Faculty of Science
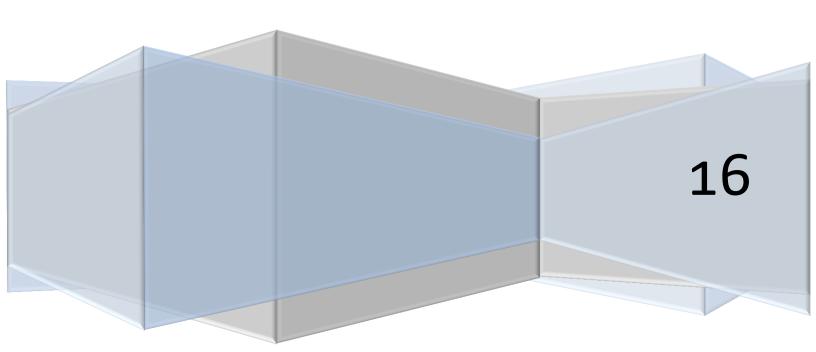
Compiler

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1. What is compiler?

Is a software to take source code of specific programming language and execute a number of tasks on it to produce machine language in the format of executable file.

2. What are the phases of compiler?

1. **Lexical Analysis:** This phase scans the source code as a stream of characters and converts it into meaningful lexemes "token".

2. **Syntax Analysis:** It takes the token produced by lexical analysis as input and generates a parse tree.

3. **Semantic Analysis:** In This phase checks whether the parse tree constructed follows the rules of language.

4. **Code Optimization:** Optimization can be assumed as something that removes unnecessary code lines, and arranges the sequence of statements in order to speed up the program execution without wasting resources (CPU, memory).

5. **Code Generation:** The code generator translates the intermediate code into a sequence of (generally) re-locatable machine code. Sequence of instructions of machine code performs the task as the intermediate code would do.

3. What is the difference between compiler and interrupter?

Interpreter	Compiler
Translates program one statement at a time.	Scans the entire program and translates it as a whole into machine code.
It takes less amount of time to analyze the source code but the overall execution time is slower.	It takes large amount of time to analyze the source code but the overall execution time is comparatively faster.
No intermediate object code is generated, hence are memory efficient.	Generates intermediate object code which further requires linking, hence requires more memory.
Continues translating the program until the first error is met, in which case it stops. Hence debugging is easy.	It generates the error message only after scanning the whole program. Hence debugging is comparatively hard.
Programming language like Python, Ruby use interpreters.	Programming language like C, C++ use compilers.

4. What is the difference of compiling and execution?

Executing	Compiler
Uses users inputs to execute a certain task	Uses a source to be converted to machine language.
The output should be a results based on user input or logic error.	The output may be syntax or logic error if the code is not right.