

CS411-Compiler Construction



- **A Quick Review of Lexical Analysis**
- **Syntax Analysis - Introduction**



Course Learning Objectives

CLO2 □ PLO1

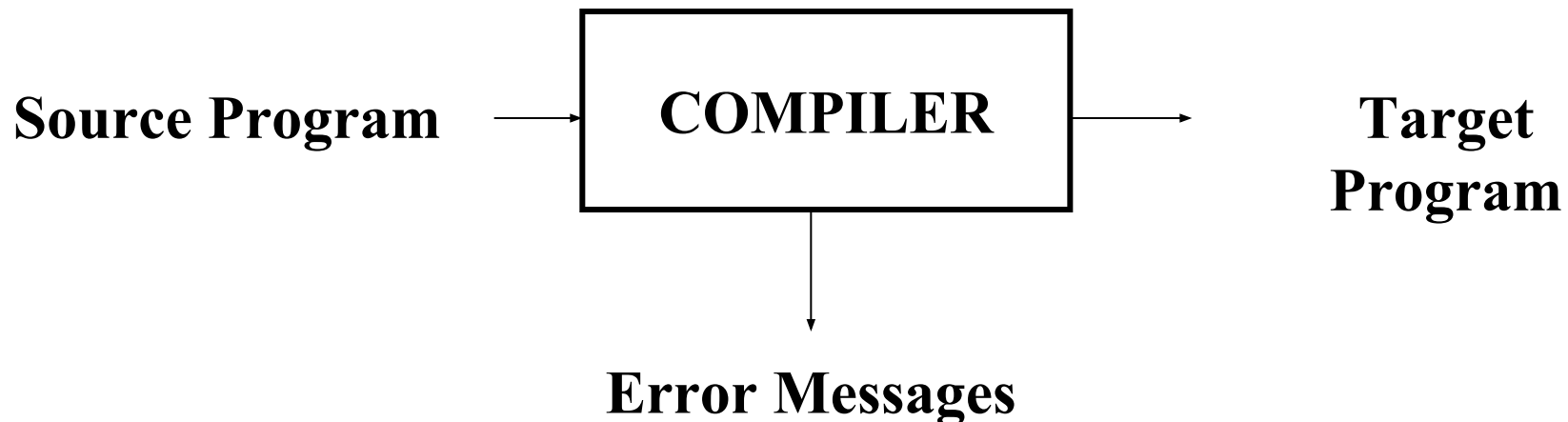
(Cognitive Domain, Domain Level: 2 Understand)

- CLO2: Understand the working principles of various phases of a compiler and how they are integrated to produce a working compiler
- PLO1 (Engineering Knowledge): An ability to apply knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems

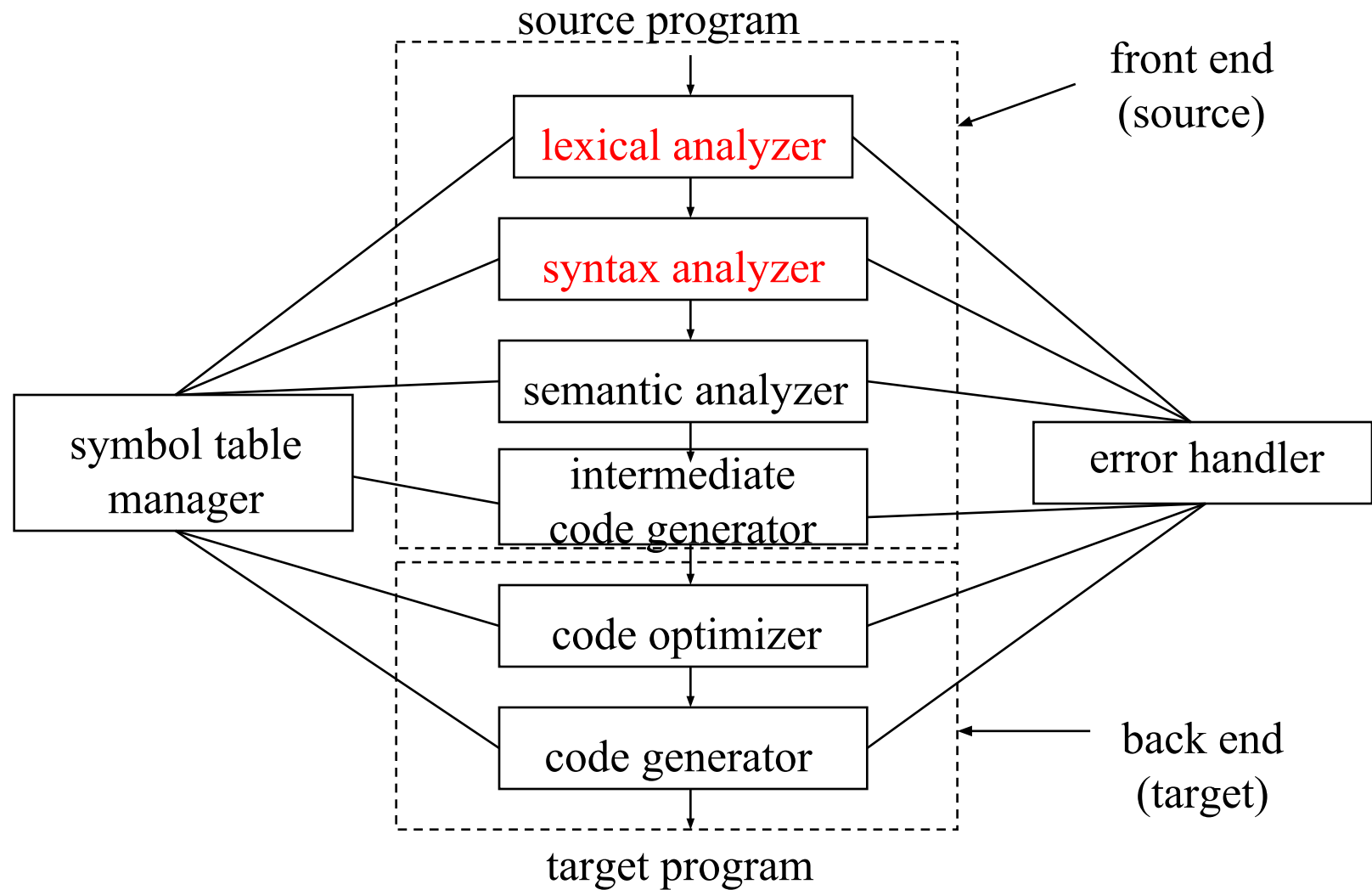


Quick Review 1/3 - What is a Compiler?

A compiler is a program that takes a program written in a **source language (usually a High Level Programming Language)** and translates it into an equivalent program in a **target language (usually an Intermediate Code, Machine Code or Relocatable Object File).**



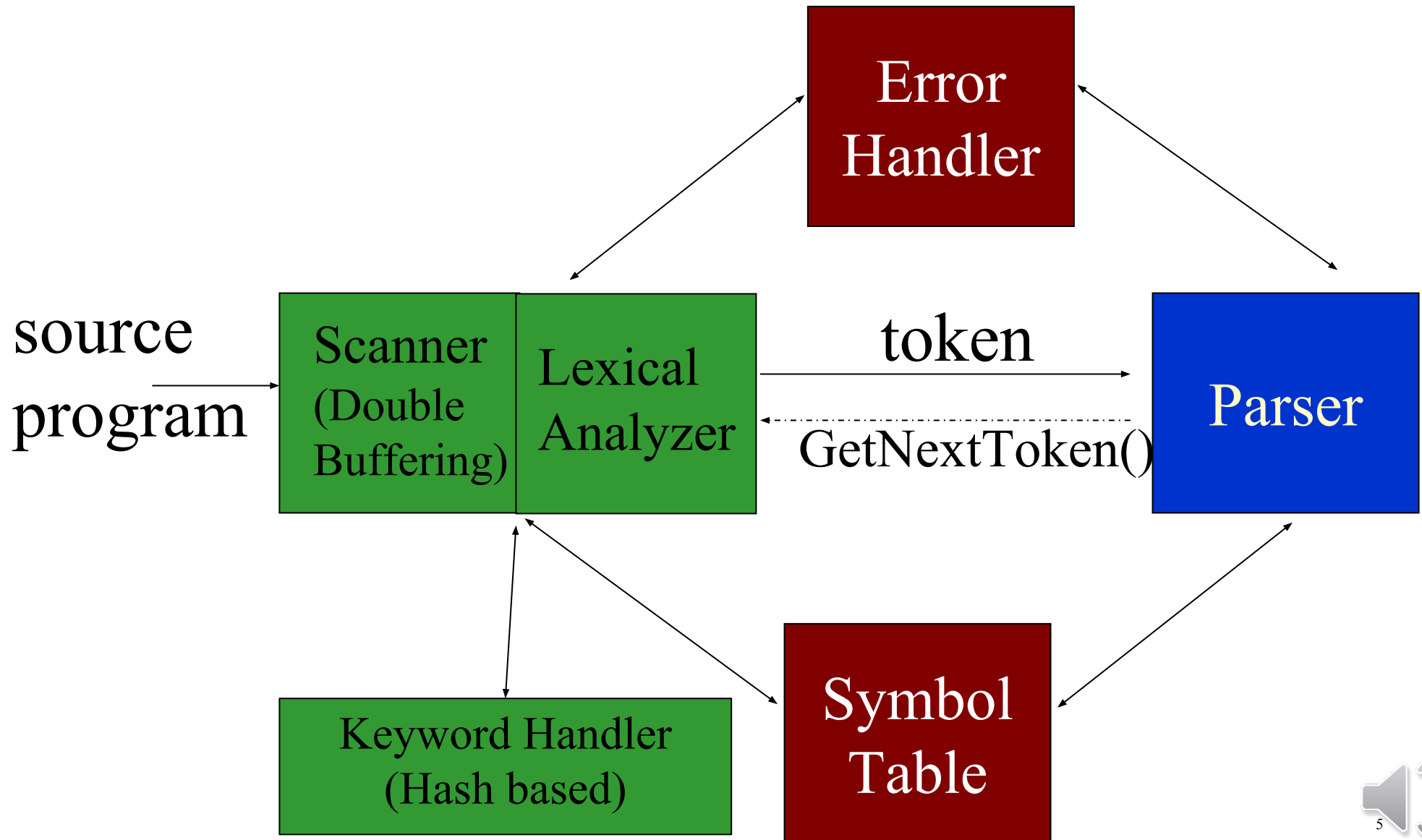
Quick Review 2/3 - Phases of Compilation



Each phase transforms the source program from one representation into another representation.



Quick Review 3/3 - Lexical Analyzer



What is Parsing?

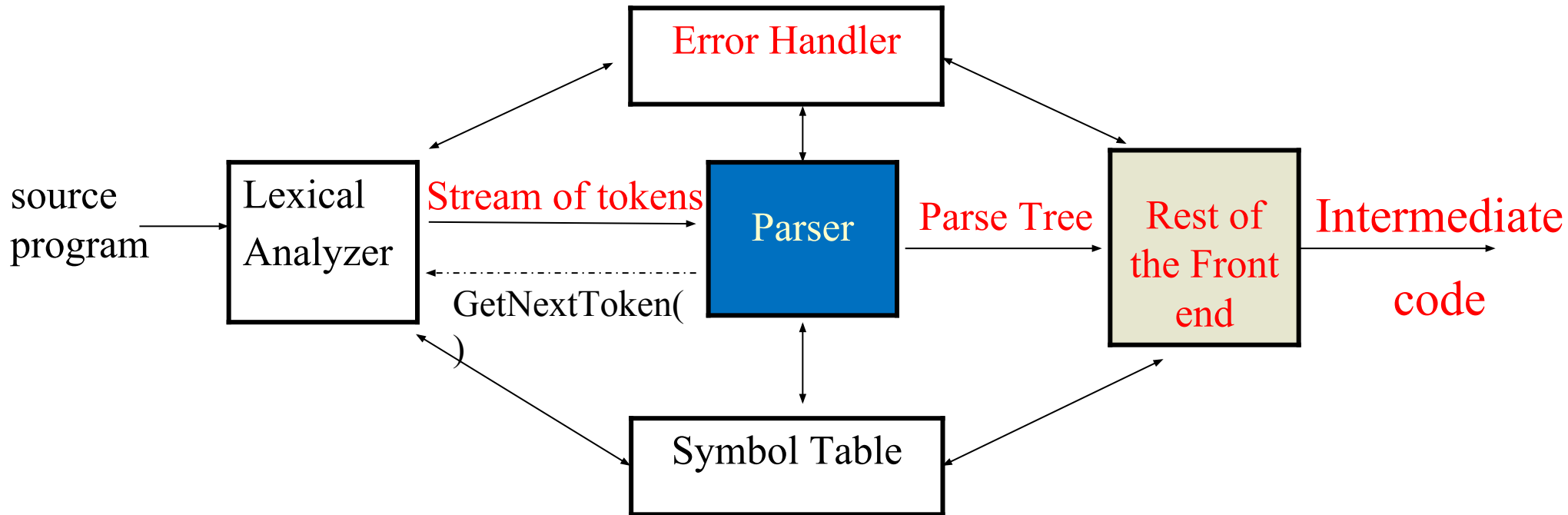
Parsing, syntax analysis, or syntactic analysis is the process of **analyzing a string of symbols**, either in natural language, **computer languages** or data structures, conforming to the **rules** of a formal **grammar**.

(Definition from Wikipedia)



Context of Parser

- **Input:** a stream of tokens.
- **Output:** Generates a Parse Tree
- **Purpose:** To check validity of a statement, otherwise generates error



Role of the Parser

- To determine if the **string of tokens** provided by the lexical analyzer is a **valid** string in the language
- To report **syntax errors**
- To **recover** from errors (if possible)
so that all syntactical errors can be **reported at once**.



Parser

- Parser generates the **syntactic structure** of the given source program.
- This syntactic structure is mostly a **parse tree**.
- The syntax of a programming language is typically described by a **context-free grammar** (CFG).



CFG for Parser

- A context-free grammar (CFG)
 - gives a precise syntactic specification of a programming language.
 - the design of the grammar is an initial phase of the design of a compiler.
 - a grammar can be directly converted into a parser manually or by using some tools.

