

CBCS SCHEME

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18CS61

Sixth Semester B.E. Degree Examination, June/July 2024 System Software and Compilers

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Explain architecture of SIC/XE machine. (10 Marks)
b. Generate Target address for the following object codes :
i) 032600
ii) 03C300
Contents of X = 000090 B = 006000 PC = 003000 (04 Marks)
c. Define control section. Explain EXTDEF and EXTREF with examples. (06 Marks)

OR

- 2 a. Write steps and algorithm of pass 2 of two pass assembler. (10 Marks)
b. Give the general formats of the following records :
i) Header Record
ii) Text Record
iii) End Record (06 Marks)
c. Write the algorithm for absolute loader. (04 Marks)

Module-2

- 3 a. With the help of diagram, explain the various phases of a compiler. (08 Marks)
b. Write the transition diagram to recognize the token below.
i) Identifier
ii) Relational operator. (06 Marks)
c. Explain the concept of input buffering in the lexical analysis. (06 Marks)

OR

- 4 a. Explain interaction between lexical analyzer and parser with the help of diagram. (08 Marks)
b. What are the applications of compiler technologies? Explain any two. (06 Marks)
c. What are operations on Languages? List and explain. (06 Marks)

Module-3

- 5 a. Write an algorithm to eliminate left recursion. Elimination left recursion from grammar.
 $S \rightarrow Aa \mid b$
 $A \rightarrow Ac \mid sd \mid E$ (08 Marks)
b. Give rules for constructing FIRST and FOLLOW sets. (06 Marks)
c. List actions of shift Reduce parser. Show the actions for input string $w = id * id$ using the grammar.
 $E \rightarrow E + T \mid T$
 $T \rightarrow T * F \mid F$
 $F \rightarrow (E) \mid id$ (06 Marks)

OR

- 6 a. Explain ambiguity in “dangling else” grammar. How do you eliminate it? Explain. (10 Marks)
 b. Construct predictive parsing table by making necessary changes to the grammar given below and parsing string $w = id + id$ (10 Marks)
 $E \rightarrow E * T \mid T$
 $T \rightarrow id + T \mid id$

Module-4

- 7 a. With an example program, explain the structure of a LEX program. (06 Marks)
 b. What is regular expression? Explain any 8 characters that form a regular expression. (10 Marks)
 c. Explain the use of `yywrap()` function. (04 Marks)

OR

- 8 a. Explain shift Reduce parser with an example. (10 Marks)
 b. Write a YACC program to evaluate arithmetic expression involving operators $+$, $-$, $*$, $/$. (10 Marks)

Module-5

- 9 a. Write SDD for simple disk calculator, and give annotated parse tree for $3 * 5 + 4n$. (10 Marks)
 b. Construct syntax tree and DAG for the expression $a + a * (b - c) + (b - c) * d$ (06 Marks)
 c. Define synthesized and inherited attributes with example. (04 Marks)

OR

- 10 a. Explain design issues in code generation. (08 Marks)
 b. Explain the following with examples :
 i) Quadruples
 ii) Triples
 iii) Indirect Triples (09 Marks)
 c. Write the machine instruction for the following three address instruction $x = y - z$. (03 Marks)
