DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Regular End Semester Examination – Summer 2022

Branch : Computer Engineering/ CSE/ CSE(AI&ML)

Course: S.Y B. Tech. **Semester :IV**

Subject Code & Name: BTCOC401 (Design and Analysis of Algorithm)

Max Marks: 60 **Date: 12/08/2022** **Duration: 3.45 Hr.**

Instructions to the Students:

1. *All the questions are compulsory.*
2. *The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.*
3. *Use of non-programmable scientific calculators is allowed.*
4. *Assume suitable data wherever necessary and mention it clearly.*

		(Level/CO)	Marks
Q. 1	**Solve Any Two of the following**		
A)	Define Algorithm? State the main characteristics of Algorithm	Knowledge	**6**
B)	Describe Asymptotic notations with expression	Understand	**6**
C)	Evaluate $9T(n/3) + n$	Evaluation	**6**
Q.2	**Solve Any Two of the following.**		
A)	Describe an algorithm for Merge Sort and find its time complexity	Understand	**6**
B)	Evaluate and write the algorithm for Quick sort describe its best and worst case with suitable example	Evaluation	**6**
C)	$\begin{bmatrix}6 & 7\\5 & 4\end{bmatrix}\begin{bmatrix}1 & 2\\3 & 4\end{bmatrix}$ Solve using Strassen's Matrix Multiplication, and Calculate its time complexity	Analysis	**6**
Q. 3	**Solve Any Two of the following.**		
A)	Draw a state space tree for finding four queens solutions	Understand	**6**
B)	Apply branch and bound technique to solve travelling salesman problem for the graph whose matrix is $\begin{matrix}\infty & 20 & 30 & 10 & 11\\15 & \infty & 16 & 4 & 2\\3 & 5 & \infty & 2 & 4\\19 & 6 & 18 & \infty & 3\\16 & 4 & 7 & 16 & \infty\end{matrix}$	Analysis	**6**
C)	Describe Graph Coloring Problem with suitable example	**Understand**	**6**
Q.4	**Solve Any Two of the following.**		
A)	Solve the Fractional Knapsack problem Given n = 5 objects and a knapsack capacity W = 60 profit= (30, 20 ,100,90,160) Weight = (5,10,20,30,40)	**Analysis**	**6**
B)	Solve an optimal Huffman code for the following set of frequencies a: 50 b: 25 c: 15 d: 40 e=75	**Analysis**	**6**
C)	Solve Job sequencing with deadlines n=4 , p=(100,10,15,27) and d =(2,1,2,1) find optimal solution	Analysis	**6**

Q. 5 Solve Any Two of the following.

A) Calculate the shortest path by using Floyd's Warshall Algorithm — Application — **6**

$$\begin{matrix} 0 & 4 & 5 \\ 2 & 0 & \infty \\ \infty & -3 & 0 \end{matrix}$$

B) Calculate the longest common subsequence for X={ A,B,C,B,D,A,B} — Application — **6**

Y={B,D,C,A,B,A}

C) Differentiate between Dynamic Programming and greedy Approach — Analysis — **6**

*** **End** ***

	DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE **Supplementary Winter-2023** **Course: B. Tech. Branch : Computer & Allied Engineering Semester :IV** **Subject Code & Name: BTCOC401 Design & Analysis of Algorithms** **Max Marks: 60 Date:16-01-24 Duration: 3 Hr.**		
	Instructions to the Students: 1. *All the questions are compulsory.* 2. *The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in front of the question.* 3. *Use of non-programmable scientific calculators is allowed.* 4. *Assume suitable data wherever necessary and mention it clearly.*		
		(Level/CO)	Marks
Q. 1	Solve Any Two of the following.		12
A)	What is Algorithm? Explain criteria of Algorithms.	Remember	6
B)	What is Asymptotic Notations? Explain any three Asymptotic Notations.	Remember	6
C)	Define Max and Min Heap and write algorithm to insert into a heap.	Analysis	6
Q.2	Solve Any Two of the following.		12
A)	Write algorithm for Binary Search and calculate its time complexity.	Application	6
B)	Explain Quick Sort algorithm with its performance analysis.	Analysis	6
C)	Explain Strassen's Matrix Multiplication.	Remember	6
Q. 3	Solve Any Two of the following.		12
A)	Draw a state space tree for finding Four Queens problems solution.	Application	6
B)	Describe Graph Coloring Problem with suitable example	Analysis	6
C)	Explain Branch and Bound with suitable example.	Remember	6
Q.4	Solve Any Two of the following.		12
A)	Find an optimal solution to the knapsack instance n = 7, m = 15, (P_1 ,P_2, P_3 ,P_4 P_5 ,P_6 P_7) = (10,5,15,7,6,18,3), and (w_1, w_2, w_3, w_4, w_5, w_6, w_7) = (2,3,5,7,1,4,1).	Application	6
B)	What is Minimum Cost Spanning Tree? Explain with suitable example.	Remember	6
C)	Explain Job Sequencing with Deadlines.	Remember	6
Q. 5	Solve Any Two of the following.		12
A)	Analyze Floyd Warshals algorithm for Dynamic Programming.	Analysis	6
B)	Explain complexity class P and complexity class NP.	Remember	6
C)	Differentiate between Dynamic Programming and Greedy Algorithm.	Analysis	6

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Supplementary Winter-2023

Course: B. Tech. **Branch: Computer Engineering** **Semester: IV**

Subject Code & Name: BTCOC402 & Operating System

Max Marks: 60 **Date:** **Duration: 3 Hr.**

Instructions to the Students:

1. *All the questions are compulsory.*
2. *The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.*
3. *Use of non-programmable scientific calculators is allowed.*
4. *Assume suitable data wherever necessary and mention it clearly.*

		(Level)	Marks
Q. 1	**Solve Any Two of the following.**		**12**
A)	List out different services of Operating Systems and Describe each service.	**(2)**	**6**
B)	What are system calls? Explain different categories of system calls with example?	**(2)**	**6**
C)	Describe different sub-components of an operating system.	**(2)**	**6**

Q.2	**Solve Any Two of the following.**			**12**
A)	Consider the following data with burst time given in milliseconds:		**(3)**	**6**

Process	Burst Time	Priority	Arrival time
P1	7	3	0
P2	4	1	2
P3	1	2	4
P4	4	4	5

i) Draw Gantt charts for the execution of these processes using FCFS, non-preemptive and preemptive SJF, and non-preemptive Priority scheduling.

ii) What is the Average waiting time of each process for each of the scheduling algorithm.

B)	Describe the actions taken by a kernel to context switch between kernel level threads		**(2)**	**6**
C)	Suppose the following jobs arrive for processing at the times indicated, each job willrun the listed amount of time.		**(3)**	**6**

Job	arrival time	burst time
1	0.0	9
2	0.2	5
3	1.2	2

i) Give a Gantt chart illustrating the execution of these jobs using the non- preemptive FCFS and SJF scheduling algorithms.

ii) what is turnaround time and wait time of each job for the above algorithms?

Q. 3 Solve Any Two of the following. **12**

A) Examine banker's algorithm after applying to the example given below A system has 5 processes, P1, P2, P3, P4 and P5. There are 2 types of resources A, and B. there are 10 instances of A, and 5 instances of B. At time T0, the situation is as follows; **(3)** **6**

Process-	Allocation-		Maximum	
	A	B	A	B
P1	0	1	7	5
P2	2	0	3	2
P3	3	0	9	0
P4	2	1	2	2
P5	0	0	4	3

Is the system in a safe state at time T0?

Suppose now a time T1, process P2 requests one additional instance of resource type A.

B) Describe necessary conditions for a deadlock situation to arise. **(2)** **6**

C) What is critical section problem and what are the requirements that need to be satisfied by any solution to critical section problem? Give a solution to a 2 processcritical section problem. **(2)** **6**

Q.4 Solve Any Two of the following. **12**

A) Consider a logical address space of 8 pages of 1024 words each, mapped on to a physical memory of 32 frames. **(3)** **6**

How many bits are there in the logical address?

How many bits are there in the physical address?

B) A process references 6 pages 1, 2, 3, 4, 5, 6 in the following order **(3)** **6**

1,2,3,4,2,1,5,6,2,1,2,3,7,6,3,2,1,2,3,6

Assuming that the replacement algorithm is LRU, Optimal and FIFO, find out the number of page faults during the sequence of references, starting with an empty main memory with 3 frames.

C) Explain with the help of supporting diagram how TLB improves the performance of a demand paging system. **(2)** **6**

Q. 5 Solve Any Two of the following. **12**

A) Consider two files systems A and B, that use contiguous allocation and linked allocation, respectively. A file of size 100 blocks is already stored in A and also in B. Now, consider inserting a new block in the middle of the file (between 50th and 51st block), whose data is already available in the memory. Assume that there are enough free blocks at the end of the file and that the file control blocks are already in memory. Let the number of disk accesses required to insert a block in the middle of the file in A **(3)** **6**

and B are n_A and n_B respectively, then the calculate value of $n_A + n_B$.

B) Suppose that a disk drive has 200 cylinders, numbered 0 to 199. the drive currently services a request at cylinder 50, and the previous request was at cylinder 25. the queue of pending request in FIFO order is 82,170,43,140,24,16,190 Starting from the current position, what is the total distance (in cylinders) that the disk arm moves to satisfy all pending requests, for each of the following algorithms i)FCFS ii) SSFT iii) SCAN iv)LOOK v) C-SCAN vi) C-LOOK. **(3)** **6**

C) What are the three methods for allocating disk space? Explain with help each method suitable diagram, merits and demerits. **(2)** **6**

***** End *****

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE-RAIGAD-402103

Summer Semester Examination, 2022

B.Tech. Computer Engineering /CSE/ CSE(AI&ML).

Semester: IV **Max. Marks: 60**

Subject: Probability Theory & Random Processes/Probability and Statistics [BTBS404]

Date: 24/08/2022 **Time: 3.45 Hrs**

Instructions to the Student:

1. Each question carries 12 marks
2. All Questions are compulsory
3. Illustrate your answers with neat sketches diagram etc. wherever necessary.
4. If some pare or parameter is noticed to be missing, you may appropriately assume it and should mention it clearly.

Marks

Que: 1 Attempt any TWO of the following questions. [12]

A] i) What is the chance that a non-leap year should have fifty three Sundays?

ii) Urn A contains 5 red and 3 white memory chips; the urn B contains 2 red and 6 white memory chips. If a chip is drawn from each box what is the probability that they are both of the same colour?

B] A committee of 4 persons is to be appointed from 3 officers of the production department, 4 officers of the purchase department, 2 officers of the sales department and 1 chartered accountant. Find the probability of the committee in the following manner:

i) There must be one from each category.
ii) It should have at least one from the purchase department.
iii) The chartered accountant must be in the committee

C] In a certain college 25% of boys and 10% of girls are studying mathematics. The girls constitute 60% of the students. If a student is selected at random and is found to be studying mathematics, find the probability that the student is a (i) girl and (ii) a boy.

Que: 2 Attempt any TWO of the following questions. [12]

A] i) A continuous random variable has the probability density function $f(x)f(x)$ as

$f(x) = \begin{cases} ke^{-x}, & x > 0 \\ 0, & elsewhere \end{cases}$.

Determine the constant k k.

ii) Obtain the probability distribution of X, the number of heads in three tosses of a coin. Also find the expected number of heads appearing when a fair coin is tossed three times.

B] Fit a Binomial distribution to the following observation:

x	0	1	2	3	4	5
f	2	14	20	34	22	8

C] Sacks of sugar packed by an atomic loader having an average weight of 100 kg with standard deviation 0.250 kg. Assuming normal distribution find chance of sack get weighing less than 99.5 kg. (Given: $A(2) = 0.4772$ $A(2) = 0.4772$)

Que: 3 Attempt the following questions. [12]

A] From the following data, calculate the rank correlation coefficient by Karl Pearson's method

x	6	2	10	4	8
y	9	11	?	8	7

Arithmetic means of X and Y series are 6 and 8 respectively.

B] From the following table, calculate the coefficient of correlation by Karl Pearson's method

x	48	33	40	9	16	16	65	24	16	57
y	13	13	24	6	15	4	20	9	6	19

Que: 4 Attempt the following questions. [12]

A] Obtain the least square regression line of y on x for the following data.

x_i	6	2	10	4	8
y_i	9	11	5	8	7

Also, obtain an estimate of y which should correspond on the average to $x = 5.$ $x = 5.$

B] The equation of two lines are $2x = 8 - 3y2x = 8 - 3y$ and $2y = 5 - x$ $2y = 5 - x$. Find the mean values of x and y. Find the value of correlation coefficient.

Que: 5 Attempt the following questions. [12]

A] i) A die was thrown 6000 times and a throw of 5 or 6 was obtained 3240 times. On the assumption of random throwing, do the data indicate an unbiased die?

ii) There are 30% and 25% respectively of faired haired people in the two large populations. Is this difference likely to be hidden in samples of 1200 and 900 respectively from the two populations?

B] A full-time Ph.D. students received an average salary of $12,837 according to U.S. Department of Education. The dean of graduate studies at a large state University feels that Ph.D. students in his state earn more than this. He surveys 44 randomly selected students and finds their average salary is $14,445 with a standard deviation of $150. With $\alpha = 0.05,$ $\alpha = 0.05,$ is the dean correct?

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Supplementary Winter Semester Examination – 2023

Course: B. Tech. **Branch : Computer Science & Engineering** **Semester: IV**

Subject Code & Name: Probability Theory and Random Processes (BTBS404)

Max Marks: 60 **Date:23-01-24** **Duration: 3 Hr.**

Instructions to the Students:

1. *All the questions are compulsory.*
2. *The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.*
3. *Use of non-programmable scientific calculators is allowed.*
4. *Assume suitable data wherever necessary and mention it clearly.*

		(Level/CO)	Marks
Q. 1	**Solve Any Two of the following.**		**12**
A)	A card is drawn from a well shuffled pack of playing cards. Find the probability that it is either a diamond or a king.	Understand	
B)	In a random arrangement of the letters of the word "MATHEMATICS". Find the Probability that all the vowels come together	Understand	
C)	Derive equation of Bayes' Theorem	Application	
Q.2	**Solve Any Two of the following.**		**12**
A)	Ten unbiased coin are tossed simultaneously. Find the probability of obtaining, i) exactly 6 heads ii) No head	Application	
B)	A continuous random variable has probability density function $f(x) = 6(x - x^2)$ where $0 \leq x \leq 1$. Find mean, variance, median.	Evaluation	
C)	A die is tossed twice. Getting 'an odd number' is termed as success. Find the probability distribution of the number of successes.	Understand	
Q. 3	**Solve Any Two of the following.**		**12**
A)	Calculate probable error. If the coefficient of correlation is 0.92 and number of pairs of items are 25.	Application	
B)	The ranks of some 16 students in Mathematics and Physics are as follows. Two numbers within brackets denote the ranks of the students in Mathematics and Physics: (1,1), (2,10), (3,3), (4,4), (5,5), (6,7), (7,2), (8,6), (9,8), (10,11), (11,15), (12,9), (13,14), (14,12), (15,16), (16,13). Calculate the rank correlation coefficient for the proficiencies of this group in Mathematics & Physics.	Application	
C)	What is Correlation? Explain its types and causation.	Understand	

Q.4 **Solve Any Two of the following.** **12**

A) Obtain the angle between the two lines of regression.

B) From the following data of the age of husband and age of wife, find two regression lines and calculate the husband's age when wife's age is 16. Analysis

Husband age	36	23	27	28	28	29	30	31	33	35
Wife age	29	18	20	22	27	21	29	27	29	28

C) If $\bar{x} = 8.2;\ \bar{y} = 12.4; \sigma_x = 6.2;\ \sigma_y = 20; r(x,y) = 0.9,$ find the lines of regression. Estimate the value of x for $y = 10$ and estimate y for $x = 10.$ Application

Q. 5 **Solve Any Two of the following.** **12**

A) A random sample of size 36 is taken from a normal population with known variance $\sigma^2 = 25.$ If the mean of the samples is $\bar{x} = 42.6$ test the null hypothesis $\mu = 45$ against the alternative hypothesis $\mu < 45$ with $\alpha = 0.05$ Application

B) Explain Null Hypothesis and Alternative Hypothesis. Evaluation

C) In a random sample of 340 students, 178 of the 210 females and 90 of the 130 males passed Statistics and Probability on their first take. Construct a 90% confidence interval for the population proportion of students who passed the subject. Application

***** End *****

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Regular End Semester Examination – Summer 2022

Course: B. Tech. **Branch: Multiple Branches** **Semester : IV**

Subject Code & Name: (BTHM403) Basic Human Rights

Max Marks: 60 **Date: 20/08/2022** **Duration: 3.45 Hr.**

Instructions to the Students:

1. *All the questions are compulsory.*
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3. *Use of non-programmable scientific calculators is allowed.*
4. *Assume suitable data wherever necessary and mention it clearly.*

		(Level/CO)	Marks
Q. 1	**Solve any One of the following**		
A)	Write short notes on: i) Liberty ii) Equality iii) Fraternity	**L2/CO2**	12
B)	Write short notes on: i) Civil society ii) State iii) Industrialism and the present social system	**L2/CO2**	12
Q.2	**Solve any Two of the following**		
A)	What is the contribution of the French Revolution to the human rights movement?	**L3/CO1**	6
B)	Explain the following concepts: i) Interrelationship between religion and culture ii) Communal riots and social harmony	**L3/CO1**	6
C)	Elaborate the following terms: i) Unemployment ii) Rural poverty	**L3/CO1**	6
Q. 3	**Solve any Two of the following**		
A)	Throw light on the rights of migrant workers.	**L5/CO5**	6
B)	How will you focus on the rights of mentally and physically challenged people? Elaborate.	**L5/CO5**	6
C)	'Freedom is the soul of democracy'. Justify.	**L5/CO5**	6
Q.4	**Solve the following**		
A)	Elaborate the contribution of NGOs in India to help people get their rights in regard with: a) Water b) Forest c) Land	**L4/CO4**	12
Q. 5	**Solve any Two of the following**		
A)	Illustrate the fundamental rights in the Constitution of India?	**L2/CO3**	6
B)	What duties are suggested by the Constitution of India? Explain.	**L2/CO3**	6
C)	What is UDHR, what are its provisions in India?	**L2/CO3**	6

***** End *****

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Regular End Semester Examination – Summer 2022

Branch : Computer Engineering/ CSE/ CSE(AI&ML)

Course: S.Y B. Tech. **Semester :IV**

Subject Code & Name: BTCOC401 (Design and Analysis of Algorithm)

Max Marks: 60 **Date: 12/08/2022** **Duration: 3.45 Hr.**

Instructions to the Students:

1. *All the questions are compulsory.*
2. *The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.*
3. *Use of non-programmable scientific calculators is allowed.*
4. *Assume suitable data wherever necessary and mention it clearly.*

		(Level/CO)	Marks
Q. 1	**Solve Any Two of the following**		
A)	Define Algorithm? State the main characteristics of Algorithm	Knowledge	**6**
B)	Describe Asymptotic notations with expression	Understand	**6**
C)	Evaluate $9T(n/3) + n$	Evaluation	**6**
Q.2	**Solve Any Two of the following.**		
A)	Describe an algorithm for Merge Sort and find its time complexity	Understand	**6**
B)	Evaluate and write the algorithm for Quick sort describe its best and worst case with suitable example	Evaluation	**6**
C)	$\begin{bmatrix}6 & 7\\5 & 4\end{bmatrix}\begin{bmatrix}1 & 2\\3 & 4\end{bmatrix}$ Solve using Strassen's Matrix Multiplication, and Calculate its time complexity	Analysis	**6**
Q. 3	**Solve Any Two of the following.**		
A)	Draw a state space tree for finding four queens solutions	Understand	**6**
B)	Apply branch and bound technique to solve travelling salesman problem for the graph whose matrix is $\begin{matrix}\infty & 20 & 30 & 10 & 11\\15 & \infty & 16 & 4 & 2\\3 & 5 & \infty & 2 & 4\\19 & 6 & 18 & \infty & 3\\16 & 4 & 7 & 16 & \infty\end{matrix}$	Analysis	**6**
C)	Describe Graph Coloring Problem with suitable example	**Understand**	**6**
Q.4	**Solve Any Two of the following.**		
A)	Solve the Fractional Knapsack problem Given n = 5 objects and a knapsack capacity W = 60 profit= (30, 20 ,100,90,160) Weight = (5,10,20,30,40)	**Analysis**	**6**
B)	Solve an optimal Huffman code for the following set of frequencies a: 50 b: 25 c: 15 d: 40 e=75	**Analysis**	**6**
C)	Solve Job sequencing with deadlines n=4 , p=(100,10,15,27) and d =(2,1,2,1) find optimal solution	Analysis	**6**

Q. 5 Solve Any Two of the following.

A) Calculate the shortest path by using Floyd's Warshall Algorithm — Application — **6**

$$\begin{matrix} 0 & 4 & 5 \\ 2 & 0 & \infty \\ \infty & -3 & 0 \end{matrix}$$

B) Calculate the longest common subsequence for X={ A,B,C,B,D,A,B} — Application — **6**

Y={B,D,C,A,B,A}

C) Differentiate between Dynamic Programming and greedy Approach — Analysis — **6**

*** **End** ***

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Regular End Semester Examination – Summer 2022

Course: TY. **Branch : Computer Engg/CSE** **Semester : VI**

Subject Code : BTCOE605(C) **Subject Name: Consumer Behavior**

Max Marks: 60 **Date:26/08/2022** **Duration: 3.45 Hr.**

Instructions to the Students:

1. *All the questions are compulsory.*
2. *Assume suitable data wherever necessary and mention it clearly.*

		(Level/CO)	Marks
Q. 1	**Solve Any Two of the following.**		
A)	Explain nature and scope of consumer behavior.	**Understand**	6
B)	What are the Approaches to consumer behaviour research?	**Knowledge**	6
C)	**Illustrate and explain various buying rolls through following example.** **Eg:** You and Friend went to a Cloth shops for his/her shopping. Suddenly your mother phoned you and asked you to buy a shirt for your father.	**Application/ Evaluation**	6
Q.2	**Solve Any Two of the following.**		
A)	On what criteria would you evaluate the viability of the segment?	**Knowledge**	6
B)	What are the various levels at which segmentation can take place?	**Knowledge**	6
C)	**Write short note on** **i.** Bases of segmenting consumer markets. **ii.** Positioning strategies	**Understand**	6
Q. 3	**Solve Any Two of the following.**		
A)	Compare the levels of consumer decision making w.r.t. EPS And LPS.	**Analysis**	6
B)	Explain stages in consumer decision making process with example.	**Understand**	6
C)	What is cognitive dissonance? How can a marketer help reduce cognitive dissonance?	**Analysis**	6
Q.4	**Solve Any Two of the following.**		
A)	Explain versatility of Maslow's Hierarchy of Needs Theory with an example	**Understand**	6
B)	List out models of Consumer Behavior. Explain economic model in brief.	**Synthesis**	6
C)	Note the differences between Organizational and Consumer Buying.	**Analysis**	6
Q. 5	**Solve Any Two of the following.**		
A)	**Write short notes on :** **i.** Social class mobility **ii.** Lifestyle analysis	**Knowledge**	6
B)	What is adoption process? Explain its Stages.	**Knowledge**	6
C)	Explain types of promotion. What is Promotion Mix?	**Understand**	6

***** End *****