

1. Write a program contains a function to read an array of n integer numbers, a function to test a given number prime or not, and a function to test a given number even or not. Write two versions of overloaded functions, the first version function returns the average of all prime numbers in a given array. The second version returns the average of even numbers or the average of odd numbers in a given array according to the value of a given character ('E' or 'e') or ('O' or 'o'). In main function, define an array of m integer numbers, a character c, and call the functions on them.
2. Write a program contains a struct Data that has data members A[30](float), y(int), T[30](string), n (number of elements of A, T). It contains a function to read data members, and set the elements of T such that each element $T_i = \text{"yes"}$ if A_i is divisible by y and "no" otherwise, a function to return the number of A's elements that are not divisible by y (use T), a function to return the average of all elements of A that are divisible by y (use T), a function to display data members in tabular form. The program contains a function to compare between the A's averages for two objects and display the object with max value. In main function, define two objects of Data class, and call the functions on them.

Homework

Write a program contains a function to return the factorial of a given positive integer number (check if the given number negative convert it). A function to return $\binom{a}{b}$ for two given positive integer a, b (if not convert them). It contains the structure Data that has data members: x (float), D[20] (float), S[20] (double) , n (number of array's elements). It contains a function to read data members (D, x (if equal zero reread it)) and set the elements of S such that each element S_i is equal to $\sum_{j=0}^i \binom{i}{j} \frac{x}{|D_j|} \quad D_i \neq 0$ if not put it 1 *for* $i = 0, \dots, n - 1$, a function to return the minimum element in S, and a function to display data members D, S in tabular form. In main function, define two objects of Data and display the difference between minimum values for them. Also, compare between them and display the object with minimum value.