



School of Information Technology and Engineering

Fall Semester 2022-2023 - Fresher

Continuous Assessment Test – II

Programme Name & Branch : MCA

Course Name & code: Software Project Management (ITA5001)

Class Number (s): VL2022230105033/VL2022230105090

Slot: A1+TA1

Faculty Name (s) (Dr. Neetu Khare and Dr. Brijendra Singh)

Exam Duration: 90 Min.

Maximum Marks: 50

General instruction(s):

Q.No	Question	Max Marks																								
1.	<p>Design an activity network considering Activity – On –Node and identify the critical path to estimate the project duration. Perform forward pass and backward pass to calculate Earliest Start, Earliest Finish, Latest Start, Latest Finish and Float value for each activity.</p> <table border="1"> <thead> <tr> <th>Activity Name</th><th>Duration (Weeks)</th><th>Precedence</th></tr> </thead> <tbody> <tr> <td>P</td><td>5</td><td>-</td></tr> <tr> <td>Q</td><td>5</td><td>-</td></tr> <tr> <td>R</td><td>6</td><td>Q</td></tr> <tr> <td>S</td><td>7</td><td>P</td></tr> <tr> <td>T</td><td>9</td><td>R,S</td></tr> <tr> <td>U</td><td>11</td><td>Q</td></tr> <tr> <td>V</td><td>7</td><td>T,U</td></tr> </tbody> </table>	Activity Name	Duration (Weeks)	Precedence	P	5	-	Q	5	-	R	6	Q	S	7	P	T	9	R,S	U	11	Q	V	7	T,U	10
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2.	Consider the table from question.1 to construct the network using critical path method by considering the rules on activity on arrow and conventions.	10																								
3.	Discuss the concept of free float and interfering float. Consider the project details given below and evaluate the free float and interfering float.	10																								
	<table border="1"> <thead> <tr> <th>Activity Name</th><th>Duration</th><th>Precedence</th></tr> </thead> <tbody> <tr> <td>L</td><td>5</td><td>-</td></tr> <tr> <td>M</td><td>4</td><td>-</td></tr> <tr> <td>N</td><td>8</td><td>-</td></tr> <tr> <td>O</td><td>6</td><td>L,M</td></tr> <tr> <td>P</td><td>3</td><td>N,O</td></tr> </tbody> </table>	Activity Name	Duration	Precedence	L	5	-	M	4	-	N	8	-	O	6	L,M	P	3	N,O							
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4.	<p>Consider yourself as a project manager of developing web application for IDBI bank. Determine the detailed framework that could be used for risk management with steps.</p>	10																								
5.	<p>Consider the project Xtream has the following estimates for the activities.</p> <table border="1" data-bbox="319 362 1220 675"> <thead> <tr> <th>Task</th><th>Optimistic Time (O)</th><th>Most Likely Time(M)</th><th>Pessimistic Time(P)</th></tr> </thead> <tbody> <tr> <td>Task A</td><td>2 weeks</td><td>4 weeks</td><td>5 weeks</td></tr> <tr> <td>Task B</td><td>1 weeks</td><td>2 weeks</td><td>3 weeks</td></tr> <tr> <td>Task C</td><td>2 weeks</td><td>3 weeks</td><td>4 weeks</td></tr> <tr> <td>Task D</td><td>3 weeks</td><td>5 weeks</td><td>8 weeks</td></tr> <tr> <td>Completion</td><td>8 weeks</td><td>14 weeks</td><td>20 weeks</td></tr> </tbody> </table> <p>Let the target time T for completing the tasks A+B+C+D is 18 weeks. Evaluate the following :</p> <ol style="list-style-type: none"> Expected time t_e for each activity. Standard deviation S for each activity. The likelihood of meeting a target 	Task	Optimistic Time (O)	Most Likely Time(M)	Pessimistic Time(P)	Task A	2 weeks	4 weeks	5 weeks	Task B	1 weeks	2 weeks	3 weeks	Task C	2 weeks	3 weeks	4 weeks	Task D	3 weeks	5 weeks	8 weeks	Completion	8 weeks	14 weeks	20 weeks	3 3 4
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**VIT**

Vellore Institute of Technology

(Deemed to be University under section 3 of UGC Act 1956)

School of Information Technology and Engineering**Fall Semester 2022-2023****Continuous Assessment Test – II****Programme Name & Branch: MCA****Course Name & code: ITA5005 Object Oriented Software Engineering****Class Number (s): VL2022230106225****Slot: B1+TB1****Faculty Name (s): Prof. Sweta Bhattacharya****Exam Duration: 90 Min.****Maximum Marks: 50****General instruction(s):**

Q No.	Question	Max Marks
1.	<p>You have been asked to develop an expert system which has to be made expertise in diagnosing the disease of the patient who has come for consultation. The expert system is domain oriented and has well defined knowledge database. This knowledge database contains all possible combinations of symptoms, conditions and resultant medicine prescription. Once the expert system is developed by acquiring the expert knowledge it can be refined and used by the practitioner in their domain. When the patient comes for consultation the practitioner can ask the symptoms to the patient. The practitioner will then log on to the system and once the system is ready; the practitioner can type/enter the symptoms of the patient. The system will in turn display some questions related to the patient's system and yes/no answer as mentioned by the patient is selected by the practitioner. The system keeps track of all combinations of questions and answers with necessary conditional checks and at the end it will display the detected disease and will also prescribe the medicine for curing the disease. If the patient revisits the clinic due to the same problem his record is to be retrieved from the system database. The expert system then refines the conditions and gives the alternate prescription.</p>	10
2.	<p>Considering the above requirement, draw an Activity diagram in detail. (10)</p>	10
3.	<p>Considering the Scenario mentioned in Question 1, Draw a Sequence Diagram. (10)</p> <p>You intend to develop a Stock Maintenance System. You have been asked to develop automatic stock maintenance system for a popular Grocery product manufacturing system. The inventory manager maintains the database and checks the stock level of food grains at regular interval. If there is underflow, he calls for the quotation. By consolidating the quotations, he places the orders with the better hawkers who are delivering the goods of high quality with low price in time. In case of emergency, the inventory manager fixes up the deadline and requests the hawker to deliver the goods in time to satisfy the customers. After getting the goods delivered by</p>	10

	<p>the hawker, he updates the stock level. If the inventory manager feels that the particular hawker is not good in delivering goods, he need not place any more orders to him</p> <p>Considering the above requirement, draw a Data Flow Diagram – Level 0 and Level 1.</p>	
4.	Considering the Scenario mentioned in Question 3, Draw a State Transition Diagram. (10)	10
5.	Assuming that you are developing Movie Ticket Booking system similar to “BookmyShow”. While designing the user interface, as a UI designer, identify the plausible difficulties you might encounter. Also mention the mitigation steps that you would take to ensure the design meets the required quality criteria. (5+5)	10



School of Information Technology and Engineering

Fall Semester 2022-2023

Continuous Assessment Test - II

Programme Name & Branch: MCA

Course Name & Code: Problem Solving with Data Structures and Algorithms (ITA5002)

Class Number (s): VL2022230105103 & VL2022230105095

Slot: C1+TC1

Faculty Name: Dr. Prabukumar M & Dr. Dharmendra Singh Rajput

Exam Duration: 90 Min.

Maximum Marks: 50

PART A (5 * 10 = 50 Marks)

Q.No.	Question	Max Marks
1.	Analyze the worst-case and best-case time complexity for AVL Tree and binary search tree. Also, construct an AVL Tree by inserting Elements: [40, 20, 10, 25, 30, 22]. Represent all steps and appropriate rotation neatly.	10
2.	Consider the following array of elements. (89, 19, 50, 17, 12, 15, 2, 5, 7, 11, 6, 100) Give the answer to the following questions I. How many minimum interchanges are needed to convert it into a max-heap? (3) II. Arrange the array elements into ascending order using heap sort. (7)	16
3.	List the various types of the non-comparison sort that you studied. Consider the following array elements (326, 453, 170, 90, 835, 751, 526, 234, 678, 967). Sort the element in ascending order by choosing any one of the non-comparison sorting algorithms and write the best, average, and worst-case time complexity of that algorithm.	10

4. Consider a complete undirected graph with vertex set {0, 1, 2, 3, 4}. Entry W_{ij} in the matrix W below is the weight of the edge $\{i, j\}$. What is the minimum possible weight of a spanning tree T in this graph W ?

$$W = \begin{pmatrix} 0 & 1 & 2 & 3 & 4 \\ 1 & 0 & 12 & 4 & 9 \\ 2 & 12 & 0 & 7 & 3 \\ 3 & 4 & 7 & 0 & 2 \\ 4 & 9 & 3 & 2 & 0 \end{pmatrix}$$

5. Every tree is a graph, but not every graph is a tree. Breath first search (BFS) is started on a binary tree beginning from the root vertex. There is a vertex V at a distance of three from the root node. If V is the n^{th} vertex in this BFS traversal then
- Find the maximum possible value of n . (5)
 - Find the traversal path using BFS in the same graph which you assumed for the above scenario. (5)

*** ALL THE BEST ***



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Vellore Institute of Technology

Autonomous University under Section 2(f) of UGC Act 1956

Vellore – 632014, Tamil Nadu, India
DEPARTMENT OF MATHEMATICS
SCHOOL OF ADVANCED SCIENCES
FALL SEMESTER 2022-2023

CONTINUOUS ASSESSMENT TEST – II

Programme Name & Branch	: MCA	
Course Code	: MAT5007	
Course Name	: Applied Statistical Methods	
Slot	: D1	
Duration	: 90 minutes	Max. Marks : 50

General instruction(s): Answer all the questions, Statistical tables are permitted

Q. No	Question	Marks	Course Outcome (CO)	Bloom's Taxonomy (BL)														
1.	<p>Suppose that a short quiz consists of 6 multiple choice questions. Each question has four possible answers of which only one is correct. A student guesses on every question. Find the probability that a student will answer</p> <ul style="list-style-type: none"> (i) Five or more questions correctly (ii) All questions correctly (iii) At most 1 question correctly (iv) Between 4 and 5 questions correctly. 	10	CO3	BL3														
2.	<p>The annual salaries of employees in a large company are approximately normally distributed with a mean of Rs.50,000 and a standard deviation of Rs,20,000.</p> <ul style="list-style-type: none"> (i) What percent of people earn less than Rs.40,000? (ii) What percent people earn between Rs.45,000 and Rs.65,000? (iii) What percent of people earn more than Rs.70,000? 	10	CO3	BL3														
3.	<p>Given the following probability distribution of X .</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>x</td> <td>-2</td> <td>-1</td> <td>0</td> <td>1</td> <td>2</td> <td>3</td> </tr> <tr> <td>p(x)</td> <td>1/10</td> <td>k</td> <td>2/10</td> <td>2k</td> <td>3/10</td> <td>3k</td> </tr> </table> <p>Compute (i) Value of k. (ii) $E(x)$ (iii) $E(x^2)$ (iv) $E(10x \pm 100)$ (v) $\text{Var}(6x \pm 100)$.</p>	x	-2	-1	0	1	2	3	p(x)	1/10	k	2/10	2k	3/10	3k	10	CO3	BL5
x	-2	-1	0	1	2	3												
p(x)	1/10	k	2/10	2k	3/10	3k												

4.	<p>A company wants to improve the quality of products by reducing defects and monitoring the efficiency of assembly lines. In assembly line A, there were 18 defects reported out of 200 samples while in line B, 25 defects out of 600 samples were noted. Is there a difference in the procedures at a 5% LOS.</p>	10	CO4	BL4
5.	<p>An online medicine shop claims that the mean delivery time for medicines is less than 120 minutes with a standard deviation of 30 minutes. Is there enough evidence to support this claim at 5% LOS if 49 orders were examined with a mean of 100 minutes?</p>	10	CO4	BL4

School of Information Technology and Engineering

Fall Semester 2022-2023

Continuous Assessment Test – II

Programme Name & Branch: MCA

Course Name & code: Data Communication and Networking & ITA5003

Class Number (s): VL2022230105115, VL2022230105119, VL2022230105117

Slot: E1+TE1

Facility Name: Prof K.Santhi, Prof Felicita S A M, Prof Shobana D

Exam Duration: 90 Min.

Maximum Marks: 50

Answer all the questions

Q.No.	Question	Max Marks
1.	<p>Define the following parameters for a switching network:</p> <p>N= number of hops between two given end systems</p> <p>L= message length in bits</p> <p>B= data rate in bits per second (bps), on all links</p> <p>P= packet size</p> <p>H= overhead (header) bits per packet</p> <p>S= call setup time (circuit switching or virtual circuit) in seconds</p> <p>D= propagation delay per hop in seconds</p> <p>For $N=5$, $L=6400$, $B=50000$, $P=2048$, $H=16$, $S=0.3$, $D=0.004$, compute the end-to-end delay for circuit, virtual-circuit, and packet switching. Assume there are no acknowledgements, and no queuing delay.</p>	10
2.	<p>i) A slotted aloha network transmits 500-bit frame on a shared channel of 100 Mbps what is the throughput if the system (all station together) produces 2000 frames/sec. (Marks 5)</p> <p>ii) A 4km long broadcast LAN 10^7Gbps bandwidth and use CSMA/CD. The signal travels along the wire are 6×10^6M/Sec. What is minimum packet size that can be used on this network? (Marks 5)</p>	10
3.	<p>i) If the message sequence is 1010000 and the generator polynomial is $G(x)=x^3+1$, calculate the transmitted frame. Also, check if the data is accepted at the receiver side. (Marks 5)</p>	10

	<p>ii) Calculate the 16 bits-checksum of the following hexadecimal numbers 00FE C523 FDA1 D68A AF02 Note that the answer should be in hexadecimal without spaces. (Marks 5)</p>	
4.	<p>Suppose a 7-bit data word stored in memory is 0111001. Using the Hamming algorithm, determine check bits that would be stored in memory with the data word. Show how the redundancy bits are to be found. Consider if data bit 3 sustains an error due to transmission error, Identify the location of the errored bit.</p>	10
5.	<p>i) Illustrate the sender side and receiver side window configuration for the following scenario for Selective Repeat ARQ flow control algorithm for a window size of 8. Let's assume both forward channel and the reverse channel is unreliable.</p> <p>[5 Marks]</p> <ul style="list-style-type: none"> • Frame 0,1, and 2 are sent; ACK is delayed • Frames 3,4, and 5 are sent ;ACK is lost • Frames 3,4, and 5 are sent; Frame 4 lost • Frames 4,5,6, and 7 are sent; Frame 6 is damaged <p>ii) Station A needs to send a message consisting of 10 packets to Station B using a siding window (window size 4) and go-back-n error control strategy. All packets are ready and immediately available for transmission. If every 5th packet that A transmits gets lost (but no acks from B ever get lost), then what is the number of packets that A will transmit for sending the message to B?</p> <p>[5 Marks]</p>	10



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School of Information Technology and Engineering

Fall Semester 2022-2023

Continuous Assessment Test – II

Programme Name & Branch: MCA

Course Name & code: Database Technologies & ITA5008

Class Number (s): VL2022230105091

Slot: F1 + TF1

Faculty Name: Yuvarani S

Exam Duration: 90 Min.

Maximum Marks: 50

Answer ALL the Questions (5 × 10 = 50)

1. Draw Optimized Tree using Heuristic approach for the given query.

```
SELECT S.sname, P.pname  
FROM Suppliers S, Parts P, Supply Y  
WHERE S.sid = Y.sid AND Y.pid = P.pid AND S.city = 'Madison' AND P.price ≤ 1,000 [10M]
```

2. Consider the following Transaction r1(X); w1(X); r2(Y); r3(Y); w2(Y); w3(Y); w2(Y); w2(Y).

Draw a wait-for graph, check for occurrence of deadlock and suggest suitable prevention methods. [10M]

3. Table 1: Supplier at Site 1

Sup_id	Name	Address	Pid
1	Ram	Vellore	1
2	Sam	Chennai	4
3	Venu	Vellore	2
4	Alex	Madison	3
5	Ken	UK	1

Table 2: product at Site 2

Pid	P_name
1	Toy
2	Bolt
3	Dress

Apply semi join operation to display supplier name and product name.

[10M]

4. Consider employee table below. Assume that there are 3 processors namely P0, P1, P2 associated with 3 disks D0, D1, D2. [10M]

Emp_table		
ENAME	GRADE	DNAME
SMITH	1	RESEARCH
BLAKE	4	SALES
FORD	4	RESEARCH
KING	5	ACCOUNTING
SCOTT	4	RESEARCH
MILLER	2	ACCOUNTING
TURNER	3	SALES

1
-1
-1
-2
1
-2
-0

Partition above table using

- (i) Round Robin
- (ii) List Partition
- (iii) Hash partition

5. a) Consider employee table, perform Horizontal fragmentation and vertical fragmentation. [5M]

Eno	Ename	Design	Salary	Dep
101	A	Abc	3000	1
102	B	Abc	4000	1
103	C	Abc	5500	2
104	D	Abc	5000	2
105	E	Abc	2000	2
106	F	Bcd	5000	3

[5M]

b) Apply intra query parallelism on below query.

SELECT AVG(Salary) FROM Employee GROUP BY Dept_Id;