	DESIGN AND ANALYSIS OF ALGORITHMS LABORATORY (Effective from the academic year 2018 -2019) SEMESTER – IV				
Course C	ode	18CSL47		140	
Number of Contact Hours/Week Total Number of Lab Contact Hours		0:2:2	CIE Marks SEE Marks	60	
Course L	earning Objectives: This course (18C	SI 47) will en	abla students to		
• 0	esign and implement various algorithm	in IAVA	able students to:		
• Ei	nploy various design strategies for pro	hlem solving			
• M	easure and compare the performance of	of different alg	orithma		
Description	ons (if any):	different alge	oriums.		
Ec • In	esign, develop, and implement the spenguage under LINUX /Windows envilition IDE tool can be used for develop stallation procedure of the requiroups and documented in the journal	ment and dem	peans / Eclipse or Inter-	ellijIdea Communi	
Programs		•			
1.	,				
a.	Create a Java class called <i>Student</i> with (i) USN (ii) Name (iii) Programme (iv) Phone Write a Java program to create <i>nStua</i> Phoneof these objects with suitable h	lent objects on			
b.	Write a Java program to implement the Stack using arrays. Write Push(), Pop(), and Display() methods to demonstrate its working.				
a.	Design a superslass at 1 as as a				
	class by writing three subclasses namely <i>Teaching</i> (domain, publications), <i>Technical</i> (skills), and <i>Contract</i> (period). Write a Java program to read and display at least 3 <i>staff</i>				
b. 3.	Write a Java class called <i>Customer</i> to store their name and date_of_birth. The date_of_birth format should be dd/mm/yyyy. Write methods to read customer data as <name, dd="" mm="" yyyy=""> and display as <name, dd,="" mm,="" yyyy=""> using StringTokenizer class considering the delimiter character as "/".</name,></name,>				
a.	Write a Java program to read two inte	gers a andb	Compute alk and a		
	Write a Java program to read two integers $a$ and $b$ . Compute $a/b$ and print, when $b$ is not zero.				
b.	thread generates a random integer for every 1 second; second thread computes the square of the number and prints; third thread will print the sack.				
4.	Sort a given set of <i>n</i> integer eleme complexity. Run the program for varied Plot a graph of the time taken versus or can be generated using the random divide-and-conquer method works a average case and best case.	nts using <b>Qui</b> ed values of <i>ni</i> non graph she	ck Sort method and 5000 and record the elements can be	compute its time time taken to sort. se read from a file	

Sort a given set of $n$ integer elements using <b>Merge Sort</b> method and compute its time complexity. Run the program for some solutions $n$ in the program of $n$ in the program
record the time tolerant the program for varied values of $n > 5000$ and record the time telescope
to a graph of the time taken versus non graph sheet. The elements can be used to
the of earlier using the random number generator. Demonstrate using least to
average case and best case.
6. Implement in Java, the <b>0/1 Knapsack</b> problem using (a) Dynamic Programming mother (b)
mediod,
7. From a given vertex in a weighted connected graph, find shortest paths to other vertice using Dijkstra's algorithm. Write the program in I.
- Jastia saigorithin. Wille the propram in Java
6. Find Minimum Cost Spanning Tree of a given connected undirected greater in
<b>TRI USKAI SAIGUTITIIII.</b> Use Union-Find algorithms in your program
9. Find Minimum Cost Spanning Tree of a given connected undirected graph using
Trini s algorithm.
10. Write Java programs to
(a) Implement All-Pairs Shortest Paths problem using Florida alregida.
(b) Implement Travelling Sales Person problem using Dynamic and the sales of the sa
Design and implement in Java to find a subset of a given set $S = \{S_1, S_2,, S_n\}$ of nositive integers whose SIM is a really
positive integers whose SUM is equal to a given positive integer d. For example, if $S = \{1, 2, \dots, S_n\}$ of n $\{1, 2, \dots, S_n\}$ and $\{1, 2, \dots, S_n\}$ and $\{1, 2, \dots, S_n\}$ of $\{1, 2, \dots, S_n\}$ and $\{1, 2, \dots, S_n\}$ of $\{1, 2, \dots, S_n\}$ and $\{1, 2, \dots, S_n\}$ of $\{1, 2, \dots, S_n\}$ of $\{1, 2, \dots, S_n\}$ and $\{1, 2, \dots, S_n\}$ of $\{1, 2, \dots, S_n\}$ of $\{1, 2, \dots, S_n\}$ of $\{1, 2, \dots, S_n\}$ and $\{1, 2, \dots, S_n\}$ of $\{1, 2, \dots$
5, 6, 8} and $d=9$ , there are two solutions $\{1,2,6\}$ and $\{1,8\}$ . Display a suitable message, if
the given problem instance doesn't have a solution.
12. Design and implement in Java to find all Hamiltonia G. 1.
Design and implement in Java to find all <b>Hamiltonian Cycles</b> in a connected undirected Graph G of <i>n</i> vertices using backtracking principle.
Laboratory Outcomes: The student should be able to:

## Laboratory Outcomes: The student should be able to:

- Design algorithms using appropriate design techniques (brute-force, greedy, dynamic programming, etc.)
- Implement a variety of algorithms such assorting, graph related, combinatorial, etc., in a high level language.
- Analyze and compare the performance of algorithms using language features.
- Apply and implement learned algorithm design techniques and data structuresto solve real-world problems.

## **Conduct of Practical Examination:**

- Experiment distribution
  - o For laboratories having only one part: Students are allowed to pick one experiment from the lot with equal opportunity.
  - For laboratories having PART A and PART B: Students are allowed to pick one experiment from PART A and one experiment from PART B, with equal opportunity.
- Change of experiment is allowed only once and marks allotted for procedure to be made zero of the changed part only.
- Marks Distribution (Courseed to change in accoradance with university regulations)
  - e) For laboratories having only one part Procedure + Execution + Viva-Voce: 15+70+15 = 100 Marks
  - f) For laboratories having PART A and PART B
    - i. Part A Procedure + Execution + Viva = 6 + 28 + 6 = 40 Marks
    - ii. Part B Procedure + Execution + Viva = 9 + 42 + 9 = 60 Marks