FUNDAMENTALS OF PROGRAMMING
LAB MANUAL 9

HOME TASK

ABDUL MOIZ 464834 SECTION B

```
#include <iostream>
using namespace std;
float determinant(float a[][3]);
int main()
TASK # 1
int main() {
   const int size = 3;
   int matrix[size][size];
   cout << "Enter the elements of the 3x3 matrix:\n";
   for (int i = 0; i < size; ++i) {
      for (int j = 0; j < size; ++j) {
         cout << "Enter element at position " << i + 1 << "," << j + 1 << ": ";
         cin >> matrix[i][j];
      }
   }
   cout << "\nThe entered matrix is:\n";
   for (int i = 0; i < size; ++i) {
      for (int j = 0; j < size; ++j) {
         cout << matrix[i][j] << " ";
      }
      cout << "\n";
   }
   int leftDiagonalSum = 0;
```

```
    for (int i = 0; i < size; ++i) {
        leftDiagonalSum += matrix[i][i];
    }
    cout << "\nThe sum of the left diagonal is: " << leftDiagonalSum << "\n";
    int rightDiagonalSum = 0;
    for (int i = 0; i < size; ++i) {
        rightDiagonalSum += matrix[i][size - i - 1];
    }
    cout << "The sum of the right diagonal is: " << rightDiagonalSum << "\n";


    return 0;
}
```

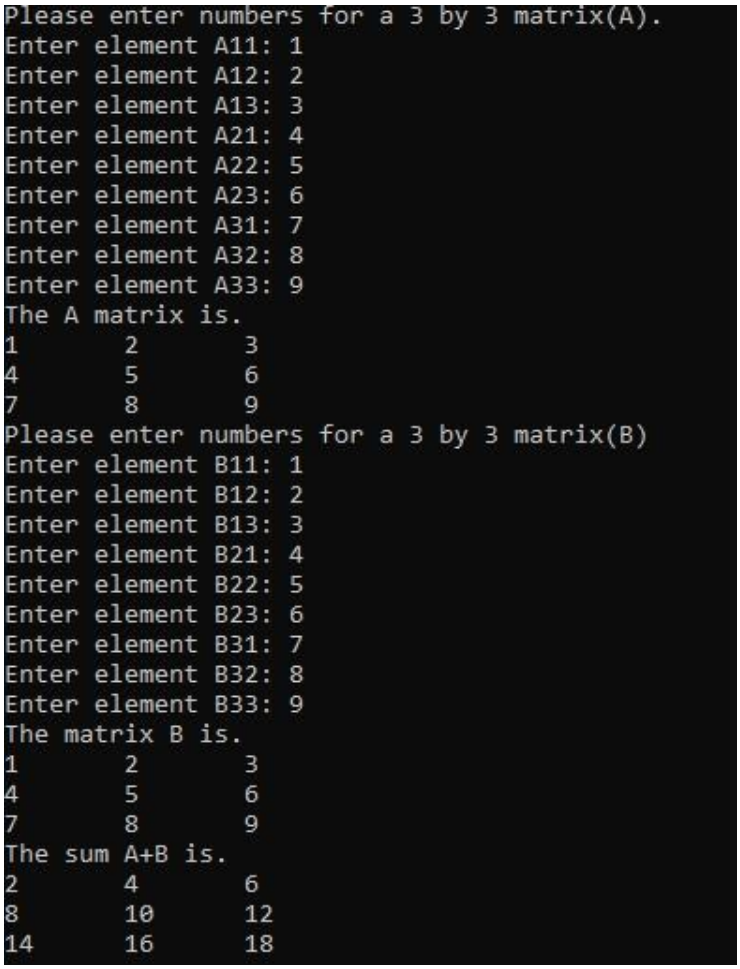
```
Enter the elements of the 3x3 matrix:
Enter element at position 1,1: 1
Enter element at position 1,2: 2
Enter element at position 1,3: 3
Enter element at position 2,1: 4
Enter element at position 2,2: 5
Enter element at position 2,3: 6
Enter element at position 3,1: 7
Enter element at position 3,2: 8
Enter element at position 3,3: 9

The entered matrix is:
1 2 3
4 5 6
7 8 9

The sum of the left diagonal is: 15
The sum of the right diagonal is: 15
```

TASK # 2

```
int main()
{
int A[3][3], B[3][3];
cout << "Please enter numbers for a 3 by 3 matrix(A)." << endl;
```

```
for (int i = 0; i < 3; i++) {
   for (int j = 0; j < 3; j++) {
      cout << "Enter element A" << i + 1 << j + 1 << ": ";
      cin >> A[i][j];
   }
}
cout << "The A matrix is." << endl;
for (i = 0; i < 3; i++) {
   for (j = 0; j < 3; j++) {
      cout << A[i][j] << '\t';
   }
   cout << endl;

}

cout << "Please enter numbers for a 3 by 3 matrix(B)" << endl;
for (int i = 0; i < 3; i++) {
   for (int j = 0; j < 3; j++) {
      cout << "Enter element B" << i + 1 << j + 1 << ": ";
      cin >> B[i][j];
   }
}

cout << "The matrix B is. " << endl;
for (i = 0; i < 3; i++)
{
   for (j = 0; j < 3; j++)
   {
      cout << B[i][j] << '\t';
```

```
    }
    cout << endl;

}

cout << "The sum A+B is. " << endl;
for (i = 0; i < 3; i++)
{
    for (j = 0; j < 3; j++)
    {
        cout << A[i][j] + B[i][j] << '\t';
    }
    cout << endl;
}
return 0;
}
```



TASK # 3

```
void transpose(int  A[3][3], int  B[3][3])
{
   int i, j;
   for (int i = 0; i < 3; i++)
   {
      for (int j = 0; j < 3; j++)
      {
         B[j][i] = A[i][j];
      }
   }
}
```

```
int main() {
   int  A[3][3], B[3][3];
   cout << "Please enter numbers for a 3 by 3 matrix(A)." << endl;
   for (int i = 0; i < 3; i++)
   {
      for (int j = 0; j < 3; j++)
      {
         cout << "Enter element A" << i + 1 << j + 1 << ": ";
         cin >> A[i][j];
      }
cout << "The transpose of a matrix is. " << endl;
   transpose(A, B);
   for (int i = 0; i < 3; i++)
   {
      for (int j = 0; j < 3; j++)
      {
         cout << B[i][j] << '\t';
      }
      cout << endl;
   }
}
```

```
Please enter numbers for a 3 by 3 matrix(A).
Enter element A11: 1
Enter element A12: 2
Enter element A13: 3
Enter element A21: 4
Enter element A22: 5
Enter element A23: 6
Enter element A31: 7
Enter element A32: 8
Enter element A33: 9
The transpose of a matrix is.
1       4       7
2       5       8
3       6       9
```

TASK # 4

```
void multiplication(int A[3][3], int  B[3][3], int  C[3][3])
{
   for (int i = 0; i < 3; i++) {
      for (int j = 0; j < 3; j++) {
         C[i][j] = 0;
      }
   }
   for (int i = 0; i < 3; i++) {
      for (int j = 0; j < 3; j++) {
         for (int k = 0; k < 3; k++) {
            C[i][j] += A[i][k] * B[k][j];
         }
      }
   }
}
int main() {
   int i, j;
   int A[3][3], B[3][3], C[3][3];
   cout << "Please enter numbers for a 3 by 3 matrix(A)." << endl;
   for (int i = 0; i < 3; i++) {
      for (int j = 0; j < 3; j++) {
         cout << "Enter element A" << i + 1 << j + 1 << ": ";
         cin >> A[i][j];
      }
   }
   cout << "The A matrix is." << endl;
   for (i = 0; i < 3; i++) {
      for (j = 0; j < 3; j++) {
```

```
        cout << A[i][j] << '\t';
    }
    cout << endl;

}

cout << "Please enter numbers for a 3 by 3 matrix(B)" << endl;
for (int i = 0; i < 3; i++) {
    for (int j = 0; j < 3; j++) {
        cout << "Enter element B" << i + 1 << j + 1 << ": ";
        cin >> B[i][j];
    }
}

cout << "The matrix B is. " << endl;
for (i = 0; i < 3; i++)
{
    for (j = 0; j < 3; j++)
    {
        cout << B[i][j] << '\t';
    }
    cout << endl;

}
multiplication(A, B, C);
cout << "the product of two matrices is " << endl;
for (i = 0; i < 3; i++) {
    for (j = 0; j < 3; j++) {
        cout << C[i][j] << '\t';
```

```
    }
    cout << endl;
  }
}
```

```
Enter element A23: 6
Enter element A31: 7
Enter element A32: 8
Enter element A33: 9
The A matrix is.
1       2       3
4       5       6
7       8       9
Please enter numbers for a 3 by 3 matrix(B)
Enter element B11: 1
Enter element B12: 2
Enter element B13: 3
Enter element B21: 4
Enter element B22: 5
Enter element B23: 6
Enter element B31: 7
Enter element B32: 8
Enter element B33: 9
The matrix B is.
1       2       3
4       5       6
7       8       9
the product of two matrices is
30      36      42
66      81      96
102     126     150
```

TASK # 5

```
void table(int x, int y)
{
  if (y > 10)
  {
  return;
  }
    cout << x << "*" << y << " = " << x * y << endl;
    return table(x, y + 1);
  }
```

```
    int main()
    {
        int x = 15, y=0, result;
        cout << "The table of 15 is. " << endl;
        table(x, y);
        return 0;
    }
}
```