

Answer as much as you can:

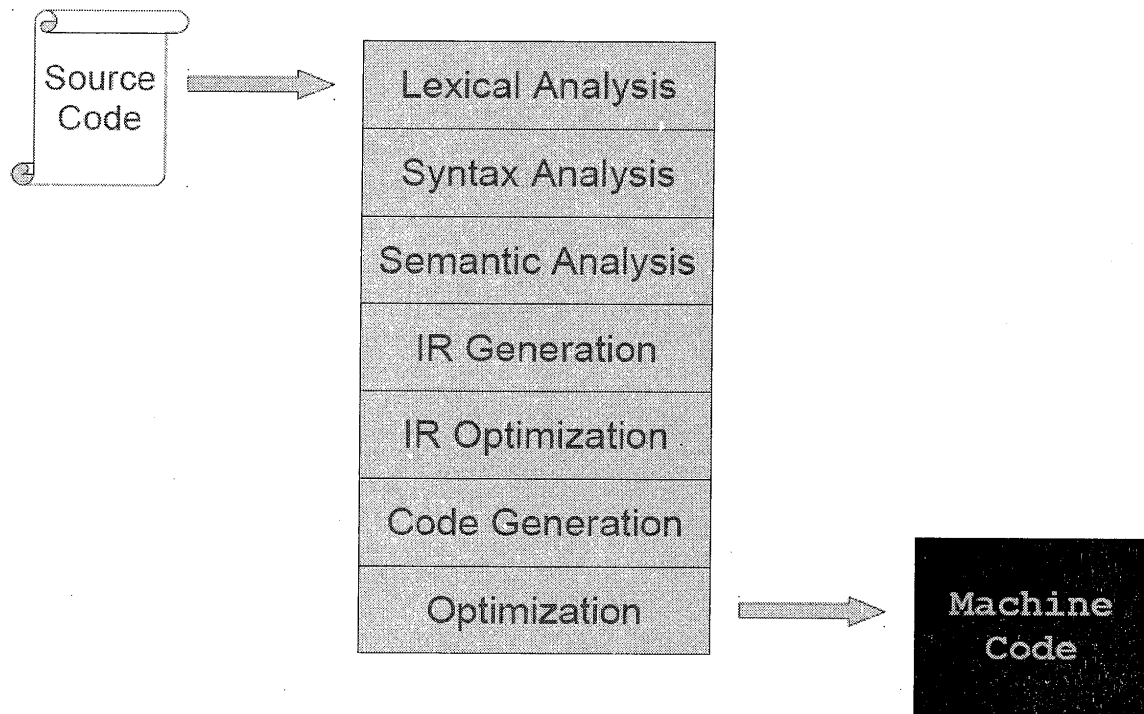
Question [1]: (35 marks) [ILOs: a1,a3,a4,b1,b3,c1,c3]

a) What is a compiler?

Compiler is a program that *translates* a program in one language to another language:
[Compilers: Translate a source (human-writable) program to an executable (machine-readable) program]

State the compiler phases (Explain by diagram.)

The Structure of a Modern Compiler



b) What are the different kinds of errors encountered during compilation?

- 1) Lexical errors
- 2) Syntax errors
- 3) Semantic errors
- 4) Logical errors

c) What are the major stages in compilation?

- 1) Lexical analysis,
- 2) Syntax analysis,
- 3) Semantic analysis,
- 4) Code generation



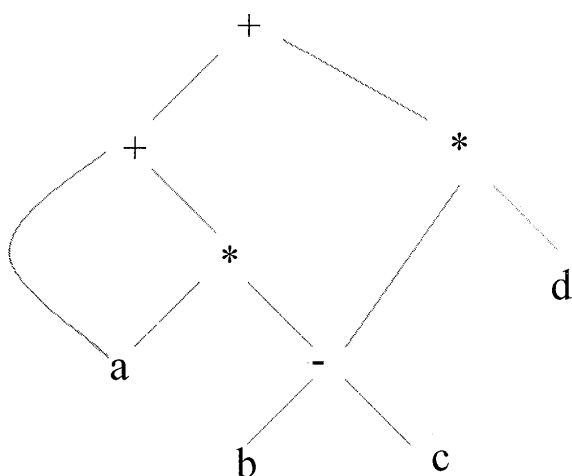
d) Define the following: Basic blocks and flow graphs.

- Partition the intermediate code into basic blocks
 - The flow of control can only enter the basic block through the first instruction in the block. That is, there are no jumps into the middle of the block.
 - Control will leave the block without halting or branching, except possibly at the last instruction in the block.
- The basic blocks become the nodes of a flow graph

e) What is happen when applying the three address code on the following expression:

$$\text{Exp} = (a+a*(b-c))+d*(b-c)$$

In a three address code there is at most one operator at the right side of an instruction



- t1 = b - c
- t2 = a * t1
- t3 = a + t2
- t4 = t1 * d
- t5 = t3 + t4

$$\text{Exp} = (a+a*(b-c))+d*(b-c)$$

Question [2]: (30 marks) [ILOs: a1,a3,a4,b1,b3,c1,c3]

Write True (T) or False (F) for the following:

- 1) Parsers do not parse the whole code if some errors exist in the program. (F)
- 2) Semantic analysis is the second phase of a compiler. (F)
- 3) The semantic analyzer breaks these syntaxes into a series of tokens, by removing any whitespace or comments in the source code. (F)
- 4) A lexical analyzer reads the source code line by line. (F)
- 5) Lexemes are said to be a sequence of characters alphanumeric in a token. (T)
- 6) There are some predefined rules for every lexeme to be identified as a valid token. (T)
- 7) CFG is a helpful tool in describing the syntax of programming languages. (T)
- 8) The lexical analyzer works closely with the syntax analyzer. (T)
- 9) If the lexical analyzer finds a token invalid, it generates an error. (T)
- 10) Semantic analyzer keeps track of identifiers, their types and expressions. (T)
- 11) Lexical Analyzer is used for grouping up of characters into token. (T)
- 12) Compiler can convert source code into executable file. (T)



- 13) In Short, Syntax Analysis Generates Parse Tree. (T)
14) Last phase of compiler is semantic analyzer. (F)
15) Syntax analyzer checks whether the parse tree constructed follows the rules of language. (F)

Question [3]: (25 marks) [ILOs: a1,a3,a4,b1,b3,c1,c3]

Select the suitable answer from the following

- 1) Lexemes can be referred to as:
a) elements of lexicography
b) sequence of alphanumeric characters in a token
c) lexical errors
d) none of the mentioned
- 2) If the lexical analyser finds a lexeme with the same name as that of a reserved word, it
a) overwrites the word
b) overwrites the functionality
c) generates an error
d) something else
- 3) The output of the lexical and syntax analyzer can stated as:
a) parse stream, parse tree
b) token tree, parse tree
c) token stream, parse tree
d) all of the mentioned
- 4) Which phase of compiler includes Lexical Analysis?
a) 1
b) 2
c) 3
d) Its primary function, not in any phase
- 5) Which of the following characters are ignored while lexical analysis?
a) .
b) =
c) #
d) WhiteSpace
- 6) The action of parsing the source code into proper syntactic classes is known as:
a) Parsing
b) Interpretation analysis
c) Lexicography
d) Lexical Analysis
- 7) Which of the following is the task of lexical analysis?
a) To build the uniform symbol table
b) To initialize the variables
c) To organize the variables in a lexical order
d) None of the mentioned
- 8) The scanner outputs:
a) Stream of tokens
b) Image file
c) Intermediate code
d) Machine code
- 9) The phase of compilation which involves type checking is:
a) Parsing
b) Scanning
c) Syntax directed translation
d) Semantic Analyzer
- 10) The process of forming tokens from an input stream of characters is called
a) Liberalisation
b) Characterisation
c) Tokenization
d) None of the mentioned
- 11) When expression $sum=3+2$ is tokenized then what is the token category of 3
a) Identifier
b) Assignment operator
c) Integer Literal
d) Addition Operator
- 12) Which grammar defines Lexical Syntax
a) Regular Grammar
b) Syntactic Grammar
c) Context free Grammar
d) Lexical Grammar



- 13) Two Important lexical categories are
- a) White Space
 - b) Comments
 - c) None of the mentioned
 - d) White Space & Comments
- 14) It has encoded within it information on the possible sequences of characters that can be contained within any of the tokens it handles. Above motioned function is performed by?
- a) Scanner
 - b) Parser
 - c) Syntactic Analyser
 - d) All of the mentioned
- 15) What goes over the characters of the lexeme to produce a value?
- a) Scanner
 - b) Parser
 - c) Evaluator
 - d) Lexical generator
- 16) The output of a lexical analyzer is
- a) Machine Code
 - b) Intermediate Code
 - c) Stream of Token
 - d) Parse Tree
- 17) Which of the following is a phase of a compilation process?
- a) Lexical Analysis
 - b) Code Generation
 - c) Both of the mentioned
 - d) None of the mentioned
- 18) A series of statements explaining how the data is to be processed is called
- a) Assembly
 - b) Machine
 - c) COBOL
 - d) Program
- 19) Assembler is a program that
- a) Puts programs into memory and executes them
 - b) Translates the assembly language into machine language
 - c) Writes in high level language and produces an object program
 - d) None of the mentioned
- 20) Compiler can diagnose
- a) Grammatical errors only
 - b) Logical errors only
 - c) Grammatical and logical errors
 - d) None of the mentioned
- 21) A programmer by mistake writes multiplication instead of division, such error can be detected by a/an
- a) Compiler
 - b) Interpreter
 - c) Compiler or interpreter test
 - d) None of the mentioned
- 22) Select a Machine Independent phase of the compiler
- a) Syntax Analysis
 - b) Intermediate Code generation
 - c) Lexical Analysis
 - d) All of the mentioned
- 23) By whom is the symbol table created?
- a) Compiler
 - b) programmer
 - c) Assembler
 - d) None of the mentioned
- 24) What does a Syntactic Analyser do?
- a) Maintain Symbol Table
 - b) Collect type of information
 - c) Create parse tree
 - d) None of the mentioned
- 25) Semantic Analyser is used for?
- a) Generating Object code
 - b) Maintaining symbol table
 - c) Generating Object code & Maintaining symbol table
 - d) None of the mentioned