CSE246: Algorithm (Section 3)
[Fall 2023]

Project Title: Algorithm Course Project

Submitted to

Amit Mandal
Lecturer
Department of Computer Science & Engineering
East West University

Submitted by

Student ID	Student Name
2021-2-60-109	Md. Miskat Hossain
2021-2-60-130	Md.Faishal Ahmed Rudro
2021-2-60-082	Md Nafiz Mustafa
2021-2-60-016	Seaum insaniat Swapnil

Submission Date: 26/12/2023

Problem-set:

Bill Gates wants to go shopping. He is facing some sweet problems. He has many malls in his city. But the problem is that not all malls contain everything, and the distance is not the same. So he has to visit different malls to get the necessary things. He needs help deciding which malls to go to utilize his entire time. Now, write a program to use his whole time. Also, he has a variety of coins. He can use them infinite times. Only select the malls that accept his set of coins.

Input:

```
Input the number of Activities/Shopping Malls: 4
Input the number of coins variety: 5
Enter the numbers of shopping starting, finishing time and spent coins of
Activity 1: 1 10 2
Activity 2: 9 20 12
Activity 3: 21 30 22
Activity 4: 23 40 1
Enter the amount of each coins: 2 5 10 20 50
```

Output:

```
1 Activity Start at 1, Finish at 10 Selected
Possible to Pay with 2  Coins

3 Activity Start at 21, Finish at 30 Selected
Possible to Pay with 20 2 Coins
```

Explanation: In this case, activities are considered as shopping malls. Firstly, all of the activities will be sorted based on finishing time. Then, we compare the starting time of an activity with the activity that finishes first. Based on comparing, we select activities.

But here comes a twist: we also checked if Bill Gates can pay with his coins. If he cant, we did not select that activity. We select the very next activity of that activity.

Input:

```
Input the number of Activities/Shopping Malls: 1
Input the number of coins variety: 6
Enter the numbers of shopping starting, finishing time and spent coins of
Activity 1: 1 10 1
Enter the amount of each coins: 50 20 10 4 8 2
```

Output:

```
No more activities available.
Process returned 0 (0x0)   execution time : 24.604 s
Press any key to continue.
```

Impact of Algorithm Course (CSE246) for this project:

We have solved the problem based on Algorithm course knowledge. Here, we implemented various algorithms that were taught in our course. Some more points are given below:

1. Bubble sort is used to sort starting, finishing time, and balance spent.
2. The concept of the Activity Selection Problem (Greedy approach) is used in the project.
3. The idea of the Coin Change Problem (Dynamic Programming) is used in the project.
4. We can solve any critical problem with the help of Algorithm course knowledge. In this case, we considered the set of coins while selecting the activity.

Algorithms used in our project:

1. Bubble sort
2. Activity Selection Problem (Greedy approach)
3. Coin Change Problem (Dynamic Programming)