

NAME : Sinwan Haider

Sapp : 56275

Section :CS3-1

Subject : Data Structure

Lab task 03

QUESTION # 01 :

```
#include <iostream>
#include <conio.h>
using namespace std;
int main()
{
    int rows, cols;
    cout << "Enter number of rows: ";
    cin >> rows;
    cout << "Enter number of columns: ";
    cin >> cols;
    int arr[rows][cols];
    cout << "Enter elements of the array: ";
    for (int i = 0; i < rows; i++) {
        for (int j = 0; j < cols; j++) {
            cin >> arr[i][j];
        }
    }
}
```

```

int sum = 0, multiplication = 1;
for (int i = 0; i < rows; i++) {
    for (int j = 0; j < cols; j++) {
        sum += arr[i][j];
        multiplication *= arr[i][j];
    }
}
double average = (double)sum / (rows * cols);
cout << "Sum: " << sum << endl;
cout << "Multiplication: " << multiplication << endl;
cout << "Average: " << average << endl;
return 0;
}

```

OUTPUT

```

Enter number of rows: 2
Enter number of columns: 2
Enter elements of the array: 2
2
2
2
Sum: 8
Multiplication: 16
Average: 2

```

Question no 2

```
#include <iostream>
```

```
using namespace std;
```

```
int main() {
```

```
    int a= 3, b =4;
```

```
int* ptrA = &a;

int* ptrB = &b;

int temp = *ptrA;

*ptrA = *ptrB;

*ptrB = temp;

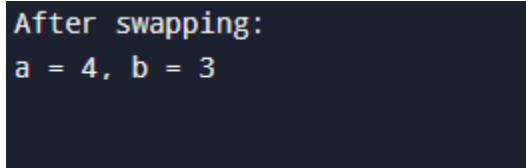

cout << "After swapping: " << endl;

cout << "a = " << a << ", b = " << b << endl;


return 0;

}
```

Output:



```
After swapping:
a = 4, b = 3
```

Question # 03

```
#include <iostream>

using namespace std;


int main() {

    int array[5];

    cout << "Enter 5 values: ";

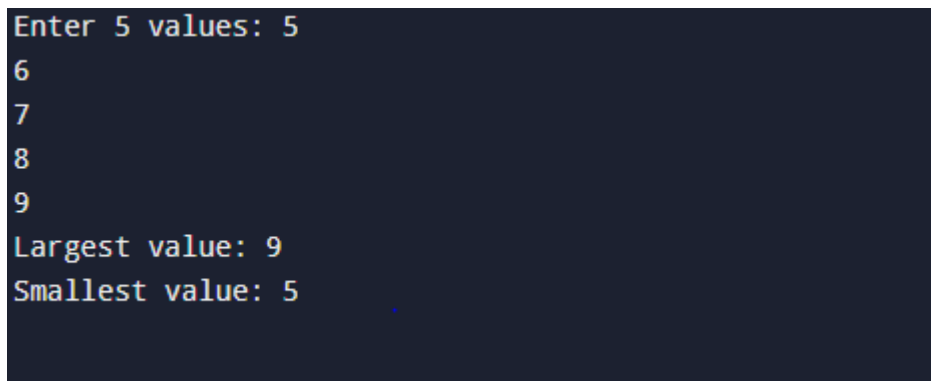
    for (int i = 0; i < 5; i++) {

        cin >> array[i];

    }
```

```
int largest = array[0], smallest = array[0];  
for (int i = 1; i < 5; i++) {  
    if (array[i] > largest) {  
        largest = array[i];  
    }  
    if (array[i] < smallest) {  
        smallest = array[i];  
    }  
}  
  
cout << "Largest value: " << largest << endl;  
cout << "Smallest value: " << smallest << endl;  
  
return 0;  
}
```

Output:

A screenshot of a terminal window with a dark background. It shows the output of a C++ program. The first line is the prompt "Enter 5 values: 5" followed by four lines of input: "6", "7", "8", and "9". The next two lines are the program's output: "Largest value: 9" and "Smallest value: 5".

```
Enter 5 values: 5  
6  
7  
8  
9  
Largest value: 9  
Smallest value: 5
```

Question # 04

```
#include <iostream>
```

```
using namespace std;
```

```
int main() {  
    double rainfall[12];  
    cout << "Enter rainfall for each of 12 months: ";  
    for (int i = 0; i < 12; i++) {  
        cin >> rainfall[i];  
    }  
    double totalRainfall = 0;  
    for (int i = 0; i < 12; i++) {  
        totalRainfall += rainfall[i];  
    }  
    double averageRainfall = totalRainfall / 12;  
    int highestMonth = 0, lowestMonth = 0;  
    for (int i = 1; i < 12; i++) {  
        if (rainfall[i] > rainfall[highestMonth]) {  
            highestMonth = i;  
        }  
        if (rainfall[i] < rainfall[lowestMonth]) {  
            lowestMonth = i;  
        }  
    }  
  
    cout << "Total rainfall: " << totalRainfall << endl;  
    cout << "Average monthly rainfall: " << averageRainfall << endl;  
    cout << "Highest rainfall in month: " << highestMonth + 1 << endl;  
    cout << "Lowest rainfall in month: " << lowestMonth + 1 << endl;  
  
    return 0;  
}
```

```
}
```

Output:

```
Enter rainfall for each of 12 months: 21
22
232
4
45
78
25
45
79
44
25
4
Total rainfall: 415
Average monthly rainfall: 34.5833
Highest rainfall in month: 9
Lowest rainfall in month: 4
```

Question # 05

```
#include <iostream>
```

```
using namespace std;
```

```
int main() {
```

```
    int arr[3][3] = {{1, 2, 3}, {4, 5, 6}, {7, 8, 9}};
```

```
    int total = 0;
```

```
    for (int i = 0; i < 3; i++) {
```

```
        for (int j = 0; j < 3; j++) {
```

```
            total += arr[i][j];
```

```
    }  
}
```

```
double average = (double)total / (3 * 3);
```

```
cout << "Total: " << total << endl;
```

```
cout << "Average: " << average << endl;
```

```
int rowTotal[3] = {0, 0, 0};
```

```
for (int i = 0; i < 3; i++) {
```

```
    for (int j = 0; j < 3; j++) {
```

```
        rowTotal[i] += arr[i][j];
```

```
    }
```

```
}
```

```
int colTotal[3] = {0, 0, 0};
```

```
for (int i = 0; i < 3; i++) {
```

```
    for (int j = 0; j < 3; j++) {
```

```
        colTotal[j] += arr[i][j];
```

```
    }
```

```
}
```

```
int highestInRow[3] = {arr[0][0], arr[1][0], arr[2][0]};
```

```
for (int i = 0; i < 3; i++) {
```

```
    for (int j = 1; j < 3; j++) {
```

```
        if (arr[i][j] > highestInRow[i]) {
```

```
            highestInRow[i] = arr[i][j];
```

```
        }
```

```
    }
```

```
}
```

```
int highestInCol[3] = {arr[0][0], arr[0][1], arr[0][2]};
```

```
for (int i = 1; i < 3; i++) {
```

```
    for (int j = 0; j < 3; j++) {
```

```
        if (arr[i][j] > highestInCol[j]) {
```

```
            highestInCol[j] = arr[i][j];
```

```
        }
```

```
    }
```

```
}
```

```
cout << "Row totals: ";
```

```
for (int i = 0; i < 3; i++) {
```

```
    cout << rowTotal[i] << " ";
```

```
}
```

```
cout << endl;
```

```
cout << "Column totals: ";
```

```
for (int i = 0; i < 3; i++) {
```

```
    cout << colTotal[i] << " ";
```

```
}
```

```
cout << endl;
```

```
cout << "Highest in each row: ";
```

```
for (int i = 0; i < 3; i++) {
```

```
    cout << highestInRow[i] << " ";
```

```
}
```

```
cout << endl;
```



```

    cout << "Highest in each column: ";

    for (int i = 0; i < 3; i++) {

        cout << highestInCol[i] << " ";

    }

    cout << endl;

    return 0;
}

```

Output:

```

Total: 45
Average: 5
Row totals: 6 15 24
Column totals: 12 15 18
Highest in each row: 3 6 9
Highest in each column: 7 8 9

```

Question # 06

```

#include <iostream>

using namespace std;

int main() {

    int size=2 ;

    int* arr = new int[size];

    cout << "Enter elements of the array: ";

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

        cin >> arr[i];
    }
}

```

```

    }

    int sumOfOdd = 0;
    for (int i = 0; i < size; i++) {
        if (arr[i] % 2 != 0) {
            sumOfOdd += arr[i];
        }
    }

    cout << "Sum of odd integers: " << sumOfOdd << endl;

    delete[] arr;

    return 0;
}

```

Output:

```

Enter elements of the array: 5
3
Sum of odd integers: 8

```

Question # 07

```

#include <iostream>

using namespace std;

int main() {

```

```
int a = 5;

int* ptrA = &a;

cout << "Value of a: " << a << endl;
cout << "Address of a: " << &a << endl;
cout << "Value of ptrA: " << ptrA << endl;
cout << "Value at address ptrA: " << *ptrA << endl;

return 0;
}
```

Output:

```
Value of a: 5
Address of a: 0x7ffc9ccba7a4
Value of ptrA: 0x7ffc9ccba7a4
Value at address ptrA: 5
```

Question # 08

```
#include <iostream>

using namespace std;

int main() {

    int a=2, b=3;

    int* ptrA = &a;
```

```
int* ptrB = &b;

cout << "Value of a: " << a << endl;
cout << "Value of b: " << b << endl;
cout << "Value of ptrA: " << ptrA << endl;
cout << "Value of ptrB: " << ptrB << endl;
cout << "Value at address ptrA: " << *ptrA << endl;
cout << "Value at address ptrB: " << *ptrB << endl;

return 0;
}
```

Output:

```
Value of a: 2
Value of b: 3
Value of ptrA: 0x7ffe3b424efc
Value of ptrB: 0x7ffe3b424ef8
Value at address ptrA: 2
Value at address ptrB: 3
```

Question # 09

```
#include <iostream>
```

```
using namespace std;
```

```
int main() {
    int choice;
```

```
double num1, num2, result;
```

```
cout << "Calculator Menu:" << endl;
```

```
cout << "1. Addition" << endl;
```

```
cout << "2. Subtraction" << endl;
```

```
cout << "3. Multiplication" << endl;
```

```
cout << "4. Division" << endl;
```

```
cout << "Enter your choice: ";
```

```
cin >> choice;
```

```
cout << "Enter two numbers: ";
```

```
cin >> num1 >> num2;
```

```
switch (choice) {
```

```
    case 1:
```

```
        result = num1 + num2;
```

```
        break;
```

```
    case 2:
```

```
        result = num1 - num2;
```

```
        break;
```

```
    case 3:
```

```
        result = num1 * num2;
```

```
        break;
```

```
    case 4:
```

```
        if (num2 != 0) {
```

```
            result = num1 / num2;
```

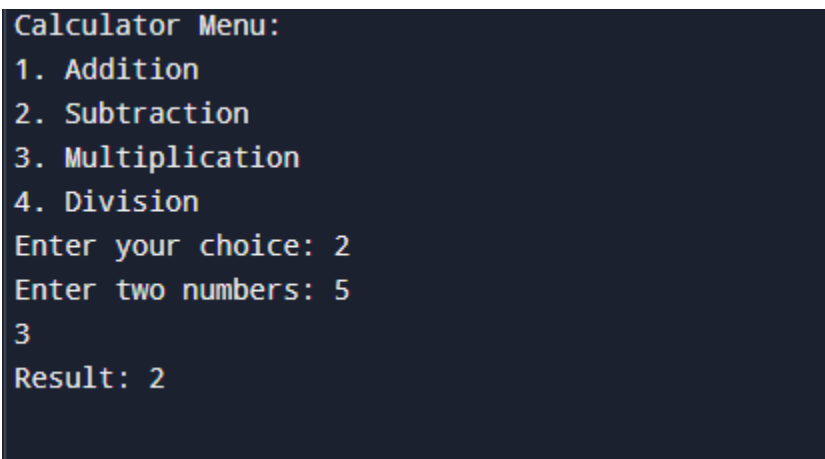
```
        } else {
```

```
            cout << "Error: Division by zero!" << endl;
```

```
            return 1;
```

```
    }  
    break;  
default:  
    cout << "Error: Invalid choice!" << endl;  
    return 1;  
}  
  
cout << "Result: " << result << endl;  
  
return 0;  
}
```

Output:



```
Calculator Menu:  
1. Addition  
2. Subtraction  
3. Multiplication  
4. Division  
Enter your choice: 2  
Enter two numbers: 5  
3  
Result: 2
```