**Table of Contents:**

|  |  |
| --- | --- |
| **BoxGo**  Algorithm and Solving Problem (15B17CI471) | Submitted to:  Dr. Sherry Garg (Lab Coordinator)  Dr. Ankita Wadhwa  Dr. Kirti Jain  Dr. Purtee Kohli    SUBMITTED BY:  1.Yashvin Pant (**21803009**)  2.Ansh Mishra (**21803011**)  3.Sanat Walia (**21803012**)  4.Vivek Shaurya (**21803013**) |

1.Acknowledment…………………………………………………………………………….1

2.Introduction…………………………………………………………………………………2

3.Problem Statement………………………………………………………………………….3

4.Algorithm Used…………………………………………………………………………….4

5.Learning Outcome………………………………………………………………………….10

5.References………………………………………………………………………………….11

ACKNOWLEDMENT

We would like to express our sincere appreciation and gratitude to our esteemed lab coordinator and teachers for their unwavering support, encouragement, and guidance throughout our Algorithm and Problem-Solving mini project.

Their expert knowledge, insightful feedback, and constructive criticism were invaluable in helping us improve our problem-solving skills and produce a high-quality project. They challenged us to think critically and creatively, and provided us with the necessary resources and tools to succeed.

Their dedication to creating a conducive learning environment was evident in their willingness to engage in meaningful discussions and answer our questions, no matter how complex they were. They fostered a collaborative and inclusive atmosphere that allowed us to learn from each other and exchange ideas.

We appreciate the time and effort that they put into our project, including their willingness to review and provide feedback on our progress at every stage. Their constructive feedback and suggestions helped us refine our approach and produce a project that exceeded our expectations.

We are grateful for their commitment to our success, and we hope to continue to learn from them in the future. Their mentorship and guidance have helped us develop a deeper understanding of algorithm and problem-solving concepts, which will undoubtedly serve us well in our future endeavours.

Once again, we extend our heartfelt thanks to our lab coordinator and teachers for their invaluable contributions to our project.

**Introduction:**

We are trying to give a one stop solution to the day to day problems of a Packers and Movers company. By our mini project we assessed the following needs and gave a working solution for the same.

* items of different sizes must be packed into a finite number of trucks, each of a fixed given capacity, in a way that minimizes the number of trucks used.
* having different doc spaces, we have to load and unload the truck, for them not to overlap their doc spaces we are proposing a graph coloring algorithm.
* given a set of items, each with a weight and a value, the goal is to select a subset of the items to include in the box such that the total weight does not exceed the capacity of the box and the total value of the selected items is maximized.
* having orders from multiple location of the country, an optimization algorithm to give us the shortest path to travel giving maximum profit.

**Problem Statement:**

1. Items of different sizes must be packed into a finite number of trucks, each of a fixed given capacity, in a way that minimizes the number of trucks used.
2. Scheduling of trucks in such a manner that picking and choosing those orders only which maximize the profit for the company.
3. Having different doc spaces, we must load and unload the truck, for them not to overlap their doc spaces we are proposing a graph coloring algorithm.
4. Given a set of items, each with a weight and a value, the goal is to select a subset of the items to include in the box such that the total weight does not exceed the capacity of the box and the total value of the selected items is maximized.
5. Sequencing of trucks on their availability and maximizing the profit through it.
6. Having orders from multiple location of the country, an optimization algorithm to give us the shortest path to travel, giving maximum profit.

**Learning Outcome:**

1. Analyse the complexity of different algorithms using asymptotic analysis.
2. Select an appropriate data structure and apply related operations for a given problem.
3. Apply algorithmic principles for solving a given problem.
4. Identify, formulate, and design an efficient solution to a given problem using appropriate data structure and algorithm design technique.

**References:**

1. <https://www.geeksforgeeks.org/bin-packing-problem-minimize-number-of-used-bins/> (as referred on 1st April,2023)
2. <https://www.tutorialspoint.com/Median-of-two-sorted-array> (as referred on 7th April,2023)
3. <https://www.javatpoint.com/0-1-knapsack-problem> (as referred on 11th April,2023)
4. <https://www.scribd.com/document/415991265/A-Project-on-packers-and-movers> (as referred on 13th April,2023)
5. <https://www.interviewbit.com/blog/graph-coloring-problem/> (as referred on 25th April,2023)
6. <https://www.youtube.com/watch?v=rp1SMw7HSO8> (as referred on 26th April,2023)
7. <https://upakstorage.com/> (as referred on 26th April,2023)