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**Programme :- BSCS 3-1**

## **Assignment #2**

### **Q1**

```
#include <iostream>
```

```
using namespace std;
```

```
int main() {
```

```
    int rows, cols;
```

```
    cout << "Enter number of rows: ";
```

```
    cin >> rows;
```

```
    cout << "Enter number of columns: ";
```

```
    cin >> cols;
```

```
    int** array = new int*[rows];
```

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

```
        array[i] = new int[cols];
```

```
    }
```

```
int sum = 0;
```

```
int product = 1; // Initialize product
```

```
cout << "Enter the elements of the " << rows << "X" << cols << "  
array:" << endl;
```

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

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

```
        cout << "Element [" << i << "][" << j << "]: ";
```

```
        cin >> array[i][j];
```

```
        sum += array[i][j]; // Add element to sum
```

```
        product *= array[i][j]; // Multiply element to product
```

```
    }
```

```
}
```

```
double average = static_cast<double>(sum) / (rows * cols);
```

```
cout << "Sum of all elements: " << sum << endl;
```

```
cout << "Product of all elements: " << product << endl;
```

```
cout << "Average of all elements: " << average << endl;
```

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

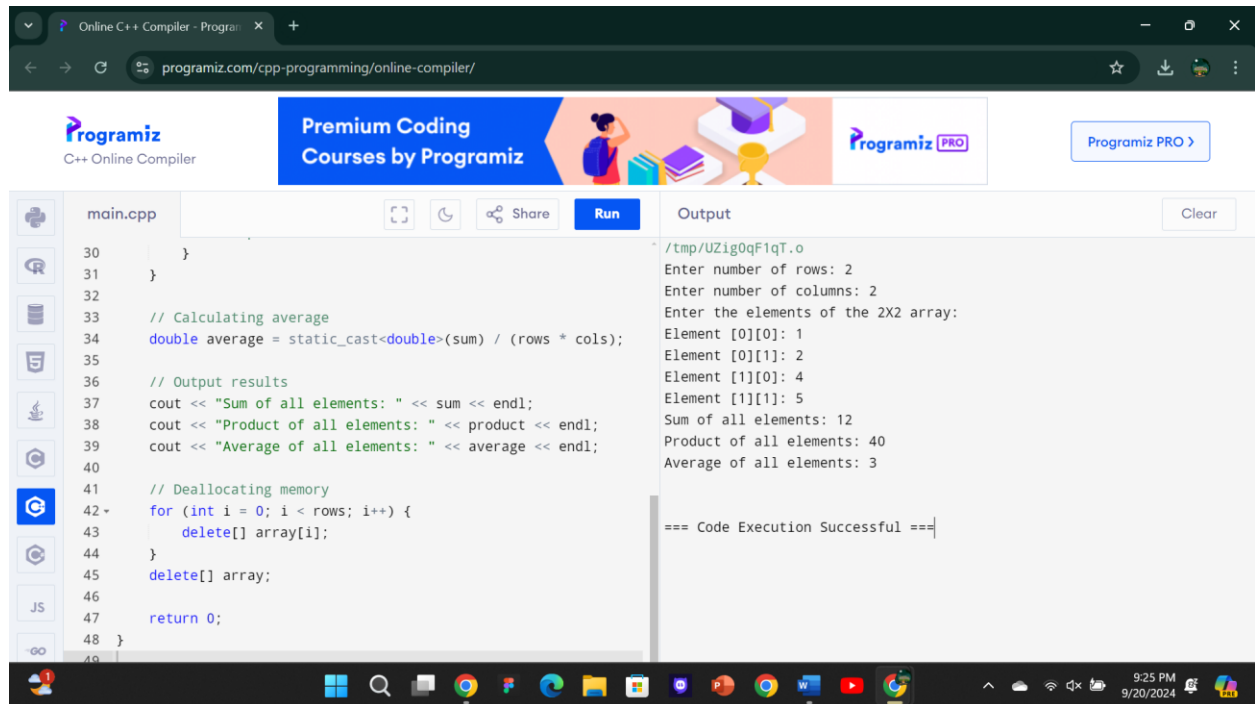
```
    delete[] array[i];
```

```
}
```

```
delete[] array;
```

```
return 0;
```

```
}
```



The screenshot displays the Programiz Online C++ Compiler interface. The browser address bar shows the URL `programiz.com/cpp-programming/online-compiler/`. The page header includes the Programiz logo, a banner for "Premium Coding Courses by Programiz", and a "Programiz PRO" button. The main workspace is divided into two panels: a code editor on the left and an output panel on the right. The code editor shows a C++ program in `main.cpp` with line numbers 30 to 49. The program calculates the sum, product, and average of a 2x2 array. The output panel shows the execution results, including the input values and the calculated results. The status bar at the bottom indicates "Code Execution Successful".

```
30     }
31 }
32
33 // Calculating average
34 double average = static_cast<double>(sum) / (rows * cols);
35
36 // Output results
37 cout << "Sum of all elements: " << sum << endl;
38 cout << "Product of all elements: " << product << endl;
39 cout << "Average of all elements: " << average << endl;
40
41 // Deallocating memory
42 for (int i = 0; i < rows; i++) {
43     delete[] array[i];
44 }
45 delete[] array;
46
47 return 0;
48 }
49
```

Output:

```
/tmp/UZig0qF1qT.o
Enter number of rows: 2
Enter number of columns: 2
Enter the elements of the 2X2 array:
Element [0][0]: 1
Element [0][1]: 2
Element [1][0]: 4
Element [1][1]: 5
Sum of all elements: 12
Product of all elements: 40
Average of all elements: 3

=== Code Execution Successful ===
```

**Q2**

```
#include <iostream>
```

```
using namespace std;
```

```
int main() {
```

```
    int x = 0;
```

```
    int y;
```

```
// Input for y
```

```
cout << "Enter value of y: ";
```

```
cin >> y;
```

```
cout << "Before swapping: x = " << x << " y = " << y <<  
endl;
```

```
int temp = x;
```

```
x = y;
```

```
y = temp;
```

```
cout << "After swapping: x = " << x << " y = " << y << endl;
```

```
return 0;
```

```
}
```

The screenshot shows a web browser window with the URL `programiz.com/cpp-programming/online-compiler/`. The page features the Programiz logo and a navigation bar with a 'Premium Coding Courses by Programiz' banner. The main area is divided into a code editor and an output window. The code editor contains a C++ program for swapping two integers using a temporary variable. The output window shows the program's execution, including the input '2' and the resulting values 'x = 2' and 'y = 0'.

```
7
8 // Input for y
9 cout << "Enter value of y: ";
10 cin >> y;
11
12 // Show values before swapping
13 cout << "Before swapping: x = " << x << " y = " << y << endl;
14
15 // Swap x and y using a temporary variable
16 int temp = x;
17 x = y;
18 y = temp;
19
20 // Show values after swapping
21 cout << "After swapping: x = " << x << " y = " << y << endl;
22 ;
23 return 0;
```

Output:

```
/tmp/nojNh3UY81.o
Enter value of y: 2
Before swapping: x = 0 y = 2
After swapping: x = 2 y = 0

=== Code Execution Successful ===
```

**Q3**

**#include <iostream>**

**using namespace std;**

**int main() {**

**const int size = 10;**

**int values[size];**

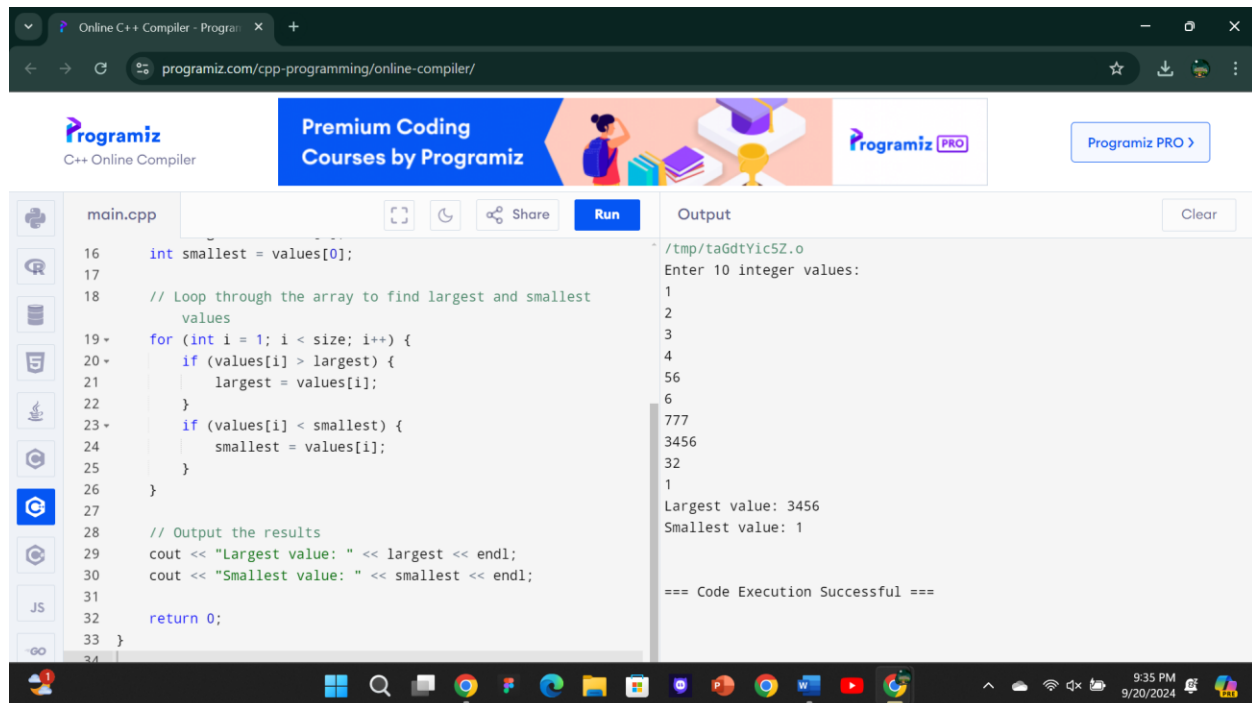
**cout << "Enter 10 integer values: " << endl;**

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

```
    cin >> values[i];  
}  
int largest = values[0];  
int smallest = values[0];  
for (int i = 1; i < size; i++) {  
    if (values[i] > largest) {  
        largest = values[i];  
    }  
    if (values[i] < smallest) {  
        smallest = values[i];  
    }  
}  
}
```

```
cout << "Largest value: " << largest << endl;  
cout << "Smallest value: " << smallest << endl;
```

```
return 0;  
}
```



```
16 int smallest = values[0];
17
18 // Loop through the array to find largest and smallest
   values
19+ for (int i = 1; i < size; i++) {
20+     if (values[i] > largest) {
21         largest = values[i];
22     }
23+     if (values[i] < smallest) {
24         smallest = values[i];
25     }
26 }
27
28 // Output the results
29 cout << "Largest value: " << largest << endl;
30 cout << "Smallest value: " << smallest << endl;
31
32 return 0;
33 }
34
```

Output

```
/tmp/taGdtYic5Z.o
Enter 10 integer values:
1
2
3
4
56
6
777
3456
32
1
Largest value: 3456
Smallest value: 1

=== Code Execution Successful ===
```

**Q4**

**#include <iostream>**

**using namespace std;**

**int main() {**

**const int MONTHS = 12;**

**double rainfall[MONTHS];**

**double totalRainfall = 0.0;**

**double averageRainfall;**

**int monthWithHighest = 0;**

**int monthWithLowest = 0;**

**// Input rainfall for each month**

```
cout << "Enter the total rainfall for each of the 12 months  
(in MM):" << endl;
```

```
for (int i = 0; i < MONTHS; i++) {  
    cout << "Month " << (i + 1) << ": ";  
    cin >> rainfall[i];  
    totalRainfall += rainfall[i];
```

```
// Compare to find highest and lowest rainfall months
```

```
if (rainfall[i] > rainfall[monthWithHighest]) {  
    monthWithHighest = i;  
}
```

```
if (rainfall[i] < rainfall[monthWithLowest]) {  
    monthWithLowest = i;  
}
```

```
}
```

```
// Calculate the average rainfall
```

```
averageRainfall = totalRainfall / MONTHS;
```

```
// Output results
```

```
cout << "Total rainfall for the year: " << totalRainfall << "  
inches" << endl;
```



```
cout << "Average monthly rainfall: " << averageRainfall <<
" inches" << endl;
```

```
cout << "Month with highest rainfall: Month " <<
(monthWithHighest + 1)
```

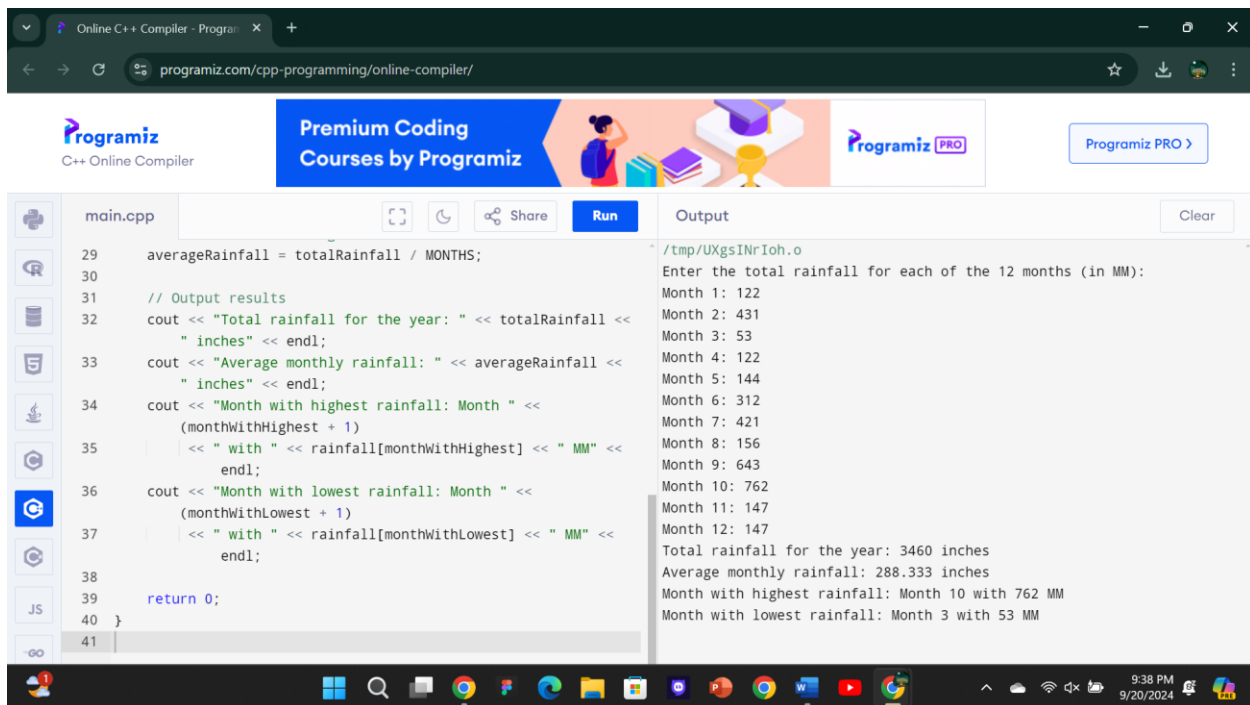
```
<< " with " << rainfall[monthWithHighest] << " MM" <<
endl;
```

```
cout << "Month with lowest rainfall: Month " <<
(monthWithLowest + 1)
```

```
<< " with " << rainfall[monthWithLowest] << " MM" <<
endl;
```

```
return 0;
```

```
}
```



The screenshot shows a web browser window with the URL `programiz.com/cpp-programming/online-compiler/`. The page features the Programiz logo and a banner for "Premium Coding Courses by Programiz". The main content area displays a C++ code editor with a file named `main.cpp`. The code calculates the average monthly rainfall, identifies the month with the highest and lowest rainfall, and prints the results. The output window shows the program's execution, including prompts for monthly rainfall data and the final calculated values.

```
main.cpp
29 averageRainfall = totalRainfall / MONTHS;
30
31 // Output results
32 cout << "Total rainfall for the year: " << totalRainfall <<
   " inches" << endl;
33 cout << "Average monthly rainfall: " << averageRainfall <<
   " inches" << endl;
34 cout << "Month with highest rainfall: Month " <<
   (monthWithHighest + 1)
35   << " with " << rainfall[monthWithHighest] << " MM" <<
   endl;
36 cout << "Month with lowest rainfall: Month " <<
   (monthWithLowest + 1)
37   << " with " << rainfall[monthWithLowest] << " MM" <<
   endl;
38
39 return 0;
40 }
41
```

Output

```
/tmp/UXgsINrIoh.o
Enter the total rainfall for each of the 12 months (in MM):
Month 1: 122
Month 2: 431
Month 3: 53
Month 4: 122
Month 5: 144
Month 6: 312
Month 7: 421
Month 8: 156
Month 9: 643
Month 10: 762
Month 11: 147
Month 12: 147
Total rainfall for the year: 3460 inches
Average monthly rainfall: 288.333 inches
Month with highest rainfall: Month 10 with 762 MM
Month with lowest rainfall: Month 3 with 53 MM
```

**Q5**

```
#include <iostream>
```

```
using namespace std;
```

```
const int ROWS = 3;
```

```
const int COLS = 4;
```

```
int getTotal(int arr[ROWS][COLS]) {
```

```
    int total = 0;
```

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

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

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

```
        }
```

```
    }
```

```
    return total;
```

```
}
```

```
double getAverage(int arr[ROWS][COLS]) {
```

```
    int total = getTotal(arr);
```

```
    return (double)total / (ROWS * COLS);
```

```
}
```

```
int getRowTotal(int arr[ROWS][COLS], int row) {
```

```
int total = 0;  
for (int j = 0; j < COLS; j++) {  
    total += arr[row][j];  
}  
return total;  
}
```

```
int getColumnTotal(int arr[ROWS][COLS], int col) {  
    int total = 0;  
    for (int i = 0; i < ROWS; i++) {  
        total += arr[i][col];  
    }  
    return total;  
}
```

```
int getHighestInRow(int arr[ROWS][COLS], int row) {  
    int highest = arr[row][0];  
    for (int j = 1; j < COLS; j++) {  
        if (arr[row][j] > highest) {  
            highest = arr[row][j];  
        }  
    }
```

```
    return highest;
}
```

```
int getHighestInColumn(int arr[ROWS][COLS], int col) {
    int highest = arr[0][col];
    for (int i = 1; i < ROWS; i++) {
        if (arr[i][col] > highest) {
            highest = arr[i][col];
        }
    }
    return highest;
}
```

```
int main() {
    int data[ROWS][COLS] = {
        {1, 2, 3, 4},
        {5, 6, 7, 8},
        {9, 10, 11, 12}
    };

    cout << "Total of all elements: " << getTotal(data) << endl;
    cout << "Average of all elements: " << getAverage(data)
    << endl;
```

```
int row;  
  
cout << "Enter row number (0 to " << ROWS - 1 << ") to get  
row total: ";  
  
cin >> row;  
  
if (row >= 0 && row < ROWS) {  
    cout << "Total of row " << row << ": " <<  
getRowTotal(data, row) << endl;  
} else {  
    cout << "Invalid row number." << endl;  
}
```

```
int col;  
  
cout << "Enter column number (0 to " << COLS - 1 << ") to  
get column total: ";  
  
cin >> col;  
  
if (col >= 0 && col < COLS) {  
    cout << "Total of column " << col << ": " <<  
getColumnTotal(data, col) << endl;  
} else {  
    cout << "Invalid column number." << endl;
```

```
}
```

```
    cout << "Enter row number (0 to " << ROWS - 1 << ") to get  
highest value in row: ";
```

```
    cin >> row;
```

```
    if (row >= 0 && row < ROWS) {
```

```
        cout << "Highest value in row " << row << ": " <<  
getHighestInRow(data, row) << endl;
```

```
    } else {
```

```
        cout << "Invalid row number." << endl;
```

```
    }
```

```
    cout << "Enter column number (0 to " << COLS - 1 << ") to  
get highest value in column: ";
```

```
    cin >> col;
```

```
    if (col >= 0 && col < COLS) {
```

```
        cout << "Highest value in column " << col << ": " <<  
getHighestInColumn(data, col) << endl;
```

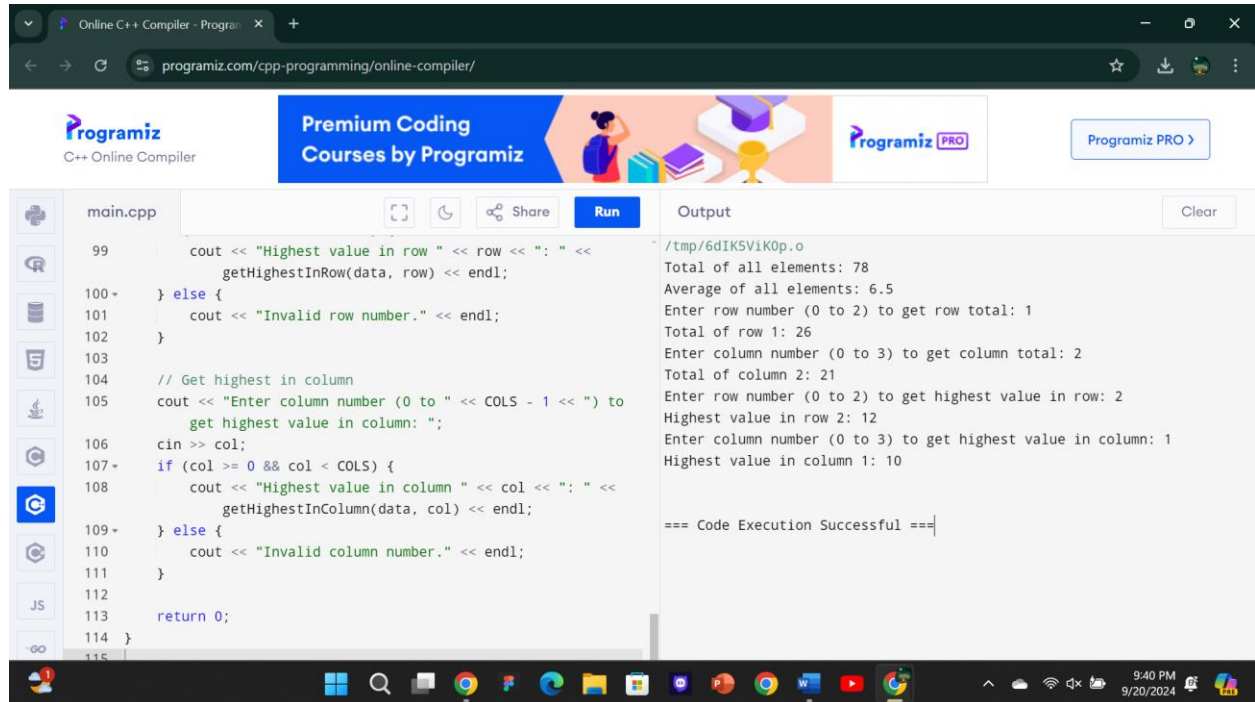
```
    } else {
```

```
        cout << "Invalid column number." << endl;
```

```
    }
```

**return 0;**

**}**



The screenshot shows the Programiz Online C++ Compiler interface. The browser address bar displays `programiz.com/cpp-programming/online-compiler/`. The page header includes the Programiz logo, a banner for "Premium Coding Courses by Programiz", and a "Programiz PRO" button. The main editor area shows a file named `main.cpp` with the following C++ code:

```
99     cout << "Highest value in row " << row << ": " <<
      getHighestInRow(data, row) << endl;
100 } else {
101     cout << "Invalid row number." << endl;
102 }
103
104 // Get highest in column
105 cout << "Enter column number (0 to " << COLS - 1 << ") to
      get highest value in column: ";
106 cin >> col;
107 if (col >= 0 && col < COLS) {
108     cout << "Highest value in column " << col << ": " <<
      getHighestInColumn(data, col) << endl;
109 } else {
110     cout << "Invalid column number." << endl;
111 }
112
113 return 0;
114 }
```

The output window on the right shows the following results:

```
/tmp/6dIK5V1K0p.o
Total of all elements: 78
Average of all elements: 6.5
Enter row number (0 to 2) to get row total: 1
Total of row 1: 26
Enter column number (0 to 3) to get column total: 2
Total of column 2: 21
Enter row number (0 to 2) to get highest value in row: 2
Highest value in row 2: 12
Enter column number (0 to 3) to get highest value in column: 1
Highest value in column 1: 10

=== Code Execution Successful ===
```

**Q6**

**#include <iostream>**

**using namespace std;**

**int main() {**

**int n;**

**cout << "Enter the number of elements: ";**

**cin >> n;**

**int\* arr = new int[n]; // Dynamic array**

```
cout << "Enter " << n << " integers: " << endl;  
for (int i = 0; i < n; i++) {  
    cin >> arr[i];  
}  
  
int sumOdd = 0; // Initialize sum for odd integers  
  
for (int i = 0; i < n; i++) {  
    if (arr[i] % 2 != 0) {  
        sumOdd += arr[i];  
    }  
}  
  
cout << "Sum of odd integers: " << sumOdd << endl;  
  
delete[] arr;  
  
return 0;  
}
```



```
main.cpp
12 for (int i = 0; i < n; i++) {
13     cin >> arr[i];
14 }
15
16 int sumOdd = 0; // Initialize sum for odd integers
17
18 for (int i = 0; i < n; i++) {
19     if (arr[i] % 2 != 0) { // Check for odd
20         sumOdd += arr[i]; // Add to sum
21     }
22 }
23
24 cout << "Sum of odd integers: " << sumOdd << endl;
25
26 delete[] arr; // Clean up memory
27
28 return 0;
29 }
30
```

Output

```
/tmp/UN3EgSWIJ1.o
Enter the number of elements: 2
Enter 2 integers:
1
4
Sum of odd integers: 1

=== Code Execution Successful ===
```

**Q7**

**#include <iostream>**

**using namespace std;**

**int main() {**

**int value;**

**value = 42;**

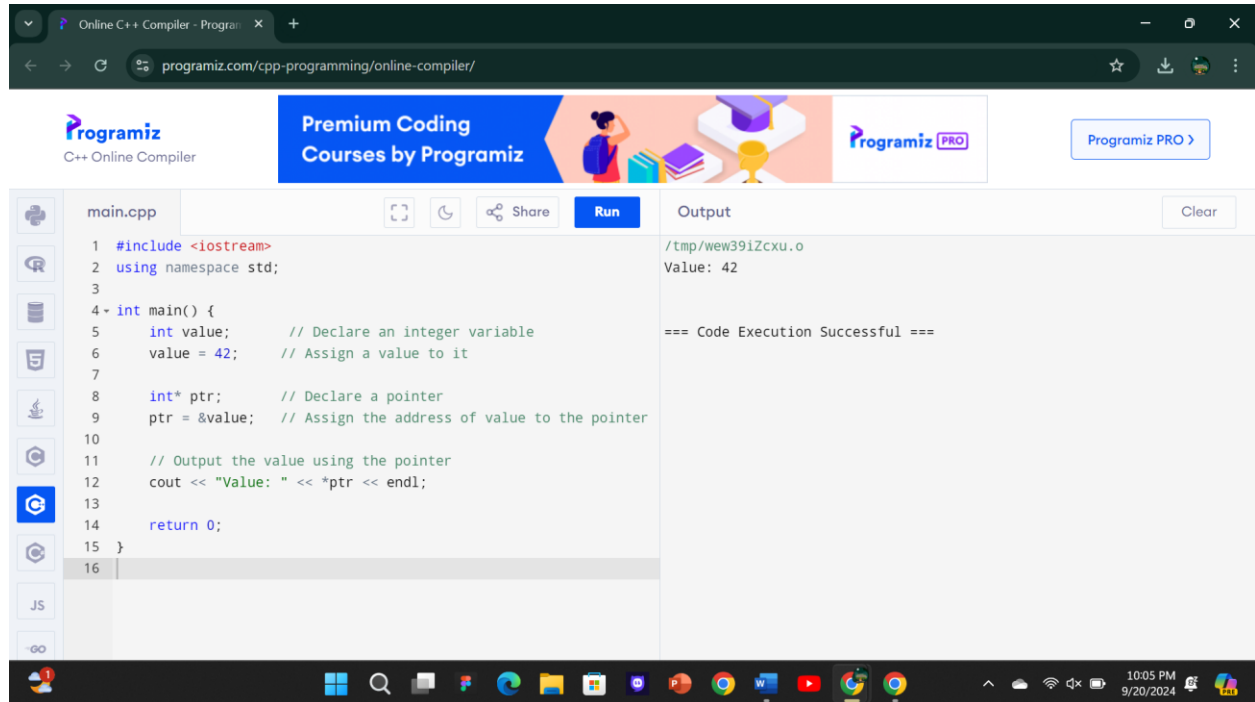
**int\* ptr;**

**ptr = &value;**

**cout << "Value: " << \*ptr << endl;**

**return 0;**

**}**



The screenshot shows the Programiz Online C++ Compiler interface. The browser address bar displays 'programiz.com/cpp-programming/online-compiler/'. The page header includes the Programiz logo, a banner for 'Premium Coding Courses by Programiz', and a 'Programiz PRO' button. The main area is divided into two panels: a code editor on the left and an output panel on the right. The code editor shows a C++ program named 'main.cpp' with the following code:

```
1 #include <iostream>
2 using namespace std;
3
4 int main() {
5     int value;        // Declare an integer variable
6     value = 42;        // Assign a value to it
7
8     int* ptr;          // Declare a pointer
9     ptr = &value;      // Assign the address of value to the pointer
10
11     // Output the value using the pointer
12     cout << "Value: " << *ptr << endl;
13
14     return 0;
15 }
16
```

The output panel shows the execution results:

```
/tmp/wew39iZcxu.o
Value: 42

=== Code Execution Successful ===
```

The Windows taskbar at the bottom shows the time as 10:05 PM on 9/20/2024.

**Q8**

**#include <iostream>**

**using namespace std;**

**int main() {**

**int a, b;**

**cout << "Enter integer for a: ";**

**cin >> a;**

**cout << "Enter integer for b: ";**

**cin >> b;**

```
int* ptrA = &a;
```

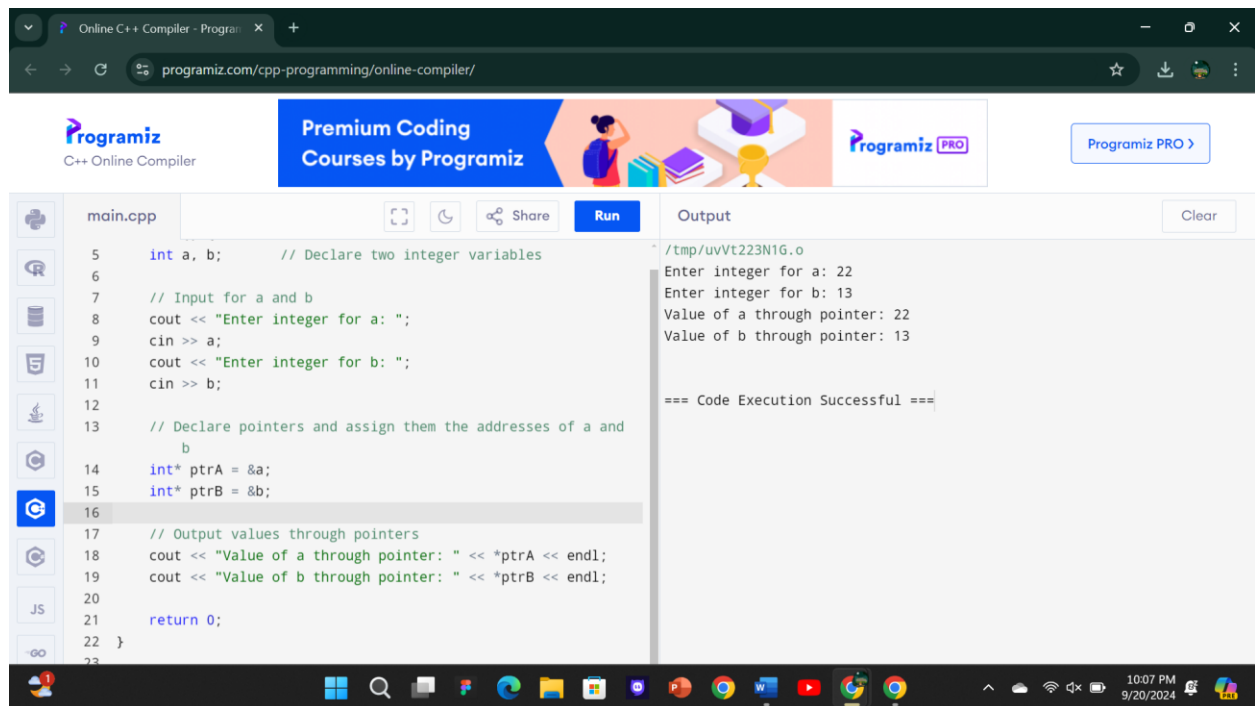
```
int* ptrB = &b;
```

```
cout << "Value of a through pointer: " << *ptrA << endl;
```

```
cout << "Value of b through pointer: " << *ptrB << endl;
```

```
return 0;
```

```
}
```



The screenshot shows the Programiz C++ Online Compiler interface. The code editor on the left contains the following C++ code:

```
main.cpp
5  int a, b;      // Declare two integer variables
6
7  // Input for a and b
8  cout << "Enter integer for a: ";
9  cin >> a;
10 cout << "Enter integer for b: ";
11 cin >> b;
12
13 // Declare pointers and assign them the addresses of a and b
14 int* ptrA = &a;
15 int* ptrB = &b;
16
17 // Output values through pointers
18 cout << "Value of a through pointer: " << *ptrA << endl;
19 cout << "Value of b through pointer: " << *ptrB << endl;
20
21 return 0;
22 }
```

The output window on the right shows the execution results:

```
/tmp/uvVt223N1G.o
Enter integer for a: 22
Enter integer for b: 13
Value of a through pointer: 22
Value of b through pointer: 13

=== Code Execution Successful ===
```

**Q9**

```
#include <iostream>
```

```
using namespace std;
```

```
void Menu() {  
    int choice;  
    int a, b;  
  
    do {  
  
        cout << "Calculator Menu:\n";  
        cout << "1. Addition\n";  
        cout << "2. Subtraction\n";  
        cout << "3. Division\n";  
        cout << "4. Multiplication\n";  
        cout << "5. Power\n";  
        cout << "6. Exit\n";  
        cout << "Enter your choice: ";  
        cin >> choice;  
  
        if (choice >= 1 && choice <= 5) {  
  
            cout << "Enter two integers: ";  
            cin >> a >> b;  
        }  
  
        switch (choice) {
```

**case 1:**

**cout << "Result: " << (a + b) << endl;**

**break;**

**case 2:**

**cout << "Result: " << (a - b) << endl;**

**break;**

**case 3:**

**if (b != 0)**

**cout << "Result: " << (static\_cast<double>(a) / b)**  
**<< endl;**

**else**

**cout << "Error: Division by zero\n";**

**break;**

**case 4:**

**cout << "Result: " << (a \* b) << endl;**

**break;**

**case 5: {**

**int result = 1;**

**for (int i = 0; i < b; i++) {**

**result = result \* a;**

**}**

**cout << "Result: " << result << endl;**


```
        break;
    }
    case 6:
        cout << "Exiting...\n";
        break;
    default:
        cout << "Invalid choice\n";
    }

} while (choice != 6);
}


int main() {
    Menu();
    return 0;
}
```

Online C++ Compiler - Program

programiz.com/cpp-programming/online-compiler/

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main.cpp

47

48

49

50

51

52

53

54

55

56

57

58

59

60

61

62

63

64

65

```
        }
        cout << "Result: " << result << endl;
        break;
    }
    case 6:
        cout << "Exiting...\n";
        break;
    default:
        cout << "Invalid choice\n";
    }
} while (choice != 6); // Repeat until exit is chosen
}
}

int main() {
    Menu();
    return 0;
}
```

Run

Share

Output

Clear

Calculator Menu:

1. Addition

2. Subtraction

3. Division

4. Multiplication

5. Power

6. Exit

Enter your choice: 2

Enter two integers: 21

44

Result: -23

Calculator Menu:

1. Addition

2. Subtraction

3. Division


4. Multiplication

5. Power

6. Exit

Enter your choice: 6

Exiting



10:10 PM  
9/20/2024