ourdiu.com | Shared by MAHMUDUL HASAN

Daffodil International University
Department of Software Engineering
Faculty of Science & Information Technology
Lab ~~Assessment~~ Final, Spring 2026
Course Code: SE215; Course Title: Algorithm Design & Analysis Lab
Sections & Teachers: 43E1 (AF)

Time: 40 Minutes **Marks: 25**

Question 1: You are given n items, each with weight and value. Also given a knapsack with capacity W. Write a program using **Dynamic Programming** to determine the **maximum total value** that can be obtained without exceeding the capacity.

Input:

- First line: Integer n (number of items)
- Second line: n integers (weights)
- Third line: n integers (values)
- Fourth line: Integer W (capacity)

Output:

- Maximum achievable value

Sample Input	Sample Output
4 2 3 4 5 3 4 5 6 5	Maximum value = 7

Question 2: You are given n items, each with weight and value, and a knapsack with capacity W. You must solve the **Fractional Knapsack** problem using a greedy approach.

Special Condition:

- Take the **last two digits of your student ID**
- If their **sum is even → use Insertion Sort**
- If their **sum is odd → use Selection Sort**
  to sort items based on **value/weight ratio (descending)** before applying greedy selection.
- Show the calculation in the word file

Input:

- First line: Integer n
- Second line: n weights
- Third line: n values
- Fourth line: Capacity W

ourdiu.com | Shared by MAHMUDUL HASAN

Output:

- Maximum obtainable value (fraction allowed)

Requirements:

- Must implement the specified sorting algorithm manually

Sample Input	Sample Output
3 10 20 30 60 100 120 50	Maximum value = 240.00