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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:

```
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: