
MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent unit of MAHE, Manipal)

II SEMESTER M.TECH. COMPUTER SCIENCE AND ENGINEERING

END SEMESTER EXAMINATIONS, MAY 2023

ADVANCED SYSTEMS SOFTWARE [CSE 5253]

Date: 22-05-2023

Time: 3 Hours. Marks: 50

Instructions to Candidates:

- Answer **ALL** the **FIVE** questions.
- Missing data may be suitably assumed.

1A. Given total, installment, and tax as floating-point variables and no_of_months as an integer variable, show the output of different phases of a compiler for the input "total = installment * no_of_months + tax". **3M**

1B. Illustrate the concept of input buffering (one and two buffers) with suitable examples. **3M**

1C. Draw the transition diagram to return tokens for the roman numbers in the range I to X (Example: for the input VI, token generated should be <ROMAN, VI>). **4M**

2A. Is the following grammar suitable for top-down Parsing? If not, convert the grammar to a form that makes it suitable for top-down parsing.

rexpr → rexpr + rterm | rterm
rterm → rterm rfactor | rfactor
rfactor → rfactor * | rprirnary
rprimary → a | b

2M

2B. Draw LR(0) automaton for the below grammar and construct SLR parser table for the same.

S → ABC
A → Agd | ε
B → Bd | ε
C → cC | ε

4M

2C. Verify if the below grammar is LL(1) by constructing the predictive parse table. Show all the necessary steps.

S→ TXaY | pY
T → cXYZ | ε
X → YdT | ad

$Y \rightarrow eYS \mid \varepsilon$

$Z \rightarrow p \mid a$ **4M**

3A. Elucidate synthesized and inherited attributes. **2M**

3B. i) Write short notes on basic block and flowgraph.
ii) For the following intermediate code, form the basic blocks, and draw the flowgraph.

```
1)  i = 1
2)  j = 1
3)  t1 = 10 * i
4)  t2 = t1 + j
5)  t3 = 8 * t2
6)  t4 = t3 - 88
7)  a[t4] = 0.0
8)  j = j + 1
9)  if j <= 10 goto (3)
10) i = i + 1
11) if i <= 10 goto (2)
12) i = 1
13) t5 = i - 1
14) t6 = 88 * t5
15) a[t6] = 1.0
16) i = i + 1
17) if i <= 10 goto (13)
```

4M

3C. For the expression a = b * -c + b * -c, write the
i) Intermediate code using three address code.
ii) Quadruple representation for the intermediate code in i).
iii) Triple representation for the intermediate code in i). **4M**

4A. Write the RISC program for the below high-level language statement.

y[i] = x;

(Note: y is an integer array and 4 bytes of memory are allocated for an integer) **2M**

4B. With neat diagrams, elucidate the client-server and peer-to-peer models. Also, compare these models. **4M**

4C. How is a coordinator process elected using ring algorithm? Illustrate with the help of an example. **4M**

5A. Illustrate the causal data-centric consistency model with appropriate examples. **4M**

5B. Elucidate client-initiated replicas in the context of content replication and placement. **3M**

5C. Write short notes on the following failure types:
i) Crash failure. ii) Omission failure. **3M**