Unit 1
Assignment
Subject:- Compiler Design

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University Question

1. Explain the phases of the compiler in detail. Write down the output of each phase for the expression a=b+c*50.
2. Differentiate between compiler and interpreter?
3. Discuss the merits and demerits of the single pass compiler and multi-pass compiler?
4. What is cross-compiler?
5. Describe various compiler writing tools?
6. Explain the term bootstrapping with example?
7. What is role of lexical analyzer? Enumerate the issues handled by lexical analyzer?
8. Differentiate between linker and loader?
9. Discuss the utility of macros?
10. Discuss input buffering and preliminary scanning in lexical analysis?
11. How is a Finite automaton useful for Lexical Analysis?
12. Why do we divide the compilation into phases?
13. Discuss the challenges in compiler design?
14. How boot strapping is done in more than one machine?
15. Explain the term token, lexeme, pattern?
16. Write the algorithm for moving forward pointer in "input buffering" Scheme ?
17. What do you mean by a regular expression?
18. Discuss the subset construction algorithms?
19. Differentiate between dynamic loader and linker?
20. Draw the transition diagram for identifier?
21. Draw the transition diagram for relational operator?
22. Describe the language denoted by the following regular Expression $(1+0)^*$.
23. Construct minimal DFA for the following regular expression
    $(a|b)^*a(a|b)$
24. Show the construction of NFA for the following Regular Expression
    $(a|b)^*a(a|b)(a|b)$
25. Construct NFA for the following RE using Thomson's construction:
    $(0|1)^*0(0|1)^*$

Competitive Exam Question

1. The number of tokens in the following C statement is
   `printf("i = %d, &i = %x", i, &i);` **(GATE-2000)**
2. In a compiler, keywords of a language are recognized during **(GATE-2011)**
   a. parsing of the program
   b. the code generation
   c. the lexical analysis of the program
   d. dataflow analysis
3. The output of a lexical analyzer is **(ISRO-2017)**
   a. A parse tree
   b. Intermediate code
   c. Machine code
   d. A stream of token
4. Which of the following statement(s) regarding a linker software is/are true ? **(NET-2017)**

   Statement1: A function of a linker is to combine several object modules into a single load module.
   Statement2: A function of a linker is to replace absolute references in an object module by symbolic references to locations in other modules.
   a. Only I
   b. Only II
   c. Both I and II
   d. Neither I nor II
5. Consider the following statements related to compiler construction : **(NET-2017)**

   Statement1:Lexical Analysis is specified by context-free grammars and implemented by pushdown automata.

   Statement2:Syntax Analysis is specified by regular expressions and implemented by finite-state machine. Which of the above statement(s) is/are correct ?
   a. Only I
   b. Only II
   c. Both I and II
   d. Neither I nor II
6. A lexical analyzer uses the following patterns to recognize three tokens T_1, T_2, and T_3 over the alphabet {a,b,c}.
   T_1: a? (b|c)*a
   T_2: b? (a|c)*b
   T_3: c? (b|a)*c
   Note that 'x?' means 0 or 1 occurrence of the symbol x. Note also that the analyzer outputs the token that matches the longest possible prefix. If the string *bbaacabc* is processes by the analyzer, which one of the following is the sequence of tokens it outputs? **(GATE-2018)**

a. $T_1T_2T_3$
b. $T_1T_1T_3$
c. $T_2T_1T_3$
d. T_3T_3

7. The lexical analysis for a modern computer language such as Java needs the power of which one of the following machine models in a necessary and sufficient sense? **(GATE-2011)**
   a. Finite state automata
   b. Deterministic pushdown automata
   c. Non-Deterministic pushdown automata
   d. Turing Machine
8. Consider the following statements: **(GATE-2018)**
   (I) The output of a lexical analyzer is groups of characters.
   (II) Total number of tokens in **`printf("i=%d, &i=%x", i, &i);`** are 11.
   (III) Symbol table can be implementation by using array and hash table but not tree.
   Which of the following statement(s) is/are correct?
   a. Only (I)
   b. Only (II) and (III)
   c. All (I), (II), and (III)
   d. None of these
9. Debugger is a program that **(NET-2014)**
   a. allows to examine and modify the contents of registers
   b. does not allow execution of a segment of program
   c. allows to set breakpoints, execute a segment of program and display contents of register
   d. All of the above
10. A particular BNF definition for a "word" is given by the following rules.

<word> :: = <letter> | <letter><charpair> | <letter><intpair>
<charpair> :: = <letter><letter> | <charpair><letter><letter>
<intpair> :: = <integer><integer> | <intpair><integer><integer>
<letter> :: = a | b | c | ..... | y | z
<integer> :: = 0 | 1 | 2 | .... | 9

(ISRO-2018)

Which of the following lexical entries can be derived from < word > ?
I. pick
II. picks
III. c44
a. I, II and III
b. I and II only
c. I and III only
d. II and III only