

Reg No.: _____

Name : _____



MVJ College of Engineering
DEPARTMENT OF COMPUTER SCIENCE AND DESIGN
(COMMON TO CSE)
IVth Semester - B.Tech
Series Exam 1

Course : MVJ22CG452 - GRAPH THEORY

Total Mark: 50

Total Time: 1.30 hrs

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- | | | |
|-----|---|-------------|
| CO1 | Apply graph theory-based tools in solving practical problems | Applying(P) |
| CO2 | Demonstrate algorithms used in interdisciplinary engineering domains. | Applying(P) |
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General Instructions

1. Answer all the questions in Part A
 2. Answer any two questions in Part B and Part C
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CO BL MARK

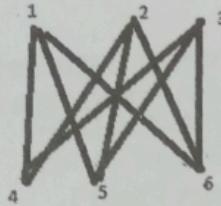
PART A

- | | |
|--|-----------|
| 1. Define Eulerian and hamiltonian graph | CO1 3 (2) |
| 2. Define Walk and trial of the graph | CO1 3 (2) |
| 3. Draw the kuratowski's graph. | CO1 3 (2) |
| 4. Define Full binary tree with example | CO2 2 (2) |
| 5. Define Minimally connected with example | CO2 2 (2) |

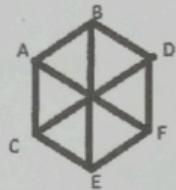
PART B

Answer Any Two Question(s)

- | | |
|---|------------|
| 6. Determine the order $ V $ of the graph $G=(V,E)$ in the following cases:
(1)G is a cubic graph with 9 edges
(2)G is regular with 15 edges.
(3)G has 10 edges with 2 vertices of degree 4 and all other vertices of degree 3. | CO1 3 (10) |
| 7. Exhibit the following:
a)A graph which has both Eulerian and Hamiltonian.
b)A graph which has neither an Eulerian nor Hamiltonian.
c)A graph which has an Eulerian but not Hamiltonian.
d)A graph which has Hamiltonian but not an Eulerian. | CO1 3 (10) |
| 8. Show that the following two graphs are isomorphic | CO1 3 (10) |



G



G'

G & G'

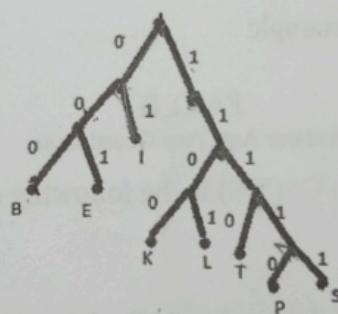
PART C

Answer Any Two Question(s)

9. Find the Prefix codes for the letters B,E,I,K,L,T,P,S if the coding scheme is as shown below.Hence (a)Find the codes for the words PIPE and BEST

CO2 3 (10)

- (b)Decode the strings(i)000011100001 (ii)11111111011010111110



prefix

10. construct an optimal prefix code for the symbols A,B,C,D,E,F,G,H,I,J that occur with frequencies 78,16,30,35,125,31,20,50,80,3 respectively.

CO2 3 (10)

11. A code for {a,b,c,d,e} is given by

a:00, b:01, c:101, d:x10, e:yz1, where $x, y, z \in \{0, 1\}$.Determine x,y and z so that the given code is a prefix code and also construct the binary tree.

CO2 3 (10)



MVJ College of Engineering
DEPARTMENT OF CSE(COMMON TO AI,CD,CG AND IS)

IVth Semester - B.Tech

Series Exam 1

**Course : MVJ22CS41 - Analysis and Design of
Algorithms**

Total Mark: 50

Total Time: 1.30 hrs

CO1 Basic Concept of Algorithms: Introduction-What is an Algorithm, Algorithm Specification, Analysis Framework, Performance Analysis: Space complexity, Time complexity. Asymptotic Notations: Big-Oh notation (O), Omega notation (Ω), Theta notation (Θ), Mathematical analysis of Non-Recursive and recursive Algorithms with Examples . CO2 Simple Design Techniques – Brute force : Selection sort, Bubble sort, Sequential Search and Brute-Force String Matching , Exhaustive search –Traveling Salesman problem, Knapsack problem , Assignment Problem. Divide and Conquer: General method, Binary search, Finding the maximum and minimum , Mergesort, Quick sort , Strassen's matrix multiplication.	Applying(P),Understanding(U),Remembering(R) Understanding(U),Remembering(R)
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General Instructions

1. Answer all the questions in Part A
2. Answer any two questions in Part B and Part C

CO BL MARK

PART A

1. Why we need algorithms explain with one example. CO1 2 (2)
2. Write an algorithm to count the sum of n numbers. CO1 2 (2)
3. What is performance analysis? What are the two types of performance analysis CO1 1 (2)
4. What is the difference between optimal solution and feasible solution. CO2 2 (2)
5. What are the three conditions are following in binary search. CO2 1 (2)

PART B

Answer Any Two Question(s)

6. Explain the general plan for analyzing the efficiency of a recursive algorithm. Explain with a suitable example CO1 3 (10)
7. Explain the general plan for analyzing the efficiency of a recursive algorithm. Explain with a suitable example CO1 3 (10)
8. Define asymptotic notation. List and explain various asymptotic notation with example of each. CO1 3 (10)

PART C

Answer Any Two Question(s)

9. Perform brute force string matching for the following:
 Text: NOBODY_NOTICED_HER
 Pattern: NOT CO2 3 (10)
10. Explain and trace the merge sort algorithm for the following elements.
 8,3,2,9,11,15,5,7,4,12,1,82 CO2 3 (10)

11. Explain and trace the quick sort algorithm for the given elements:

5,3,1,19,8,2,4,7,11,0,9

and write

- (A) partition, (B) subproblem

WAP to

method is a divide-and-conquer algorithm. It works by partitioning a list into two smaller lists: one containing elements less than a value called the pivot, and another containing elements greater than the pivot. This process is repeated on the sublists until the entire list is sorted.

- (A) 1 sec
(B) 3 sec
(C) 4 sec

ETAS

laptop, and you move

WAP to

WAP to

WAP to

Total Mark: 50

Total Time: 1.30 hrs

CO1 Introduction to Databases: Introduction, Characteristics of database approach, Advantages of using the DBMS approach, History of database applications. Overview of Database Languages and Architectures: Data Models, Schemas, and Instances. Three schema architecture and data independence, database languages, and interfaces, The Database System environment. Conceptual Data Modelling using Entities and Relationships: Entity types, Entity sets and structural constraints, Weak entity types, ER diagrams, Specialization and Generalization.

Remembering(R), Understanding(U), Applying(P)

General Instructions

1. Answer all the questions in Part A
2. Answer any two questions in Part B and Part C

CO BL MARK

PART A

1. What are the basic notations available in E-R model? CO1 1 (2)
2. Write about Data definition Language with an example. CO1 2 (2)
3. Define single valued and multivalued attributes. CO1 2 (2)
4. Define relational algebra CO2 2 (2)
5. Define Referential Integrity Constraints CO2 2 (2)

PART B

Answer Any Two Question(s)

6. Discuss the main characteristics of the database approach and how it differs from traditional file systems. CO1 2 (10)
7. Describe the three-schema architecture. Why do we need mappings among schema levels? CO1 2 (10)
8. Develop an ER diagram for A hospital with a set of patients and a set of medical doctors. Associate with each patient a log of the various tests and examinations conducted. Mention the cardinality ratio and participation constraints. CO1 3 (10)

PART C

Answer Any Two Question(s)

9. Explain Relational Algebra with example CO2 1 (10)
10. Explain Dealing with Constraint Violations CO2 2 (10)
11. Explain schema based constraints CO2 2 (10)

Course : MVJ22CS42 - Microcontrollers

Total Mark: 50

Total Time: 1.30

CO1 Understand the fundamentals of ARM-based systems and basic architecture of CISC and RISC.	Understanding(U)
CO2 Familiarize with ARM programming modules along with registers, CPSR and Flags	Understanding(U)

General Instructions

1. Answer All the Questions in Part A
2. Answer Any Two Questions in Part B and Part C

CO BL MARK

PART A

1. Given

cpsr = nzcvqiFt_USER

r0 = 4

r9 = 4

CMP r0, r9

Analyze the preconditions, and explain how CPSR, r0, r9 are updated after the above instruction is executed

2. Which are the different conditional flags of ARM processor.

CO1 1 (2)

3. What are the differences between the privileged and non privileged modes of processors.

CO1 1 (2)

4. What are the differences between SUB and RSB instructions. Give examples.

CO2 2 (2)

5. Describe the instructions: SMLAL and SMULL

CO2 2 (2)

PART B

Answer Any Two Question(s)

6. Explain the ARM Single-Register and Multiple-Register load-store addressing modes with example.

CO1 2 (10)

7. Explain the different processor modes provided by ARM7. What is Pipelining.

CO1 1 (10)

8. Explain with neat diagram the register file and banked registers.

CO1 2 (10)

PART C

Answer Any Two Question(s)

9. a) Explain in detail Load and store instructions for multiple register transfer-stack operation with an example.

CO2 2 (10)

b) Explain in detail about the swap instruction

10.

(A) Given the pre conditions

r1 = 0x00000002

r4 = 0x00000003

SP = 0x00080014

What are the contents of r0, r1, r2 and r3 after the execution of the following instruction. Show the pictorial representation of the memory pre and post execution.

CO2 3 (10)

STMFD SP!, {r1,r4}

(B) Explain the way of loading constants in ARM .

11. a) If register r1, r2, r3 contain the values 0, 15 and 12, respectively. What will be the value of r4 after execution of whole code. Assume that registers are 32 bit in size.

MVN r0,r1

AND r4, r0, r2

EOR r4, r4, r3

CO2 3 (10)

- b) If register r1, r2, r3 contain the values 10, 20 and 30, respectively. What will be the value of r4 after execution of whole code. Assume that registers are 32 bit in size.

ADD r4,r1,r3

SUB r4,r4,r2

RSB r4,r1,r4

6
11 | 6 | 2 | 4