PROGRAMMING FUNDAMENTALS

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Sy-hash-collab

Write a program in c++ that inputs ten integers in an array and counts all prime numbers entered by user . the program finally displays total number of primes in array. write this using arrays

```
#include <iostream>

// Function to check if a number is prime
bool isPrime(int num) {
 if (num <= 1)
        return false;

    for (int i = 2; i <= num / 2; i++) {
        if (num % i == 0)
            return false;
    }

    return true;
}

int main() {
    const int SIZE = 10;
 int numbers[SIZE];
int primeCount = 0;

    // Input numbers from the user
    std::cout << "Enter ten integers: ";
    for (int i = 0; i < SIZE; i++) {
        std::cin >> numbers[i];
    }
```

```
// Count the prime numbers
   for (int i = 0; i < SIZE; i++) {
      if (isPrime(numbers[i])) {
         primeCount++;
      }
   }

   // Display the total number of primes
 std::cout << "Total prime numbers entered: " << primeCount << std::endl;

   return 0;
}
```

Write a program in c++ that uses two arrays to store the roll number and marks of student . It inputs roll numbers and marks of five students and store them in corresponding elements of arrays. The program finally displays the roll number and marks of student with highest marks

```
#include <iostream>
using namespace std;

int main() {
const int SIZE = 5; // Number of students

   int rollNumbers[SIZE];
 int marks[SIZE];

   // Input roll numbers and marks
   for (int i = 0; i < SIZE; i++) {
      cout << "Enter the roll number of student " << i + 1 << ": ";
```

```
        cin >> rollNumbers[i];


        cout << "Enter the marks of student " << i + 1 << ": ";
        cin >> marks[i];
    }


    // Find the student with the highest marks
 int maxMarks = marks[0];
int maxIndex = 0;
    for (int i = 1; i < SIZE; i++) {
        if (marks[i] > maxMarks) {
        maxMarks = marks[i];
        maxIndex = i;
        }
    }


    // Display the roll number and marks of the student with the highest marks
 cout << "Student with the highest marks:\n";
cout << "Roll number: " << rollNumbers[maxIndex] << endl;
cout << "Marks: " << marks[maxIndex] << endl;


    return 0;
}
```

Write a program in c++ that uses four arrays numbers , squares , cubes and sums each consisting of 10 elements . The number array store the value of its indexes , the square array store the square of its indexes , the cube array store the cubes of its indexes and sum array store the sum of indexes of three arrays . The program should displays the value of sum array and total of all values in sum array.

```
#include <iostream>

int main() {
    int numbers[10];
    int squares[10];
    int cubes[10];
    int sums[10];
    int total = 0;

    // Populate the arrays
    for (int i = 0; i < 10; i++) {
        numbers[i] = i;
        squares[i] = i * i;
        cubes[i] = i * i * i;
        sums[i] = numbers[i] + squares[i] + cubes[i];
        total += sums[i];
    }

    // Display the sum array
    std::cout << "Sum array:\n";
    for (int i = 0; i < 10; i++) {
        std::cout << sums[i] << " ";
    }
    std::cout << std::endl;

    // Display the total of all values in the sum array
    std::cout << "Total: " << total << std::endl;
```

```
    return 0;
}
```

Write a program in c++ that inputs the names and monthly salaries of 10 employes . The program checks the annual salary of each person . If the salary is greater than or equal to Rs 250000 then it prints name , salary and message 'Tax to be paid" else it prints name , salary and message 'no tax"

```
#include <iostream>

#include <string>


using namespace std;


int main() {
 const int NUM_EMPLOYEES = 10;

 string names[NUM_EMPLOYEES];

double salaries[NUM_EMPLOYEES];


 // Input names and monthly salaries

 for (int i = 0; i < NUM_EMPLOYEES; i++) {

      cout << "Enter the name of employee " << i + 1 << ": ";

      getline(cin, names[i]);


      cout << "Enter the monthly salary of employee " << i + 1 << ": ";

      cin >> salaries[i];

      cin.ignore(); // Ignore the newline character

   }


 cout << "\nEmployee details:\n";
```

```
    // Check annual salaries and print details
     for (int i = 0; i < NUM_EMPLOYEES; i++) {
         double annualSalary = salaries[i] * 12;


        cout << "\nName: " << names[i] << endl;
        cout << "Salary: " << salaries[i] << " per month" << endl;


        if (annualSalary >= 250000) {
            cout << "Tax to be paid" << endl;
        } else {
            cout << "No tax" << endl;
        }
    }


    return 0;
}
```

Write a program in c++ that inputs ten integers in array . It displays the number of occurences of each number in array as:

3 is stored 4times in array

1 is stored 1 times in array

```
#include <iostream>
#include <unordered_map>


int main() {
    int arr[10];
 std::unordered_map<int, int> occurrences;
```

```
    std::cout << "Enter ten integers:" << std::endl;
    for (int i = 0; i < 10; i++) {
        std::cin >> arr[i];
        occurrences[arr[i]]++;
    }

 std::cout << "Occurrences of each number:" << std::endl;
    for (const auto& pair : occurrences) {
        int number = pair.first;
        int count = pair.second;
        std::cout << number << " is stored " << count << " times in the array" << std::endl;
    }

    return 0;
}
```

Write a program in c++ that inputsmarks of ten students . The program displays the number of students in each grade

80 or above A 60 to 79 40 to 59 below 40

B

C

F

```
#include <iostream>
using namespace std;

int main() {
 int marks[10];
    int gradeA = 0, gradeB = 0, gradeC = 0, gradeF = 0;
```

```
 cout << "Enter marks of 10 students: " << endl;
   for (int i = 0; i < 10; i++) {
      cout << "Student " << i + 1 << ": ";
      cin >> marks[i];

      if (marks[i] >= 80) {
         gradeA++;
      } else if (marks[i] >= 60 && marks[i] <= 79) {
         gradeB++;
      } else if (marks[i] >= 40 && marks[i] <= 59) {
         gradeC++;
      } else {
         gradeF++;
      }
   }

 cout << "Grade A: " << gradeA << " student(s)" << endl;
 cout << "Grade B: " << gradeB << " student(s)" << endl;
cout << "Grade C: " << gradeC << " student(s)" << endl;
cout << "Grade F: " << gradeF << " student(s)" << endl;

   return 0;
}
```

Write a program in c++ that uses three arrays Mango , Orange and Banana to store the number of fruits purchased by customer and stores them in corresponding arrays the program finally displays the total bill of each customer according to following prices

Rs 20 per mango

Rs 10 per orange

Rs 5 per banana

```
#include <iostream>

const int NUM_CUSTOMERS = 3;
const int NUM_FRUITS = 3;

int main() {
    int Mango[NUM_CUSTOMERS];
    int Orange[NUM_CUSTOMERS];
    int Banana[NUM_CUSTOMERS];
    int totalBill[NUM_CUSTOMERS];

    // Input the number of fruits purchased for each customer
    for (int i = 0; i < NUM_CUSTOMERS; i++) {
        std::cout << "Customer " << i + 1 << ":\n";
        std::cout << "Enter the number of Mangoes: ";
        std::cin >> Mango[i];
        std::cout << "Enter the number of Oranges: ";
        std::cin >> Orange[i];
        std::cout << "Enter the number of Bananas: ";
        std::cin >> Banana[i];
        std::cout << std::endl;
    }

    // Calculate the total bill for each customer
    for (int i = 0; i < NUM_CUSTOMERS; i++) {
```

```
        totalBill[i] = Mango[i] * 20 + Orange[i] * 10 + Banana[i] * 5;
    }

    // Display the total bill for each customer
    std::cout << "Bill Details:\n";
    for (int i = 0; i < NUM_CUSTOMERS; i++) {
        std::cout << "Customer " << i + 1 << ": ";
        std::cout << "Mangoes: " << Mango[i] << ", ";
        std::cout << "Oranges: " << Orange[i] << ", ";
        std::cout << "Bananas: " << Banana[i] << ", ";
        std::cout << "Total Bill: Rs " << totalBill[i] << std::endl;
    }

    return 0;
}
```

Write a program in c++ that inputs ten floating point numbers in array .It displays the values which are greater then average value of array

```
#include <iostream>
using namespace std;

int main() {
    const int SIZE = 10;
    float numbers[SIZE];
    float sum = 0.0, average;

    // Input the numbers
    cout << "Enter ten floating-point numbers:" << endl;
```

```
    for (int i = 0; i < SIZE; i++) {
        cout << "Number " << i + 1 << ": ";
        cin >> numbers[i];
        sum += numbers[i];
    }

    // Calculate the average
    average = sum / SIZE;

    // Display numbers greater than the average
    cout << "Numbers greater than the average value (" << average << "):" << endl;
    for (int i = 0; i < SIZE; i++) {
        if (numbers[i] > average) {
            cout << numbers[i] << " ";
        }
    }

    return 0;
}
```

Write a program in c++ that uses a two dimensional array to initialize the scores of students the students are arranged in five rows with five students in each row . The program inputs row number and student number in that row and then display the score of student

```
#include <iostream>

const int ROWS = 5;
const int COLS = 5;

int main() {
```

```
 int scores[ROWS][COLS] = {
    {85, 76, 90, 88, 92},
    {78, 82, 79, 85, 80},
    {90, 92, 88, 87, 86},
    {77, 80, 85, 89, 81},
    {95, 87, 91, 83, 79}
 };

 int row, student;

 std::cout << "Enter row number (0-4): ";
std::cin >> row;

 std::cout << "Enter student number in that row (0-4): ";
std::cin >> student;

 if (row < 0 || row >= ROWS || student < 0 || student >= COLS) {
    std::cout << "Invalid row or student number!" << std::endl;
    return 1;
 }

 std::cout << "Score of student at row " << row << " and student number " << student << ": ";
 std::cout << scores[row][student] << std::endl;

 return 0;
}
```

Write a program in c++ that declares a structure to store the distance covered by an player along with the minutes and seconds taken to cover the distance . the program should input the records of two players and then displays record of the winnner

```
#include <iostream>

struct PlayerRecord {
    double distance;
    int minutes;
    int seconds;
};

void inputPlayerRecord(PlayerRecord& record) {
    std::cout << "Enter distance covered (in meters): ";
    std::cin >> record.distance;

    std::cout << "Enter minutes taken: ";
    std::cin >> record.minutes;

    std::cout << "Enter seconds taken: ";
    std::cin >> record.seconds;
}

void displayPlayerRecord(const PlayerRecord& record) {
    std::cout << "Distance: " << record.distance << " meters\n";
    std::cout << "Time: " << record.minutes << " minutes and " << record.seconds << " seconds\n";
}

int main() {
    PlayerRecord player1, player2;

    std::cout << "Enter record for Player 1:\n";
```

```
    inputPlayerRecord(player1);

    std::cout << "\nEnter record for Player 2:\n";
    inputPlayerRecord(player2);

    std::cout << "\nPlayer 1's record:\n";
    displayPlayerRecord(player1);

    std::cout << "\nPlayer 2's record:\n";
    displayPlayerRecord(player2);

    // Comparing the distances covered by the players
    if (player1.distance > player2.distance) {
        std::cout << "\nPlayer 1 is the winner!\n";
    } else if (player2.distance > player1.distance) {
        std::cout << "\nPlayer 2 is the winner!\n";
    } else {
        std::cout << "\nIt's a tie!\n";
    }

    return 0;
}
```

Write a program in c++ that declares a structure to store tcode number salary , grade of employeee . The program defines two structure variables inputs records of two employees and then displays record of employee with more salary

```
#include <iostream>
using namespace std;

struct Employee {
```

```
    int tcode;
    float salary;
    char grade;
};

int main() {
    Employee emp1, emp2;

    // Input details for the first employee
    cout << "Enter details for Employee 1:\n";
    cout << "TCode: ";
    cin >> emp1.tcode;
    cout << "Salary: ";
    cin >> emp1.salary;
    cout << "Grade: ";
    cin >> emp1.grade;

    // Input details for the second employee
    cout << "\nEnter details for Employee 2:\n";
    cout << "TCode: ";
    cin >> emp2.tcode;
    cout << "Salary: ";
    cin >> emp2.salary;
    cout << "Grade: ";
    cin >> emp2.grade;

    // Compare the salaries and display the record of the employee with higher salary
    cout << "\nRecord of Employee with higher salary:\n";
```

```
    if (emp1.salary > emp2.salary) {
        cout << "TCode: " << emp1.tcode << endl;
        cout << "Salary: " << emp1.salary << endl;
        cout << "Grade: " << emp1.grade << endl;
    } else {
        cout << "TCode: " << emp2.tcode << endl;
        cout << "Salary: " << emp2.salary << endl;
        cout << "Grade: " << emp2.grade << endl;
    }

    return 0;
}
```

Write a program in c++ that declares a structure to store income , tax rate and tax of person The program defines an array of structure to store the record of five persons It inputs income and tax rate of five persons and then displays the tax payable

```
#include <iostream>

struct Person {
    double income;
    double taxRate;
    double tax;
};

int main() {
    Person persons[5];

    // Inputting income and tax rate for each person
    for (int i = 0; i < 5; i++) {
        std::cout << "Enter income for person " << i + 1 << ": ";
```

```
        std::cin >> persons[i].income;

        std::cout << "Enter tax rate for person " << i + 1 << ": ";
        std::cin >> persons[i].taxRate;
    }

    // Calculating tax payable for each person
    for (int i = 0; i < 5; i++) {
        persons[i].tax = persons[i].income * persons[i].taxRate;
    }

    // Displaying tax payable for each person
    std::cout << "\nTax Payable for each person:\n";
    for (int i = 0; i < 5; i++) {
        std::cout << "Person " << i + 1 << ": $" << persons[i].tax << std::endl;
    }

    return 0;
}
```

Write a program in c++ that declares a structure Book to store book id , book name and price it declares another structure Order that contains order id and array of book of length 5 . the program should define a variable of type order and input values from user the program finally displays the values .

```
#include <iostream>
using namespace std;

// Structure to store book details
struct Book {
    int bookId;
    string bookName;
```

```
    double price;
};

// Structure to store order details
struct Order {
    int orderId;
    Book books[5];
};

int main() {
    Order order;

    // Input order details from user
    cout << "Enter Order ID: ";
    cin >> order.orderId;

    cout << "Enter Book Details:\n";
    for (int i = 0; i < 5; i++) {
        cout << "Book " << (i + 1) << " ID: ";
        cin >> order.books[i].bookId;
        cout << "Book " << (i + 1) << " Name: ";
        cin.ignore();
        getline(cin, order.books[i].bookName);
        cout << "Book " << (i + 1) << " Price: ";
        cin >> order.books[i].price;
        cout << endl;
    }
```

```
    // Display order details
    cout << "\nOrder ID: " << order.orderId << endl;
    cout << "Book Details:\n";
    for (int i = 0; i < 5; i++) {
        cout << "Book " << (i + 1) << " ID: " << order.books[i].bookId << endl;
        cout << "Book " << (i + 1) << " Name: " << order.books[i].bookName << endl;
        cout << "Book " << (i + 1) << " Price: $" << order.books[i].price << endl;
        cout << endl;
    }

    return 0;
}
```