



BAHIR DAR UNIVERSITY

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Principles of Compiler Design

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ASSIGNMENT 2

What is Backtracking in Parsing?

Backtracking in parsing is a technique used by a parser where it tries one possible grammar rule, and if it fails, the parser goes back (backtracks) to an earlier point and tries another rule.

1. A parser reads the input **from left to right**.
2. When multiple grammar rules are possible, the parser **chooses one rule**.
3. If the chosen rule **does not match** the input later:
 - The parser **returns to the previous position**
 - Tries a **different rule**
4. This process continues until:
 - The input is successfully parsed, or
 - All possibilities fail

Where Backtracking is Used

- Top-down parsers (like recursive descent parsers)
- LL parsers without lookahead
- Parsers for ambiguous grammars

Advantages

- Simple to understand and implement
- Can handle some ambiguous grammars

Disadvantages

- Inefficient and slow
- May try many possibilities
- Can cause exponential time complexity