

What is parser ? Write the role of parser. What are the most popular parsing techniques ? OR Explain about basic parsing techniques. What is top-down parsing ? Explain in detail.

## What is Parsing?

Parsing is like analyzing the structure of a sentence in a language. When you read a sentence, you understand it by breaking it down into subject, verb, object, etc. Similarly, in computing, parsing is understanding the structure of code or text according to some rules or grammar.

## Role of Parser:

1. **Check Syntax:** It checks if the code follows the rules of the language's grammar. Just like in language, a sentence must follow grammar rules to be meaningful, in programming, code must follow syntax rules.
2. **Error Reporting and Recovery:** If there's a mistake in the code, the parser identifies it and tries to suggest where the mistake might be. It can help programmers understand and fix errors.
3. **Construct Parse Tree:** After checking the syntax, the parser builds a tree-like structure called a parse tree. This tree represents the syntactic structure of the code, which is used in later stages of compilation or interpretation.

## Parsing Techniques:

### 1. Top-down Parsing:

What is it?

- Imagine you're trying to understand a sentence by breaking it down starting from the beginning.

How does it work?

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- It starts from the highest level of the grammar (like the start symbol) and tries to match the input by expanding the rules of the grammar.
- As it reads the input from left to right, it builds the parse tree top to bottom, hence the name.

In simple terms:

- It's like understanding a complex sentence by breaking it down from the main idea into smaller parts.

## 2. Bottom-up Parsing:

What is it?

- Here, you start from the smallest parts and combine them to form larger structures.

How does it work?

- It tries to find the rightmost derivation of the input string by reversing the process.
- It matches small pieces of the input to the right side of grammar rules and combines them until it reaches the start symbol.

In simple terms:

- It's like solving a puzzle by starting with the pieces and gradually assembling them into the whole picture.

Both techniques have their advantages and are used in different scenarios depending on the

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complexity of the language and the efficiency needed.

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structure of symbol table ?