

MIT ACADEMY OF ENGINEERING

COURSE CODE: CS322T/CS348

MAY 2022

TY BTECH SEMESTER - VI 2021 - 2022 EXAMINATION

DEPARTMENT OF COMPUTER ENGINEERING

END SEMESTER EXAMINATION

COMPILER DESIGN

TIME : 2 HOURS

MAX MARKS : 50

TOTAL NO OF QUESTIONS: 5

TOTAL NO OF PRINTED PAGES: 2

INSTRUCTIONS TO CANDIDATES:

1. Assume suitable data wherever necessary
2. All questions are compulsory
3. Figures in square bracket to the right indicate full marks

1 a) Simulate the following string using given grammar [5] CO3 L3
with proper explanation of the working of shift reduce parser

String: $id^*id+id^*(id^*id)$

Grammar:

$E \rightarrow E + T \mid T$

$T \rightarrow T^* F \mid F$

$F \rightarrow (E) \mid id$

Evaluation Scheme: Parsing Table 3 marks Simulation 2 marks

b) Obtain the following intermediate code generation [5] CO4 L3
forms for the expression $z=(a+b*c)/(b/c) - d$

i) Three address code

ii) Quadruple

iii) Triple

iv) indirect triple

v) Syntax Tree

Evaluation Scheme: 1 mark each

2 a) Give operator precedence table for the following [5] CO3 L3
grammar and refer the same to Simulate the given
string $\$ id^* (id^*id)-id/id \$$

Grammar: $E \rightarrow E-E \mid E^*E \mid E/E \mid E^E \mid (E)$

Evaluation Scheme: Parsing Table 3 marks Simulation 2 marks

b) Explain with suitable example- parse tree, syntax tree [5] CO5 L3
and annotated parse tree. Construct Annotated Parse
Tree for following expression

$5+(3*4)*(7*2)+9$

Evaluation Scheme: Explanation of each tree 3 marks

Construction 2 marks

- 3 ✓ a) What is LALR parser. Obtain LALR parsing table for the following grammar. [5] CO3 L4

S->AA

A->cA

A->d

Evaluation Scheme: Goto graph 2 marks, Parsing Table 3 marks

- b) Develop three address translation scheme for given program statements, while($i < n$) [5] CO4 L3

```
{  
z=x*y+i;  
i=i+1;  
}
```

Evaluation Scheme: Correct steps

- 4 a) Draw Directed Acyclic Graph(DAG) for the following expression by making use of respective functions to make nodes and leaves. [5] CO5 L3

$$Z = x - y + x * y * u - v / w + x + v$$

Evaluation Scheme: Functions DAG 2 marks

- b) Justify SLR(1) parsers are more powerful than LR(0) parsers taking reference of the following grammar? [5] CO3 L4

E->BB

B->cB/d

Evaluation Scheme: Stepwise solution 3 marks Justification 2 marks

- 5 ✓ a) Draw directed acyclic graph for the expression below and obtain optimized code. [5] CO5 L3

$$X = ((a * b) + c) / (c + d) + (a * b) / (d + c)$$

Evaluation Scheme: DAG 2 marks ,optimized code 3 marks

- b) Write goals & methods for peephole optimization. [5] CO5 L2

Evaluation Scheme: correct goals and methods

dead code
motion

MIT ACADEMY OF ENGINEERING

COURSE CODE: CS347T

02 MAY 2022

TY BTECH SEMESTER - VI 2021 - 2022 EXAMINATION

DEPARTMENT OF COMPUTER ENGINEERING

END SEMESTER EXAMINATION

DESIGN AND ANALYSIS OF ALGORITHMS

TIME : 2 HOURS

MAX MARKS : 50

TOTAL NO OF QUESTIONS:

TOTAL NO OF PRINTED PAGES: 02

INSTRUCTIONS TO CANDIDATES:

1. Assume suitable data wherever necessary
2. Non programmable scientific calculators are allowed
3. Black figures to the right indicate full marks

1 **a)** A thief enters a house for robbing it. He can carry a maximal weight of 5 kg into his bag. There are 4 items in the house with the following weights and values. What items should thief take if he either takes the item completely or leaves it completely? Solve this problem using FIFOBB.

[10] CO2 L3

Item	Weight (kg)	Value (\$)
Mirror	2	3
Silver nugget	3	4
Painting	4	5
Vase	5	6

Rubrics: Two marks for each correct step. Two marks for correct maximum profit.

b) Write backtracking algorithm for the 4 Queen's problem and discuss the possible solution.

[08] CO1 L3

Rubrics: 4 Marks for 4 Queen's problem algorithm. 2 Marks for each possible solution.

2 **a)** Define NP Hard and NP-Complete problem
Rubrics: 2 marks each for correct explanation.

[04] CO2 L2

- (b) What are the steps used to show a given problem is NP Complete [04] CO2 L2
Rubrics: Correct explanation of concept 2Marks
Example 2Marks.
- (c) Write short notes on Polynomial time reductions with an example. [04] CO2 L1
Rubrics: Correct explanation of concept 2Marks
Example 2Marks.
- (d) What do you mean by tractable and intractable problems. [02] CO4 L1
Rubrics: Correct explanation of concept 1 Marks
Example 1 Marks.
- 3 a) Apply Boyer-Moore (BM) algorithm to check pattern "Pune" in given string "MIT AOE Pune". Search the pattern using Good suffices and Bad character heuristics [07] CO5 L3
Rubrics: 2
Mark for Bad character Table, 3 marks for good suffices table ,2 mark for Pattern Matching.
- b) Write an algorithm for the prefix computation for KMP algorithm with example. [05] CO5 L3
Rubrics: 3 marks for algorithm. 2
marks for example.
- c) Write the algorithm to search the repeated element in the array using Monte Carlo and Las Vegas algorithm. [06] CO4 L3
Rubrics:3 Marks for Monte Carlo explanation with example 3 Marks for Las Vegas explanation with example.

MIT ACADEMY OF ENGINEERING

COURSE CODE: CS349T

4 MAY 2022

TY BTECH SEMESTER - VI 2021 - 2022 EXAMINATION

DEPARTMENT OF COMPUTER ENGINEERING

END SEMESTER EXAMINATION

SOFTWARE ENGINEERING

TIME : 2 HOURS

MAX MARKS : 50

TOTAL NO OF QUESTIONS: 05 TOTAL NO OF PRINTED PAGES: 03

INSTRUCTIONS TO CANDIDATES:

1. Assume suitable data wherever necessary
2. Non programmable scientific calculators are allowed
3. Black figures to the right indicate full marks

- 1 a) Tenders or contracts are generally used by governments and companies to procure goods or services. Wrongful tender management leads to huge losses in case of faulty practices. This includes favoring of contractors, improper record maintenance, lack of transparency, hacking, data modification and other issues. To ensure the complete tender management process is secure and efficient we here make use of blockchain tech to solve tender management issues. Construct following UML diagrams for the same.
1. Architecture Diagram 2. Deployment Diagram Evaluation scheme: each diagram 5 marks

OR

- b) These days the development of smart cars is on the rise. Self-driving cars equipped with sensors is in high demand in the research field. Algorithm to be developed for maintaining secure communication for smart cars. Algorithm for situational awareness. Cyber-Physical Systems (CPS) are integrations of computation, networking, and physical processes. The solution will be used for in vehicle communication and vehicle tracking application Technology that can help address the issue: Sensor integration / Cloud computing Desired Solution: The solution is to be developed for secure communications between sensors in the car as well as the secure communication between smart cars to prevent cyber-attacks on smart cars. Design following UML diagrams for the same.
1. Architecture Diagram 2. Deployment Diagram
- Evaluation scheme: each diagram 5 marks

[10] CO3 L3

2 a)

[10] CO4 L5

Task ID	Predecease ID	Successor ID	Duration
A	1	2	9
B	1	3	5
C	2	4	6
D	2	6	6
E	3	4	6
F	3	5	2
G	4	6	9
H	5	6	2

Evaluate estimations for ECT and LCT for given problem. Evaluation scheme: ECT calculation 5M and LCT calulations 5M

- 3 a) Explain in detail about Types of Black box testing.
Evaluation scheme: explaination of each type with example 1M

[6] CO6 L2

- b) Differentiate between load testing and Volume testing. [4] CO6 L2
Evaluation scheme : each difference 1M
- 4 a) How the Architecture Design can be represented? [6] CO3 L2
Evaluation scheme: importance 2M, Architecture styles 3M, patterns 1M
- b) What is a boundary value analysis with proper example? [4] CO6 L2
Evaluation scheme: explanation 2 M, Example 2 M
- 5 a) The system is designed for use in clinics attended by patients suffering from mental health problems and records details of their consultations and conditions. It is separate from a more general patient records system as more detailed information has to be maintained and the system has to be set up to generate letters and reports of different types and to help ensure that the laws pertaining to mental health are maintained by staff treating patients. This is a secondary safety-critical system as system failure can lead to decisions that compromise the safety of the patient or the medical staff caring for the patient. There are also significant security and privacy considerations that have to be taken into account in this system. Give a suitable name to this system. Analyze the Risk and prepare Mitigation Plan.
Evaluation scheme risk identification 2M, risk assessment 2M, risk prioritization 2M, risk mitigation and its effectiveness 4M [10] CO4 L4

OR

- b) Analyze the Risk and prepare Mitigation Plan for digital learning system. [10] CO4 L4
Evaluation scheme risk identification 2M, risk assessment 2M, risk prioritization 2M, risk mitigation and its effectiveness 4M