NATIONAL UNIVERSITY OF COMPUTER & EMERGING SCIENCES ISLAMABAD CAMPUS

Design and Analysis of Algorithms (CS302) – Spring 2019
ASSIGNMENT-4

Due Date: 8TH April 2019 Before 9:30am At Sir Ahmad Nawaz Office in sends lab.

Instructions:

1. *Write the C++ programs for Algorithms.*
2. *Do not **plagiarize**.*
3. *Write the clear answer for each question.*
4. *Late assignments will not be acceptedt.*

Question # 1

Suppose you are standing in the room of n*m length. There are cells on the floor that have certain value (gift). Considering you are standing on the top left corner (cell) of the room. You have to reach the bottom right corner of the room by collecting the gifts. But you can only move in right or forward direction (left and backward is not allowed). Determine the maximum value of the gifts that you can collect. **Input and expected output :**

Values of gifts in cells

1	**10**	**3**	**8**
12	**2**	**9**	**6**
5	**7**	**4**	**11**
3	**7**	**16**	**5**

Maximum attainable value of gifts=53

Question # 2

Suppose there are n adjacent bags are placed in the classroom and thief has to steal something from bag but the condition is that he cannot steal from two adjacent bags. What is the maximum value thief can steal

Input and expected output :

Number of bags=7

Values in each bag []=9, 3, 5, 8, 2, 4, 7

Maximum stolen value =24 by stealing from 1st, 4th and 7th house

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Question # 3

In a game you can only score 3 5 or 10 points in a single move. If you are given with S score then find the number of ways so that you can reach the given score considering specified move.

Input and expected output:

Score=22

No. of ways=2 using 3+3+3+3+5+5, 3+3+3+3+10

Question # 4

You are given n numbers and selecting subset from that n number in such a way that their sum is equal to given value S. Find whether there exist any subset whose sum is equal to the given S.

Input and expected output :

Sum=17

n=4

A[]={2,4,6,9}

Required subset exists subset {2,6,9} has the Sum 17

Question #5

You are given with a wire of length n and you are also given with market rate of a wire of a length. The problem is to cut the wire in such a way that when you sell them the profit will be maximum.

Input and expected output : **Given length =5**

Length =1 Rate= 2

Length =2 Rate= 3

Length =3 Rate= 7

Length =4 Rate= 8

Length =5 Rate= 10

Expected result=11 by cutting the rod in pieces of sizes 1,1 and 3