep} \rightarrow \text{with/on}$

a) Construct Augmented Transition Network?



d)



b) Write augmented Grammar head Variables

$$S \rightarrow NP VP$$

Let VP whose head word is the verb v , be denoted by $VP(v)$

Let NP whose head word is the noun n , be denoted by $NP(n)$

$$\text{So, } S \rightarrow NP(n) VP(v)$$

$$NP \rightarrow \text{Det Adj Noun}$$

$$\Rightarrow NP(n) \rightarrow \text{Det}(d) \text{ Adj}(a) \text{ Noun}(n)$$

$$NP \rightarrow \text{Det } N$$

$$\Rightarrow NP(n) \rightarrow \text{Det}(d) N(n)$$

$$VP \rightarrow V NP$$

$$\Rightarrow VP(v) \rightarrow V(v) NP(n)$$

$$VP \rightarrow V$$

$$\Rightarrow VP(v) \rightarrow V(v)$$

$$PP \rightarrow \text{Prep } NP$$

$$\Rightarrow PP(p) \rightarrow \text{Prep}(p) NP(n)$$

b) N → chair / man
 Det → The / a
 V → ate / sit
 Prep → with / on
 Adj → old / ~~ate~~

NP → Det Adj N
 → old, chair
 → old, man

VP → V NP
 NP → Det N
 V → ate / sits
 N → chair / man

head words: (ate, chair)
 (old, man)
 (sits, chair)

PP → Prep NP

NP → Det N

N → chair / man
 Prep → with / on

head words: with, chair
 with, man
 on, chair
 on, man

c) Write Augmented Grammar with case agreement?

S / SBJ: Subjective
O / OBJ: Objective

$S \rightarrow NP_S VP \mid NP_O VP$

~~$NP_S \rightarrow Det_S Adj N$~~

$NP_S \rightarrow Det_S Adj N \mid Det_S N$

$NP_O \rightarrow Det_O Adj N \mid Det_O N$

$VP \rightarrow V NP_O \mid V$

$PP \rightarrow Prep NP_O \mid Prep NP_S$

$N \rightarrow \text{chair} \mid \text{man}$

$V \rightarrow \text{ate} \mid \text{sits}$

$Adj \rightarrow \text{old}$

$Det \rightarrow \text{the} \mid \text{a}$

$Prep \rightarrow \text{with} \mid \text{on}$

d) Augmented Grammar Subject vs Agreement

$S(\text{head}) \rightarrow NP(\text{Subj}, p, h) V(p, \text{head})$

$NP(c, p, \text{head}) \rightarrow \text{Det}(p, h) \text{Adj}(p, h) N(c, p, \text{head})$

$NP(c, p, \text{head}) \rightarrow \text{Det}(p, h) N(c, p, \text{head})$

$VP(p, \text{head}) \rightarrow V(p, \text{head}) NP(\text{Obj}, p, h)$

$VP(p, \text{head}) \rightarrow V(p, \text{head})$

$PP(\text{head}) \rightarrow \text{prep}(\text{head}) NP(\text{Obj}, p, \text{head})$

~~NP~~

$NP(3s) \rightarrow \text{Det } N(3s)$

$N(3s) \rightarrow \text{man} | \text{chair}$

$V(3s) \rightarrow \text{sits}$

$V(3p) \rightarrow \text{ate}$

Q37) Describe in a few lines how augmented grammar would help a modern NLP project

An ~~any~~ augmented grammar is a grammar whose productions are augmented with conditions expected/expressed using features.

When values included with the feature, the feature and safe values are bracketed of no ambiguity, feature name is omitted.

- i) Augmented grammar makes use of ruling probabilities generated in PCFG.
- ii) Augmented grammar is used to input features in logical form.
- iii) Augmented Grammar helps in identifying the head word to create a PCFG parse tree.
- iv) helps in identifying subjective or objective case agreement.
- v) Identification of word, grammar helps in augmenting to variables.
- vi) PCFG results in shorter sentences, so using Augmented grammar is better. Using Augmented Grammar results in longer

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Sentences than PCFG or CFG.

vij) In augmented grammar neighbouring words are taken into account whereas in PCFG neighbouring words are not taken into account.