National University of Computer & Emerging Sciences, Karachi

Fall-2019

CS-Department

Final Examination

3rd December2019, 1:30 pm – 3:30 pm

Course Code: CL-103	Course Name: Object Oriented Programing Lab
Instructor Name / Names: Ms. FARAH SADIA	
Student Roll No:	Section No: Gr1(Tuesday)

Instructions:

- Return the question paper.
- Read each question completely before answering it. There are **3 questions and 2 pages**
- In case of any ambiguity, you may make assumption. But your assumption should not contradict any statement in the question paper.

Time: 120 minutes. **Max Marks:** 30 points

Question 1: 10 marks

Design a class to perform various matrix operations. A matrix is a set of numbers arranged in rows and columns. Therefore, every element of a matrix has a row position and a column position. If A is a matrix of five rows and six columns, we say that the matrix A is of the size 5x6 and sometimes denote it as A 5x6. Clearly, a convenient place to store a matrix is in a two-dimensional array. Two matrices can be added and subtracted if they have the same size. Suppose $A = [aij]$ and $B = [bij]$ are two matrices of the size n x n, in which a_{ij} denotes the element of A in the i^{th} row and the j^{th} column and so on. The sum and difference of A and B are given by:

$A+B = [a_{ij} + b_{ij}]$

$A-B=[a_{ij} - b_{ij}]$

The multiplication of A and B (A*B) is defined only if the number of columns of A is the same as the number of rows of B. If A is of the size m * n and B is of the size n * t, then $A * B = [c_{ij}]$ is of the size m*t and the element c_{ij} is given by the formula:

$C_{ij} = a_{i1}b_{1j} + a_{i2}b_{2j} + \ldots + c_{in}b_{nj}$

Design and implement a Class matrixType that can store a matrix of any size. Overload the operators +, - and * to perform the addition, subtraction, and multiplication operations, respectively, and overload the operator << to output a matrix. Also, write a test program to test various operations on the matrices and store the resultant metric in the file "Result.txt".

Question #02: Marks: 10

You are hired as an analyst for the Pakistan cricket team. You are required to maintain information for players and produce analysis. A player can either be a Test player or T20 player but a cricketer who plays in ODIs must be a player of both Tests & T20s. Anyways, for each player you must store his name, role (batsman, bowler, all-rounder or wicket-keeper), matches played, runs scored, highest score, batting average (runs scored divided by matches played), best bowling figures, wickets taken, bowling average (wickets taken divided by matches played), catches & stumping. As part of the cricket board's policy, any team (whether Test, ODI or T20) must contain 4 specialist batsmen, 2 all-rounders, 1 wicketkeeper & 4 bowlers.

the best four batsman (those having the highest average), the best possible all-rounders (those who've scored the most runs in their career), the best wicket-keeper (the one with the most catches & stumping) and best four bowlers (those having the highest bowling average). Remember that your function(s) must be flexible i.e. whenever called it must always produce the best possible team even after new players are inducted & old players leave.

Note:*For a specialist batsman there would be no bowling average, so you may initialize similar inapplicable fields for any player with zero.*

Question # 03: Marks: 10

Write a C++ program using class template that has ten sets of age and name pairs, such as 17 Talha and 25 Sara. Display all the 10 pairs. The program should enable the user to enter a age and view the person having that age.