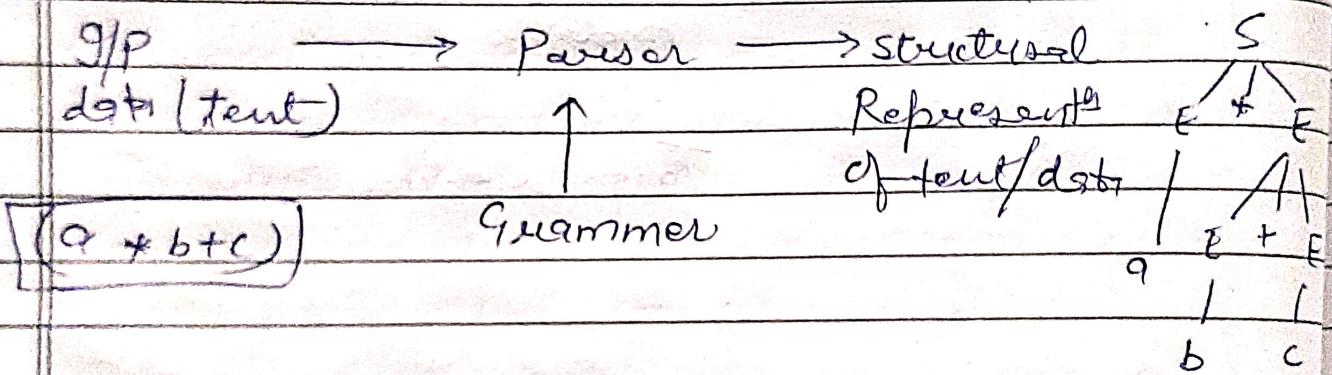


## Parser

It is a S/w component design for taking input data (text) and give structured representation of the input after checking for correct syntax or grammar.

- How it is used in NLP:
- Grammar checking
- Intermediate stage of syntactic Analysis



Parsing play an important role in many NLU systems for two reasons:

- Semantic processing must operate on sentence constituents. If there is no syntactic parsing step, then the semantic system must decide on its own constituents.
- Although, it is often possible to extract the meaning of a sentence without using grammatical facts, it is not always possible to do so.

## Concept of Grammer & Parse Tree

- Mathematically a grammar  $G$  can be written as four tuple  $(N, T, S, P)$

$N \rightarrow$  Non terminal

$T \rightarrow$  Terminal

$S \rightarrow$  Start symbol

$P \rightarrow$  Production Rule

$$\text{Eg: } S \rightarrow E$$

$$E \rightarrow E + E \mid E * E$$

In a simple grammar, we get non-terminal on right side, but in Content free Grammar (CFG) we get non-terminal <sup>also</sup> on left side.

In ~~in~~ CFG, tuple is

$$(V, \Sigma, S, P)$$

### Concept of parse tree:

- It is ~~Exams~~ Graphical Representations of Derivation  $\leftarrow$  Leftmost Derivation
- Start symbol is root of Parse tree
- leaf node are terminal
-

## Parsing in NLP

The Parsing process takes the rules of the grammar and compare them against the input sentence. Each rule that matches adds something to the complete structure that is being built for the sentence.

### ⇒ A Simple Grammar for a Fragment of English

- A sentence is composed of a noun phrase followed by a verb phrase.
- Symbols that further expand by seeds are called nonterminal symbols.
- Symbols that correspond directly to strings that must be found in an ip sentence are called terminal symbols.

$$S \rightarrow NP VP$$

I/p : Bill printed

$$NP \rightarrow \text{the } NPI$$

the file.

$$NP \rightarrow PRO$$

$$NP \rightarrow PN$$

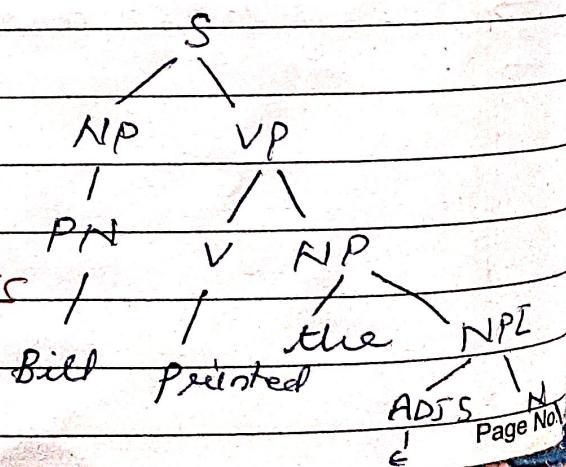
$$NP \rightarrow NPI$$

$$NPI \rightarrow ADJS N$$

$$ADJS \rightarrow \epsilon \mid ADJ \quad ADJC$$

$$VP \rightarrow V$$

$$VP \rightarrow V APP$$



N → File | painter

PN → Bill

PRO → I

ADJ → Short | long | fast

V → painted | created | want

Eg:- I/P : The little boy ran quickly.

< Sentence > → < noun phrase > < Verb Phrase >

< noun Phrase > → < adjective > < noun Phrase > |

< adjective > < singular noun >

< verb Phrase > → < singular Verb > < adverb >

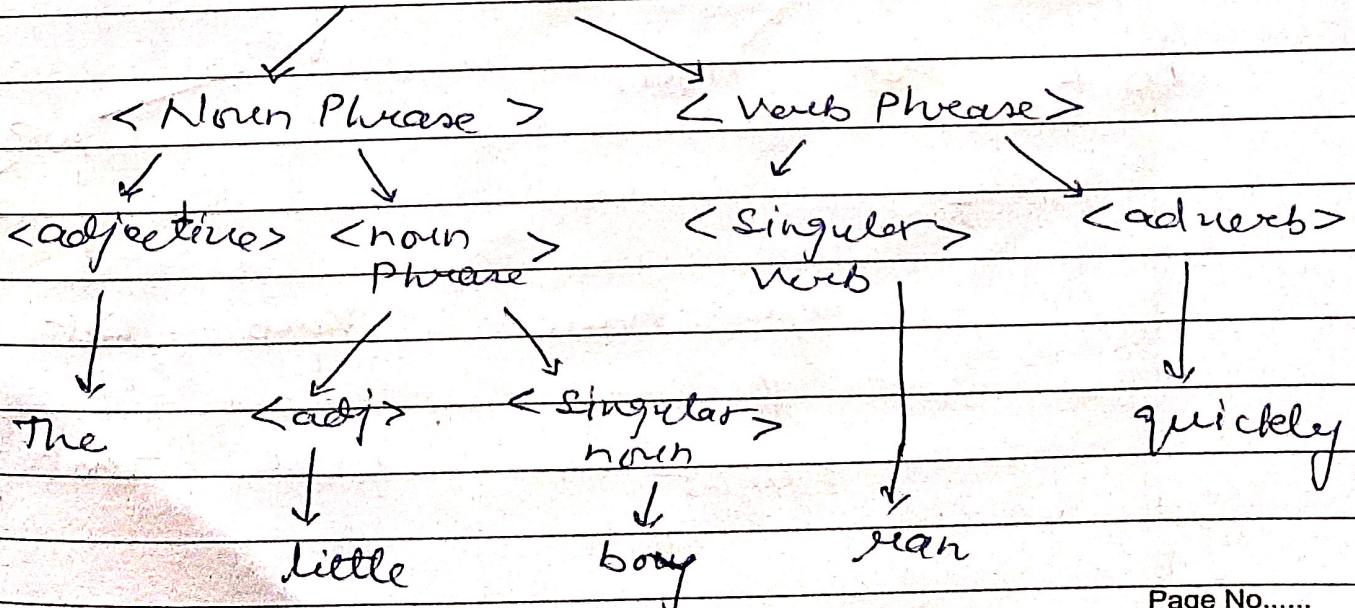
< adjective > → a / the / little

< singular noun > → boy

< singular verb > → ran

< adverb > → quickly

< Sentence >



~~Top down~~

~~Bottoms up~~

## Grammar

$S \rightarrow VP$

$VP \rightarrow Verb \ NP$

$NP \rightarrow Det \ Noun$

$Det \rightarrow that$

$Noun \rightarrow Singular \ noun$

$Verb \rightarrow Book$

$S \cdot Noun \rightarrow Flight$

i/P  $\Rightarrow$  Book that flight.

~~Top down~~

~~Bottoms up~~

