

Code No.: 30510/40511

MALLA REDDY ENGINEERING COLLEGE (AUTONOMOUS)

(Affiliated to JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD)

Gundlapochampally (H), Maisammaguda (V), Medchal (M), Medchal-Malkajgiri (Dist), Hyderabad.

II B.Tech II Semester Supplementary Examinations, NOVEMBER-2017**SUBJECT: FORMAL LANGUAGES AND AUTOMATA THEORY**

Branch: Common to CSE & IT

Time: 3 hours

Max. Marks: 75

PART – A**I. Answer All Questions**

5x1Mark=5Marks

1. Define finite automata
2. Define Regular set
3. What is Derivative tree
4. Define Turing machine
5. What is P and NP problem

II. Answer All Questions

10x2Marks=20Marks

1. Design finite state automata for $(0^*1^*)^*$
2. Give DFA accepting the set of all strings with three consecutive 0's $\sum \{0, 1\}$.
3. What is linear grammar? Give an example
4. Given CFG $S \rightarrow aAS \mid a$

 $A \rightarrow sbA|SS|ba$ Write the derivation for "aabbaa".

5. State Pumping Lemma for CFL's
6. What is pushdown Automata?
7. What is Recursively enumerable language
8. What is Turing Machine?
9. Define Post Correspondence Problem.
10. Define LR (0) grammar

PART-B

Answer all questions

5x10 Marks= 50Marks

1. Prove that for every NFA accepting a language L, there exist an equivalent DFA accepting the same language L.

OR

2. Convert the following Moore machine to Mealy machine

resent state	Next state		Output
	a=0	a=1	
q0	q3	q1	0
q1	q1	q2	1
q2	q2	q3	0
q3	q3	q0	0

3. a) Construct a FSA with ϵ -transitions for the regular expression $r=(ab+aba)^*$ 6 marks

b) Show that $\{a^n b^n \mid n \geq 1\}$ is not regular. 4 marks

OR

4. a) State and prove Arden's theorem 6 marks

b) Prove $(1+00^*1)+(1+00^*1)(0+10^*1)^*(0+10^*1)=0^*1(0+10^*1)^*$ 4 marks

5. a) Eliminate the null production from the given CFG 5 marks

$A \rightarrow 0B1 \mid 1B1, B \rightarrow 0B \mid 1B \mid \epsilon$

b) Optimize the CFG given below by reducing the grammar. S is a start symbol 5 marks

$S \rightarrow A \mid 0C, A \rightarrow B \mid 01 \mid 10, C \rightarrow \epsilon \mid CD$

OR

6. a) What is Pushdown Automata? Explain with an example? 6 marks

b) Construct PDA for $L = \{WCW^T \mid W \in \{a,b\}^*\}$ 4 marks

7. a) Construct a TM, which accepts the language $\{a^n b^n c^m \mid n, m \geq 1\}$ 6 marks

b) Explain the types of Turing machine 4 marks

OR

8. a) Design a TM to perform addition of two unary numbers 6 marks

b) Write short notes on Counter Machines? 4 marks

9. Write short notes on 5+ 5 marks

a) LR(0) grammar b) Universal Turing machine

OR

10. Write short notes on 5+ 5 marks

a) Linear-Bounded Automata b) NP-Complete problem.

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II B.Tech II Semester Supplementary Examinations, NOVEMBER-2017**SUBJECT: Design and Analysis of Algorithm****Branch: Common to CSE & IT****Time: 3 hours****Max. Marks: 75****PART – A****I. Answer All Questions****5x1Mark=5Marks**

1. List the characteristics of an algorithm
2. What is called divide and conquer strategy?
3. Define principle of optimality.
4. List the applications of backtracking technique.
5. Define 0/1 knapsack problem.

II. Answer All Questions**10x2Marks=20Marks**

1. Differentiate time efficiency and space efficiency.
2. What is Graph Problem
3. Analyze the time efficiency of Merge Sort algorithm
4. List the advantages of Greedy algorithm.
5. List the properties of Dynamic programming approach.
6. What is state space tree.
7. Discuss planar graph coloring
8. Briefly explain the control abstraction for Back tracking technique.
9. Compare NP-Hard and NP Complete problems.
10. State the concept of Branch and Bound.

PART-B**Answer all questions****5x10 Marks= 50Marks**

1. a) Briefly explain the time complexity, space complexity estimation.
b) Solve the recurrence relation, where $T(1)=1$ and $T(n)$ for $n \geq 2$ satisfies $T(n)=3T(n/2)+n$.

OR

2. a) Distinguish between Big Oh, Theta and Omega notation.
b) What is weighting rule for Union (i,j)? How it improves the performance of union operation ? Explain with example?

3. a) Explain matrix multiplication using divide and conquer.
b) Write dynamic programming solution for the travelling sales person problem for the network with the cost adjacency matrix.

0	10	15	30
4	0	9	11
5	13	0	10
7	7	8	0

Assume node 1 as the home city.

OR

4. a) Write the Merge Sort algorithm and arrange the following numbers (18,29,68,32, 43, 37, 87, 24, 47, 50) in ascending order using merge sort.
b) Explain Prim's algorithm for finding minimum spanning tree.
5. a) Explain multistage graph problem with an example.
b) Discuss the algorithm for finding a minimum cost binary search tree. Explain with suitable example.

OR

6. a) Explain briefly about Reliability design.
b) Write notes on Optimal Binary Search tree.
7. a) Explain the control abstraction for Backtracking method. How 8 Queens Problem could be solved using backtracking method? Explain.
b) How to solve the sum of subset problem with explanation of its time complexity.

OR

8. a) Explain elaborately recursive backtracking algorithm?
b) Apply and explain the backtracking method to solve Hamiltonian circuit problem.
9. a) Discuss about deterministic and non- deterministic algorithms
b) Explain the Dijkstra's algorithm for single source Shortest path problem with an example.

OR

10. a) Explain Branch and bound technique to solve the travelling salesperson problem .
b) Write about comparison trees

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II B.Tech II Semester Supplementary Examinations, NOVEMBER-2017SUBJECT: Operating Systems

Branch: Common to CSE & IT

Time: 3 hours

Max. Marks: 75

PART – A**I. Answer All Questions****5x1Mark=5Marks**

1. What is a system call.
2. Write about semaphores.
3. What are the different file access methods?
4. Define fragmentation.
5. What is an access right.

II. Answer All Questions**10x2Marks=20Marks**

1. What is a process? Explain different process states.
2. Explain Operating system objectives.
3. Define thrashing.
4. Explain Critical section problem.
5. What is a deadlock.
6. Briefly explain about file sharing.
7. Write about swap-space management.
8. Briefly explain about Linked allocation of disk space.
9. What are the goals of protection.
10. Explain about different threats.

PART-B**Answer all questions****5x10 Marks= 50Marks**

1. Distinguish between process and thread. Explain clearly about process scheduling and thread scheduling.

OR

2. Some CPUs provide for more than two modes of operation. What are two possible uses of these multiple modes? Explain.

3. What are monitors? Give the monitor solution to dining philosophers problem.

OR

4. Explain critical section and mutual exclusion with respect to producer consumer problem.

5. a) Explain how double buffering improves the performance than a single buffer for I/O.
b) Differentiate between logical I/O and Device I/O.

OR

6. a) Discuss necessary conditions for happening deadlock.
b) Explain the bankers algorithm for deadlock avoidance.

7. a) Discuss the criteria for choosing a file organization.
b) Describe indexed file, indexed sequential file organization.

OR

8. Suppose we have disk with 200 tracks. The disk head starts at track 100 and moving in the direction of decreasing track number. For the following sequence of disk track requests 27, 129, 110, 186, 147, 41, 10, 64, 120. Compute the average seek time for the following disk scheduling algorithms, FIFO, SSTC, SCAN.
9. Write short notes on :
 - a) Goals and principles of protection.
 - b) Implementation of Access Matrix.

OR

10. a) Discuss the security mechanisms followed by UNIX Systems.
b) How to revoke access rights.

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II B.Tech II Sem Supplementary Examinations, DECEMBER-2017**SUBJECT: Database Management Systems****Branch: Common to CSE & IT****Time: 3 hours****Max. Marks: 75****PART – A****I. Answer All Questions****5x1Mark=5Marks**

1. Define Data Abstraction?
2. How do you "Alter" a Table?
3. What is meant by Nested Query?
4. Give example for Atomicity in Transactions?
5. State the purpose of Indexing?

II. Answer All Questions**10x2Marks=20Marks**

1. Briefly discuss about different database languages?
2. Define "Generalization" quote an example?
3. List out the Integrity Constraints?
4. Explain Projection set operations briefly?
5. Give an example of correlated Nested Query?
6. Write notes on UNION INTERSECT Operators?
7. Define Concurrency?
8. Describe the various states of a transaction?
9. Define BT Tree?
10. Give examples of index base data structures?

PART-B**Answer all questions****5x10 Marks= 50Marks**

1. Draw and explain each and every component of a data base system structure?

OR

2. Explain the concept of generalization and specification in ER model with examples.
3. Explain Tuple Relational Calculus?

OR

4. How can we enforce integrity constraints on relations: explain broadly.
5. What is meant by log, what actions are updated in a log: what is its significance in recovery?

OR

6. Write notes on
 - a) Lock based protocols.
 - b) Time stamp based protocols.
7.
 - a) Compare constraints and Triggers?
 - b) What is a Trigger? List its application?

OR

8. Broadly explain the impact of logical connectives on SQL?
9. Summarize ISAM?

OR

10. Describe Hash Based indexing?

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II B.Tech II Semester Supplementary Examinations, DECEMBER-2017SUBJECT: Principles of Programming LanguagesBranch: **IT**

Time: 3 hours

Max. Marks: 75

PART – A**I. Answer All Questions****5x1Mark=5Marks**

1. Write one relation between orthogonality and simplicity.
2. Define attribute grammar.
3. Write about guarded commands.
4. Define ADT in Ada.
5. Write one application of Functional Programming language.

II. Answer All Questions**10x2Marks=20Marks**

1. Write the differences between compiler and interpreter.
2. Write about Imperative Languages.
3. Define parse tree and ambiguous grammar.
4. Explain about Inherited Attributes.
5. Write about short circuit evolution.
6. Explain about multiple selection statements.
7. Write about object oriented programming c++?
8. What is the purpose of interlock class?
9. Define Haskell briefly?
10. What is type inferencing in ML?

PART-B**Answer all questions****5x10 Marks= 50Marks**

1. a) Explain about Functional Programming Language
b) Explain about Von Neumann Architecture.
(OR)
2. Explain Language Evolution criteria with examples?
3. Discuss about Language recognizers and Language generators.
(OR)
4. Explain Inherited Attributes and Synthesized Attributes?
5. a) Explain Dijkstra's selection construct with an example?
b) Explain problems with overloading with suitable examples.
(OR)
6. Explain operator precedence and associativity. How can programmers alter the precedence and associativity.
7. a) Write about Semaphores and Monitors.
b) Differentiate between c# sleep Method and Java sleep Method.
(OR)
8. Explain Exception Handling Mechanism in Java with suitable example.
9. Explain briefly
a) LISP
b) ML
(OR)
10. Compare functional programming languages and imperative languages

