



B.E DEGREE EXAMINATIONS: NOV/DEC 2023

(Regulation 2018)

Seventh Semester

COMPUTER SCIENCE ENGINEERING

U18CSE0008: Principles of Compiler Design

COURSE OUTCOMES

CO1: Interpret the different phases of the compiler and experiment the scanner using Lex tool.

CO2: Construct various parser and execute the same using tools.

CO3: Break down the given expression into intermediate code.

CO4: Translate given intermediate code to target code.

CO5: Identify various types of optimizations that can be applied to an intermediate code.

Time: Three Hours

Maximum Marks: 100

Answer all the Questions:-

PART A (10 x 2 = 20 Marks)

(Answer not more than 40 words)

- | | |
|---|-----------------------|
| 1. Compare a parse tree and a syntax tree | CO1 [K ₂] |
| 2. Write regular definitions for all strings of 0's and 1's that do not contain the substring 011 | CO1 [K ₃] |
| 3. What do you mean by a handle? | CO2 [K ₂] |
| 4. Compute FIRST for the grammar | CO2 [K ₃] |
| S → A | |
| A → AB a | |
| B → bBc f | |
| 5. Construct the DAG for the expression a+b+(a+b) | CO3 [K ₃] |
| 6. Write Quadruples for the statement | CO3 [K ₃] |
| a=e+(b*c) + d*(b*c) | |
| 7. Compute the total cost of the instructions | CO4 [K ₃] |
| LD R1, R2 | |
| ADD R0,A | |
| 8. What are the rules for finding which statements are leaders in basic blocks? | CO4 [K ₂] |
| 9. Summarize the functions of the memory manager in Heap storage | CO5 [K ₂] |
| 10. Explain the two types of data locality considered while parallelizing a program. | CO5 [K ₂] |

Answer any FIVE Questions:-
PART B (5 x 16 = 80 Marks)
(Answer not more than 400 words)

- | | | | | | |
|-----|----|--|----|-----|-------------------|
| 11. | a) | Illustrate the functionality of the various phases of a compiler with an example. | 10 | CO1 | [K ₂] |
| | b) | Describe briefly about LEX tool. | 6 | CO1 | [K ₂] |
| 12. | a) | Obtain the DFA for the regular expression $(a/b)^*abb$ using the subset construction method. | 10 | CO1 | [K ₃] |
| | b) | Show that the grammar
$S \rightarrow aAd$
$A \rightarrow BC$
$B \rightarrow b \epsilon$
$C \rightarrow c \epsilon$ is LL(1) or not? | 6 | CO2 | [K ₃] |
| 13. | | Show that the following grammar:
$S \rightarrow Aa bAc Bc bBa$
$A \rightarrow d$
$B \rightarrow d$
is LR(1) but not LALR(1) | 16 | CO2 | [K ₃] |
| 14. | a) | Construct the three-address code for the program fragment:
while (x < y) do
If (x==5) then y = y+10;
else
while (x>=z) do
c = c + 10; | 8 | CO3 | [K ₃] |
| | b) | Write the syntax-directed definition for the flow of control statements. | 8 | CO3 | [K ₂] |
| 15. | a) | Describe any three issues in the design of a code generator. | 8 | CO4 | [K ₂] |
| | b) | Illustrate about Peephole optimization. | 8 | CO4 | [K ₂] |
| 16. | a) | Explain any five principal sources of optimization. | 10 | CO5 | [K ₂] |
| | b) | Describe activation records. | 6 | CO5 | [K ₂] |
