Structure

1. **Write a program that defines two structures Data and Employee. Date has data members: name (int), age (float), salary (loat), tax (flat). Employee has data members: E (Data) net_s(float), a function to read data members and set the value of the net_s(net salary), a function to display data members. Also, in this program write a function to swap two Employee objects. In main function, define an array of m Employees, read it, sort it in ascending order according to the value of net_s (use swap function), and compute the difference between the min and max net salaries. Finally, display the elements of array in a tabular form.**

2. **Write a program contains a function to return the factorial of a given positive integer number (check if the given number negative convert it). It contains the structure Series that has data members: a (float), X[20] (float), S[20] (double) , n (number of array's elements). It contains a function to read data members and set the elements of S such that each element S_i is equal to $\sum_{k=0}^{i} \binom{i}{k} X_i \; a^{i-k}$ for i=0, ..,n-1 by using factorial function, a function to return the maximum number in S , and a function to display data members X, S in tabular form. In main function, define two objects of Series and display the difference between max values for them. Also, compare between them and display the object with max value.**

Class

1. **Write a program contains a class Data that has data members X[30](float), h(int), T[30](char), n (number of elements of X, T). It contains a function to read data members, and to set the elements of T such that each element T_i = 'Y' if X_i is divisible by h and 'N' otherwise, a function to return the number of X's elements that are not divisible by h by using T' s elements, a function to return the average of all elements of X that are divisible by h by using T' s elements, a function to display data members, and a function to compare between the X's averages for two objects and display the object with max value. In main function, define two objects of Data class, and apply all functions on them.**

2. **Write a program contains a structure Point that has data members: x, y, z as float. This program contains a class Point_3D that has data members: P[30](Point), N[30] (float), and m(number of elements for P, N). This class includes a function to return the norm for a given Point's object, a function to read data members and set the elements of N such that each N_i is the norm of point P_i for i=0, .. , m-1. It contains a function to return the distance between the first and last points in P, a function to return the max norm in N, a function to compare between max norm for two objects and return the max object, a function to return the minimum distance for first and last points for two objects, and a function to display the data members in tabular form. In main function, define two object of class Point_3D, and apply all functions on them.**

Homework

1. **Write a program contains a structure Date that has data members: d(int), m(int) , y(int), a function to read data members, and a function to display data members in date format . Also, it contains the structure Student that has data members: name (string), BD (Date), G[7] (float) (seven student's grades). It contains a function to read data member, a function to return the average of student's grades, and a function to display data members. In main function, define an array of n Student, read this array, and display only the students with min and max averages.**

2. **Write a program contains a class Num that has data members: N[10] (float) , m (number of elements), and TP[10](string) This class includes a function to return the factorial of a given number positive integer number, a function to test if a given number prime or not, a function to read data members and set the elements of T such that each T_i is equal to "Yes" if N_i prime number and "No" otherwise. It contains:**
   a. **a function to return the following sum:**
      $\sum N_i!$ **N_i prime number (use TP's elements)**
   b. **a function to return the following product:**
      $\prod N_i!$ **N_i is not prime number (use TP's elements)**
   c. **a function to display the data members in tabular form.**

In main function, define an object of class Num and apply all functions on it.