ch-14 Understanding

14.1 * What is Understanding?

↳ To understand Something is to transform it from one Representation into another, where this Second representation has been chosen to correspond to a set of available actions that could be performed & where the mapping has been designed so that for each event, an appropsiate action will be performed.

↳ If you say to an airline database system, "I need to go to New york as soon as possible," the system will have "understood" if it finds the first available plane to new york.

↳ If you say the same thing to your best friend, who knows that your family lives in New York, She will have "understood" if she realizes that there may be a problem in your family & you may need some emotional support.

✱ What Makes Understanding Hard?

↳ There are four major factors that contribute to the difficulty of an understanding Problem.

1) The Complexity of the target representation into which the matching is being done.

2) The Type of the mapping:
one-one, many-one, one-many, or many-many

3) The level of interaction of the components of the source representation.

4) The Presence of noise in the input to the understander

↳ ① Complexity of the Target Representation:-

↳ Suppose English sentences are being used for communication with a keyword-based data retrieval System.

Eₓ→ Sentence:
"I want to read all about the last Presidential election."

↳ This is translated into representation such as.

"(SEARCH KEYWORDS = ELECTION & PRESIDENT)"

↳ for all o/p.

↳ Ex. Consider the following story as input.
"Bill told Mary he would not go to the movies with her. Her feeling were hurt."

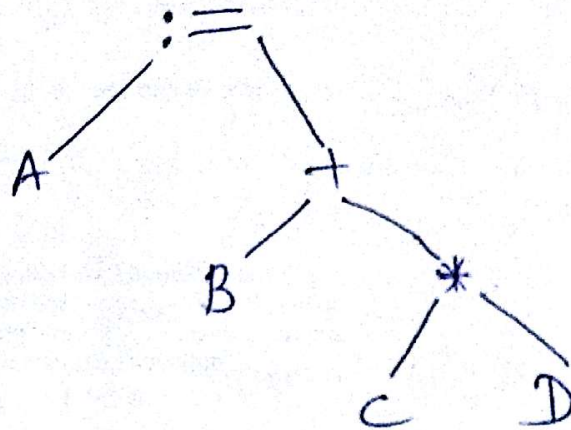↳ This representation is more complex.

② Type of Mapping :-

- One to one ⟶ Simplest ⟶ Arithmetic Expressions.
- One to many
- Many to one
- many to many

↳ Arithmetic Expression :- $A := B + C * D$ ✓

One to one
- Simplest to perform

$:=$

A

B

+

*

C   D

↳ Many to one
or (Speech Signal)

① Tell me all about the
last Presidential   ⟶
election

② I'd like to see all
the stories on the   ⟶
last presidential election

③ I am interested in
the last presidential ⟶
election

(Search Keywords =

ELECTION &

PRESIDENT)

↳ **One to Many**

They are flying planes.

→ (They are (flying airplanes))

→ (They (are flying) airplanes)

→ (They are (flying planning tools))

→ (They (are flying) planning tools)
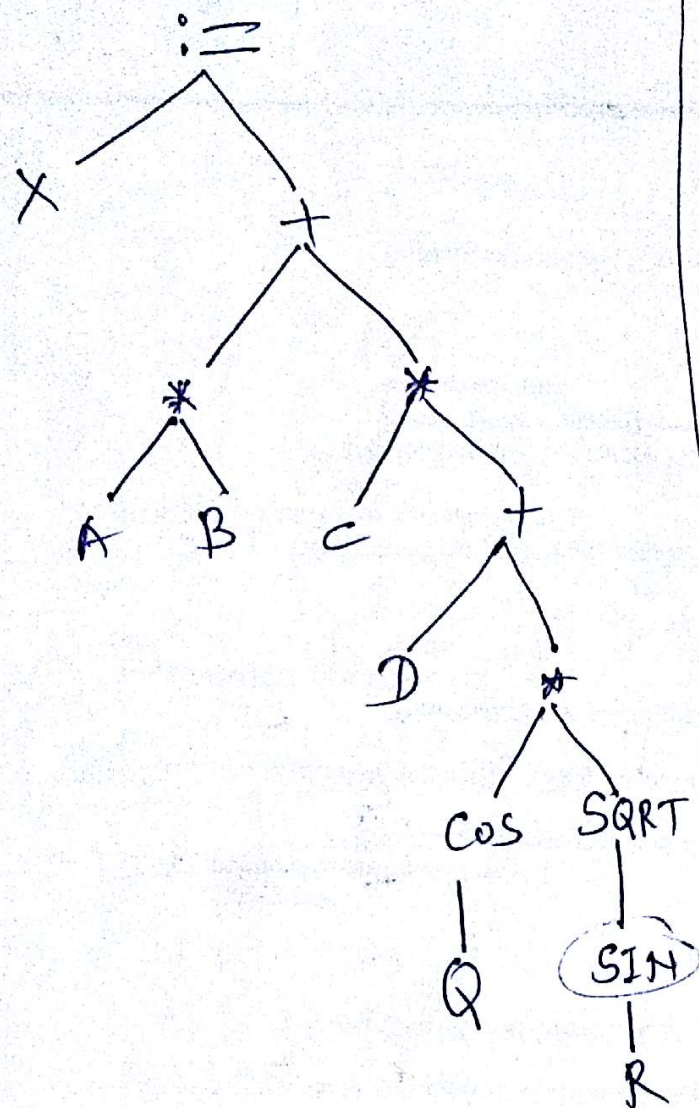
→ **Many to Many**

↳ There are many ways to say the Same thing and a given statement may have many meanings.
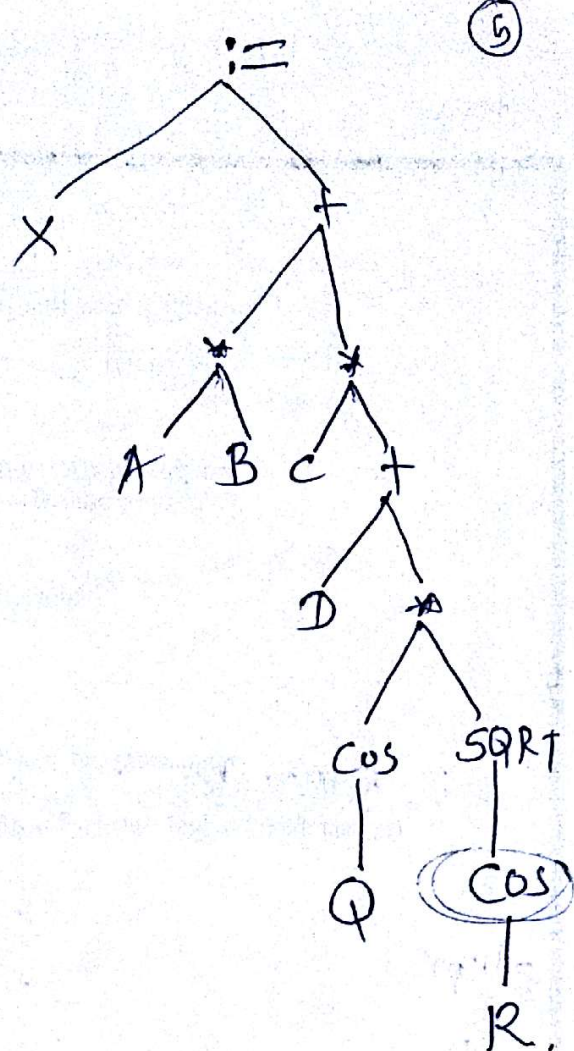
③ **Level of Interaction among Components**

↳ Each input is Composed of several Components (lines, words, Symbols, or whatever).

↳ Mapping process is Simplest if each Component Can be mapped without Concern for the other Components of the statement.

↳ fig.1 - Very little interaction among Components Can, In fig. Shows how Changing One word of a statement requires only a single change in parse tree

$$X := A * B + C * (D + Cos(Q) * SQRT(SIN(R)))$$

$$X := A * B + C * (D + Cos(Q) * SQRT(COS(R)))$$

fig-1 [Little Interaction among Components.]

↳ One Chance

S

Noun Phrase NP

Verb Phrase VP

John

V

NP

Prepositional Phrase PP

Determiner DEN

N

PP

Saw

With a telescope

1st possibility

the

boy

in the Park

[John Saw the boy in the Park with a telescope]

S

NP

VP

John

V

NP

DET

N

PP

PP

Saw

the

boy

in the Park

with a dog

2nd possibility

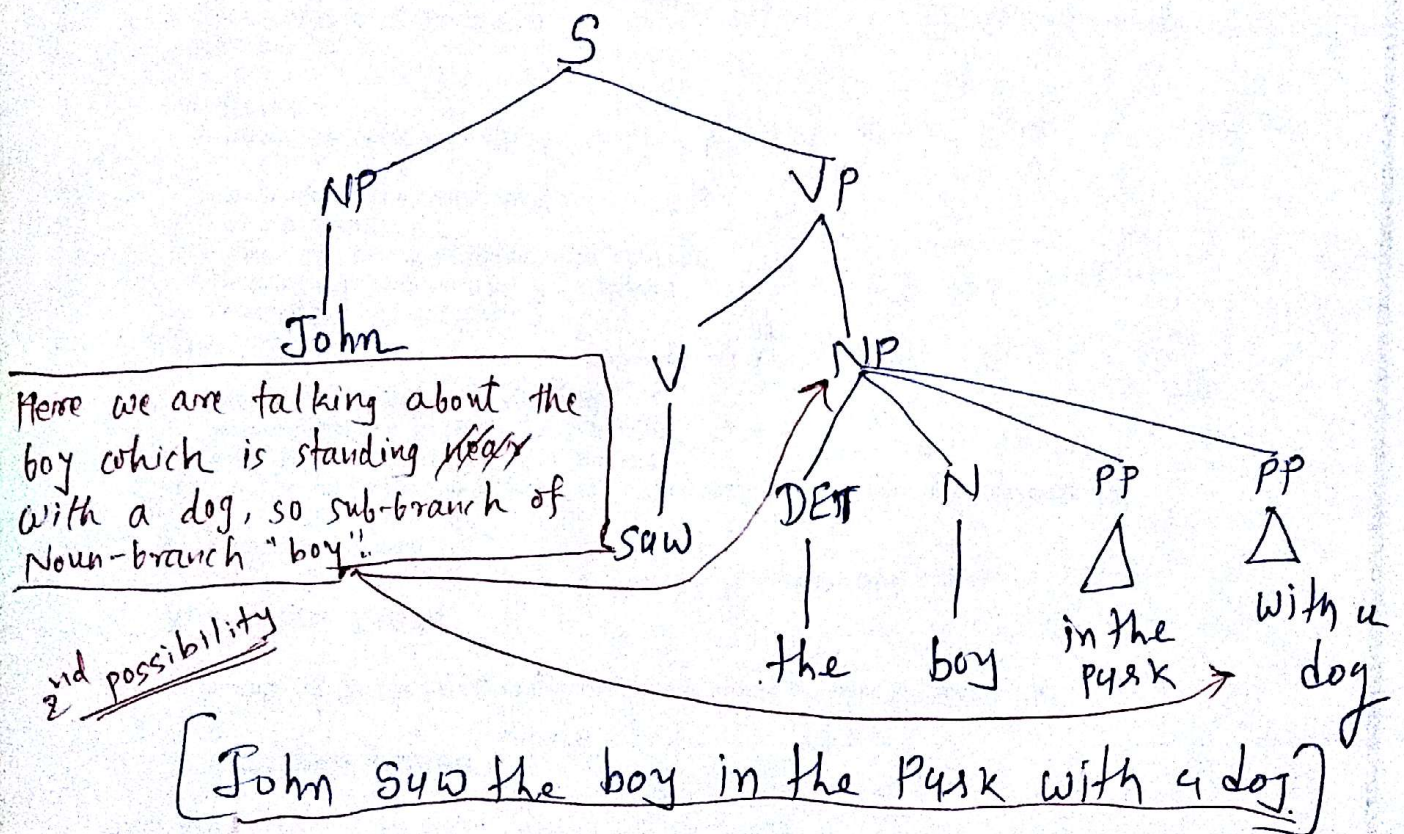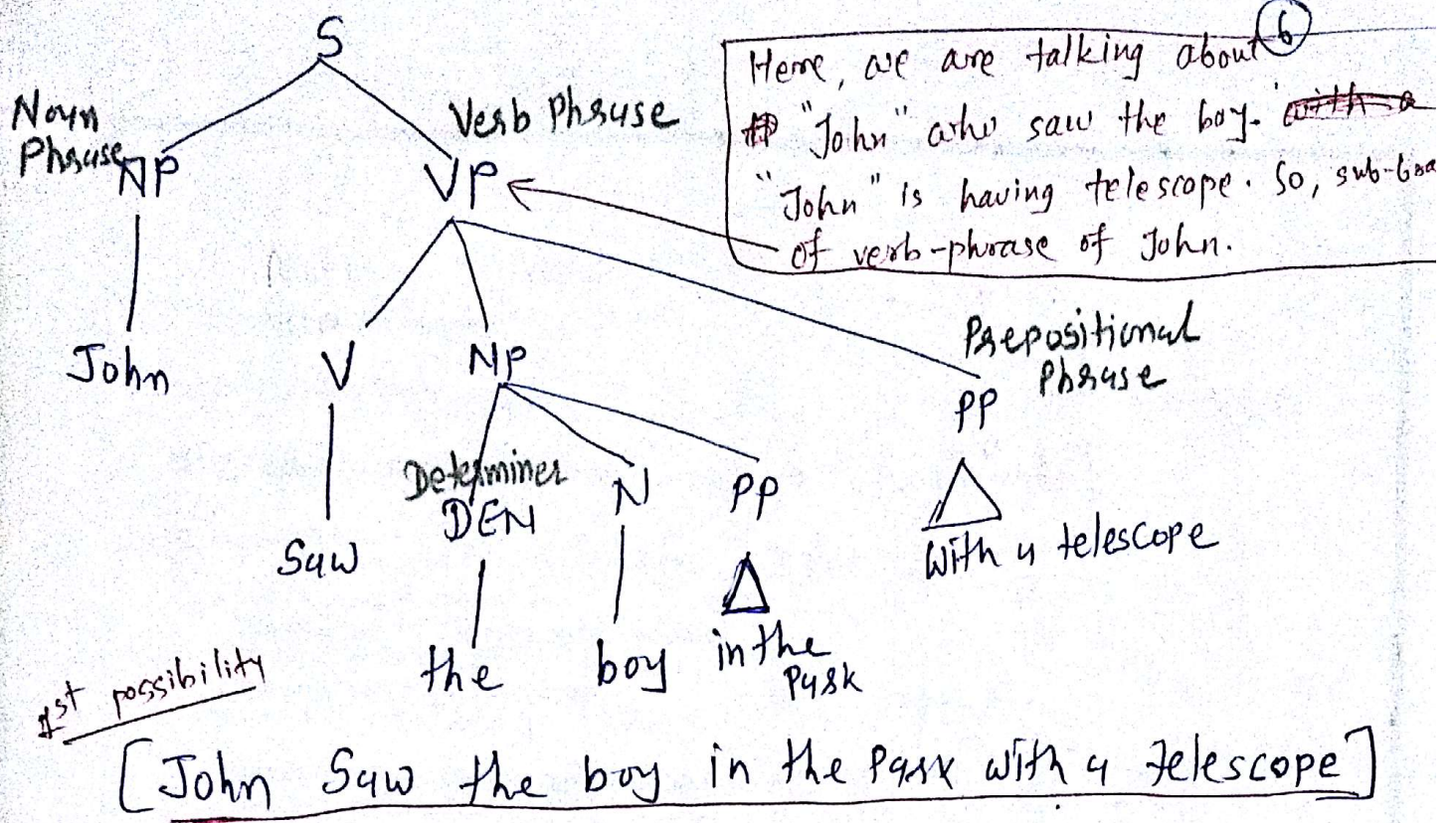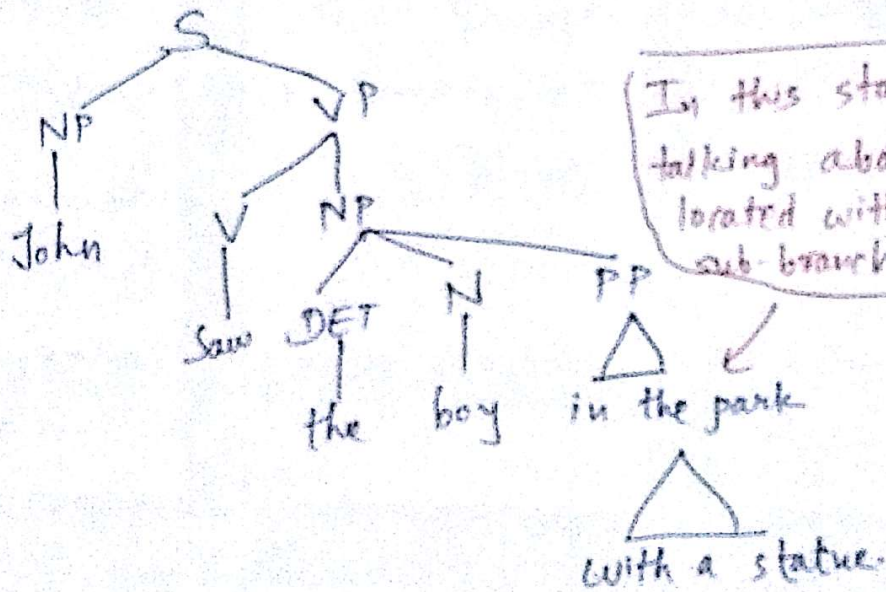[John Saw the boy in the Park with a dog.]

fig. 2 More interacting among Components.

↳ one change in Sentence & many ~~chang~~ changes in tree.

3rd possibility in "level of interaction among components" of "John"
example:-

Statement:- John saw the boy in the park with a statue

In this statement, we are talking about park which is located with a statue, so sub-branch of park.

with a statue.

④ <u>Noise in the Input</u> :-
⤷ Presence of noise in the input to
the understander.

→ Understanding is the process of interpreting
an input & assigning it meaning.
⤷ Noise in speech understanding
⤷ Image
⤷ ~~We but see~~

→ we Barely have the opportunity to listen
to each other against a background of silence.