CSC210 Advanced Algorithm and Design Lab
13/02/2023

Time: 1 Hour

Instructions
1. Write the programs with proper comments and indentation
2. Create a directory <Admission Number>_<Date> [21JEXXXX_090122], copy all the files into it and **upload in Google Class Room**
3. Submit a single C/C++ source file
4. Do not use STL calls
5. Each program should start with these comment lines:
/*
Name:
ID No:
***/**

Q1. A student is registering for courses and can take a maximal credit of N. There are n courses available in the semester and credit of ith course is ci and its utility is ui. What courses should the student take?

In this context, the courses should be selected in such a way that the student will register for those coursess for which he will gain maximum utility. Hence, the objective of the student is to maximize the utility.

Write two functions *Fraction_Register and Binary_Register* that take the credit, utility, and course details as input. In Fraction_Register, a student is allowed to take a fraction of the course and in Binary_Register a student can either take or drop a course. Print the courses, fractions, and total utility obtained in these two approaches. Further, print the difference between the computed optimal utility and the actual optimal utility. [Additional inputs might be taken with justification] [40+40]

The **main()** function:

1. Take input (number of courses n) from user. Take the corresponding credit (c) and utility (u) for each of the courses and maximal credit N. [20]

2. Call *Fraction_Register and Binary_Register* to find out the optimal solutions and their difference from actual optimal solution [40] + [40]

Example

Course	A	B	C	D
Utility	280	100	120	120
Credit	40	10	20	24

N = 60

Actual Optimal: A,B,50% of C = 380 + 60 = 440

Fraction_Register: 440 Difference = 0

Binary_Register: 400 Difference = 40