CME 2204 Assignment-2
Dynamic Programming

07.05.2023 23:55 (Sharp deadline – No extension)

Rules :

- The submissions will be checked for the code similarity. Plagiarism will be graded as zero.
- Other rules are explained at the end of this document.

Scenario of the Assignment:

Assume that you are the owner of a football club. Your club has enough trainers to improve and promote **'p'** players to the main squad from the youth team. Some other clubs ask to rent players from your club and make several demands for renting players from your club. The number of demands can be different from year to year. You should design a renting plan for the next ***'n'*** years. Consider ***'i'*** is the index of each year (*i=1,…,n)* and y_i is the number of players will be requested to rent for i^{th} year. If your club needs to promote more than ***'p'*** players for a year, you can hire some coaches, paying ***'c'*** TL costs per player for that year. However, if your club keeps any unrented player in that year, you should pay a **'salary'** for a such player**.**

An example to understand the problem:

Your current trainers can promote p=5 players in a year, for a four years' plan (n=4), y[ ] = { 8, 4, 7, 4 } and Salary(1) = 5, Salary(2)= 7, Salary(3)=10, Salary(4)=12, Salary(5)=13, etc. and c=10 TL.

For the first year, your trainers can promote 5 players, however, the demand is 8. You can hire coaches with the cost of *c*(8-5)=10*3= 30* TL.

For the second year, the demand is 4, will you promote 5 players and keep 1 player in the squad for the next years for not paying coach costs? Or will you just promote just 4 players?

You are expected to design a ***dynamic programming*** approach that computes the **minimum** total costs to promote players for the planned *n* years.

Some variables are given in the ***'yearly_player_demand.txt'*** *and* ***'players_salary.txt'*** files.

The rest of variables (***'n', 'p', 'c'***) will be assigned to constant values at the beginning of the code as shown in Table-1.

You are expected to write a ***Scientific Report*** that explains completed and uncompleted parts of your code. Your report should include run-time complexity and space complexity for the dynamic programming approach that you coded.

How to upload the documents (report and java file)?

As we cannot control the code face to face on these days, we expect your sensitivity in order and format.

You must create only ***one*** java file named as "Name_Surname_StudentID.java" that includes the main, and some functions for dynamic programming approach as seen in Table-1. Also, your report must be named as "Name_Surname_StudentID.pdf". Then, copy these two files in a folder and archive it as a .rar or .zip etc. And upload the archived file such as "Name_Surname_StudentID.rar" or "Name_Surname_StudentID.zip" to the course page on Sakai.

Table-1: "What must be in your code? " and "Default start values of variables"

Ali_Veli_2023510999.java

```
public class Ali_Veli_2023510999 {
      public int DP(...) {
      ...
      }
      //You can add different functions here...
      public static void main (String [] args) {
                int n=3, p=5, c=5;
                //read files...
                .......  //Your code
                System.out.println("DP Results:" + Cost);
                            }
      }
```

How will you be graded?

Item	%
Dynamic Programming Approach	70
Report	25
Correct File Naming	5

Note: *No questions will be answered via whatsapp or any social media application. Only questions via* ***e-mail*** *will be answered*.

Good Luck!