

PRASAD V POTLURI SIDDHARTHA INSTITUTE OF TECHNOLOGY

(AUTONOMOUS)

DEPARTMENT OF CSE

B.Tech-CSE- II Year II Semester(S3) Academic Year: 2022-23

Design and Analysis of Algorithms Laboratory exercises

Implement the following problems using C++ code

1	<b>Module 1: <u>Divide-and -Conquer.</u></b> <ul style="list-style-type: none"><li>• Sorting – (quick sort, merge sort, and heapsort)</li><li>• Finding minimum and maximum</li><li>• Strassen’s Matrix Multiplication</li><li>• Closest pair problem</li></ul>	Week 1 & 2
2	Problems on divide-and conquer from coding platforms <ol style="list-style-type: none"><li>1. <a href="https://leetcode.com/problems/kth-largest-element-in-an-array/">https://leetcode.com/problems/kth-largest-element-in-an-array/</a></li><li>2. <a href="https://leetcode.com/problems/coin-change/">https://leetcode.com/problems/coin-change/</a></li><li>3. <a href="https://leetcode.com/problems/partition-array-according-to-given-pivot/">https://leetcode.com/problems/partition-array-according-to-given-pivot/</a></li><li>4. <a href="https://leetcode.com/problems/divide-array-into-equal-pairs/">https://leetcode.com/problems/divide-array-into-equal-pairs/</a></li><li>5. <a href="https://leetcode.com/problems/removing-minimum-and-maximum-from-array/">https://leetcode.com/problems/removing-minimum-and-maximum-from-array/</a></li></ol>	Week 3
3	<b>Module 2: <u>Greedy Method</u></b> <ul style="list-style-type: none"><li>• Huffman coding</li><li>• Knapsack problem</li><li>• Minimum coin change</li><li>• Job sequencing with deadlines</li><li>• Minimum cost spanning trees</li><li>• Single source shortest paths</li></ul>	Week 4 to week 6
4	Problems from coding platforms on Greedy Method <ol style="list-style-type: none"><li>1. <a href="https://www.hackerrank.com/challenges/minimum-absolute-difference-in-an-array/problem?isFullScreen=true">https://www.hackerrank.com/challenges/minimum-absolute-difference-in-an array/problem?isFullScreen=true</a></li><li>2. <a href="https://www.hackerrank.com/challenges/marcs-cakewalk/problem?isFullScreen=true">https://www.hackerrank.com/challenges/marcs-cakewalk/problem?isFullScreen=true</a></li><li>3. <a href="https://www.hackerrank.com/challenges/grid-challenge/problem?isFullScreen=true">https://www.hackerrank.com/challenges/grid-challenge/problem?isFullScreen=true</a></li><li>4. <a href="https://leetcode.com/problems/largest-number/">https://leetcode.com/problems/largest-number/</a></li><li>5. <a href="https://leetcode.com/problems/array-partition/">https://leetcode.com/problems/array-partition/</a></li></ol>	Week 7
5	<b>Module 3: <u>Dynamic Programming</u></b> <ul style="list-style-type: none"><li>• 0/1 knapsack problem</li><li>• All pairs shortest paths problem</li><li>• Optimal Binary search trees</li></ul>	Week 8 & Week 9

	<ul style="list-style-type: none"> <li>• Travelling salesmen problem</li> </ul>	
6	<p>Problems from coding platforms on Dynamic Programming</p> <ol style="list-style-type: none"> <li>1. <a href="https://www.codechef.com/problems/SUMTRIAN">https://www.codechef.com/problems/SUMTRIAN</a></li> <li>2. <a href="https://www.codechef.com/problems/COINS">https://www.codechef.com/problems/COINS</a></li> <li>3. <a href="https://www.hackerrank.com/challenges/unique-divide-and-conquer/problem">https://www.hackerrank.com/challenges/unique-divide-and-conquer/problem</a></li> <li>4. <a href="https://leetcode.com/problems/maximum-subarray/">https://leetcode.com/problems/maximum-subarray/</a></li> <li>5. <a href="https://leetcode.com/problems/unique-binary-search-trees-ii">https://leetcode.com/problems/unique-binary-search-trees-ii</a></li> </ol>	Week 10
7	<p><b>Module 4: Back tracking</b></p> <ul style="list-style-type: none"> <li>• N -queens</li> <li>• Sum of subsets</li> <li>• Hamiltonian cycle.</li> <li>• <a href="https://leetcode.com/problems/count-numbers-with-unique-digits/">https://leetcode.com/problems/count-numbers-with-unique-digits/</a></li> </ul>	Week 11
8	<p><b>Module 5 : Branch-and -Bound</b></p> <ul style="list-style-type: none"> <li>• Assignment problem</li> <li>• Travelling salesmen problem</li> </ul>	Week 12