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**Faculty of Technology and Engineering**

**Chandubhai S. Patel Institute of Technology**

**Department of Computer Science and Engineering**

**PRACTICAL – 7**

Roll no.: Date:    /    /

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| --- | --- | --- | --- | --- | --- |
| Academic Year | : | 2024-25 | Semester | : | 4 |
| Course code | : | CSE207 | Course name | : | Design and Analysis of Algorithms |

**AIM:**

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| **7. Backtracking and Branch & Bound** | |
| 7 | You are the event manager for a large festival, and you have the opportunity to secure sponsorship from various companies. Each company offers a sponsorship amount, but their support comes with certain conditions that affect the overall budget. Each sponsorship deal has a weight (representing the budget requirement or resources needed) and a value (representing the financial contribution or visibility provided). Your goal is to maximize the total sponsorship value while staying within the festival's budget constraints. This means selecting a combination of sponsorship deals that will provide the highest overall contribution without exceeding the available budget. By employing backtracking as well as branch-and-bound methods, effectively decide which sponsorship deals to pursue, ensuring the festival's financial success. |

**7 Analysis of the Problem**

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| **Approach** | **Time**  **Complexity** | **Space Complexity** | **Observation** |
| **Backtracking** |  |  |  |
| **Branch & Bound** |  |  |  |

**Conclusion:**

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**Answer the following Questions:**

1. Backtracking can often have an exponential time complexity. Can you explain the factors that contribute to the time complexity in the problems you solved?
2. How does pruning (cutting off branches) reduce the search space, and how did this impact the efficiency of your backtracking solutions?
3. What is the key principle behind the Branch and Bound approach? How does it differ from backtracking?

**Grade / Marks Sign of Lab Teacher with Date**