The analysis and synthesis phases of a compiler are:

Analysis Phase

Breaks the source program into constituent pieces and creates intermediate representation.

The analysis part can be divided along the following phases:

1. Lexical Analysis

The program is considered as a unique sequence of characters. The Lexical Analyzer reads the program from left-to-right and sequence of characters is grouped into tokens–lexical units with a collective meaning.

2. Syntax Analysis

The Syntactic Analysis is also called Parsing. Tokens are grouped into grammatical phrases represented by a Parse Tree, which gives a hierarchical structure to the source program.

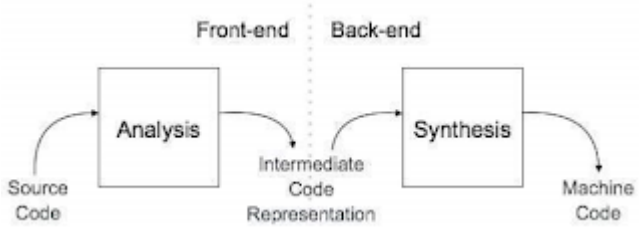
3. Semantic Analysis

The Semantic Analysis phase checks the program for semantic errors (Type Checking) and gathers type information for the successive phases. Type Checking check types of operands; No real number as index of array etc

Synthesis Phase

Generates the target program from the intermediate representation.

The synthesis part can be divided along the following phases:



Intermediate Code Generator

An intermediate code is generated as a program for an abstract machine. The intermediate code should be easy to translate into the target program.

Code Optimizer

This phase attempts to improve the intermediate code so that faster-running machine code can be obtained. Different compilers adopt different optimization techniques.

Code Generator

This phase generates the target code consisting of assembly code.

Here,

- Memory locations are selected for each variable
- Instructions are translated into a sequence of assembly instructions
- Variables and intermediate results are assigned to memory registers.

Analysis synthesis model of compilation