Institute of Computer Technology
B. Tech. Computer Science and Engineering

Sub: ESFP – I
Course Code: 2CSE102
Practical – 14

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Class: B
Batch:14

Q.1.Problem Definition:

Make a program to compute and print a multiplication table for number 1 to 5
using a 2-dimensional array.
Expected Output should be:
Multiplication Table

1 2 3 4 5

1| 1 2 3 4 5
2| 2 4 6 8 10
3| 3 6 9 12 15
4| 4 8 12 16 20
5| 5 10 15 20 25

Code:

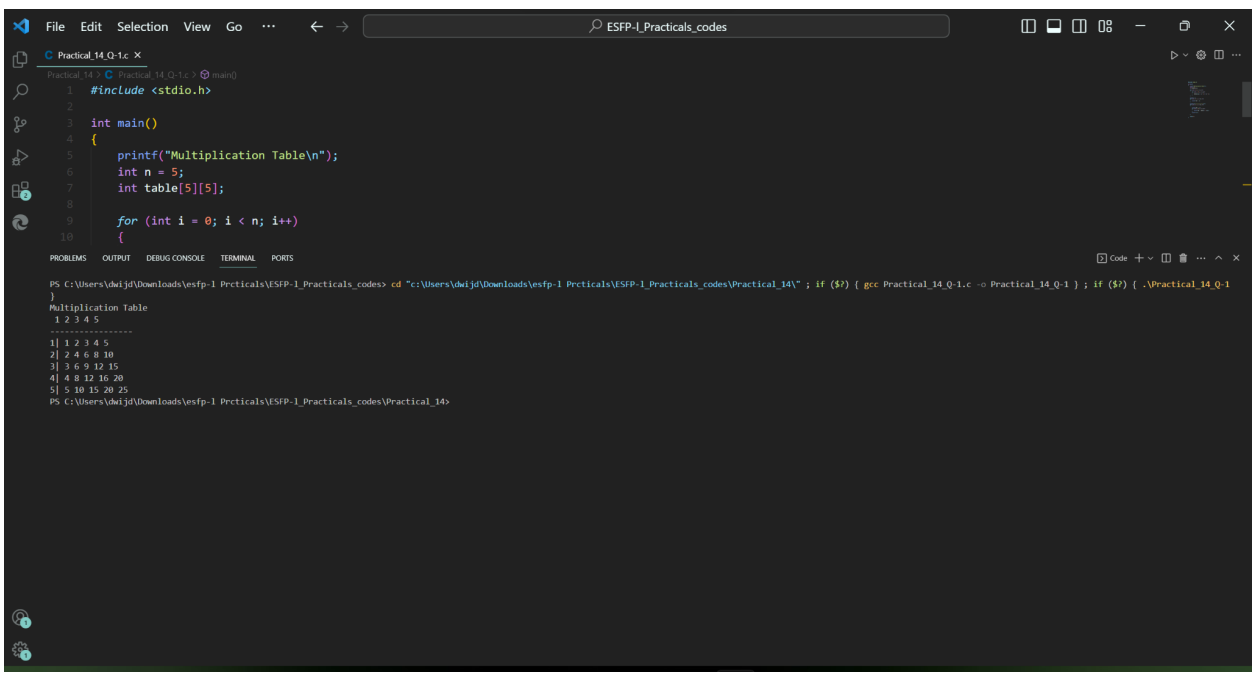
```
#include <stdio.h>

int main()
{
```

```c
    printf("Multiplication Table\n");
    int n = 5;
    int table[5][5];

    for (int i = 0; i < n; i++)
    {
        for (int j = 0; j < n; j++)
        {
            table[i][j] = (i + 1) * (j + 1);
        }
    }

    printf(" ");
    for (int i = 1; i <= n; i++)
    {
        printf("%d ", i);
    }

    printf("\n-----------------\n");
    for (int i = 1; i <= n; i++)
    {

        printf("%d| ", i);
        for (int j = 0; j < n; j++)
        {
            printf("%d ", table[i - 1][j]);
        }
        printf("\n");

    }

    return 0;
```

```
}
```

Output:

```
PS C:\Users\dwijd\Downloads\esfp-1 Prcticals\ESFP-1_Practicals_codes> cd "c:\Users\d
}
Multiplication Table
 1 2 3 4 5
-----------------
1| 1 2 3 4 5
2| 2 4 6 8 10
3| 3 6 9 12 15
4| 4 8 12 16 20
5| 5 10 15 20 25
PS C:\Users\dwijd\Downloads\esfp-1 Prcticals\ESFP-1_Practicals_codes\Practical_14>
```



<u>Q.2.Problem Definition:</u>

Find out the calculation of array elements like (addition, subtraction, multiplication and division) using a 2-D array.

Code:

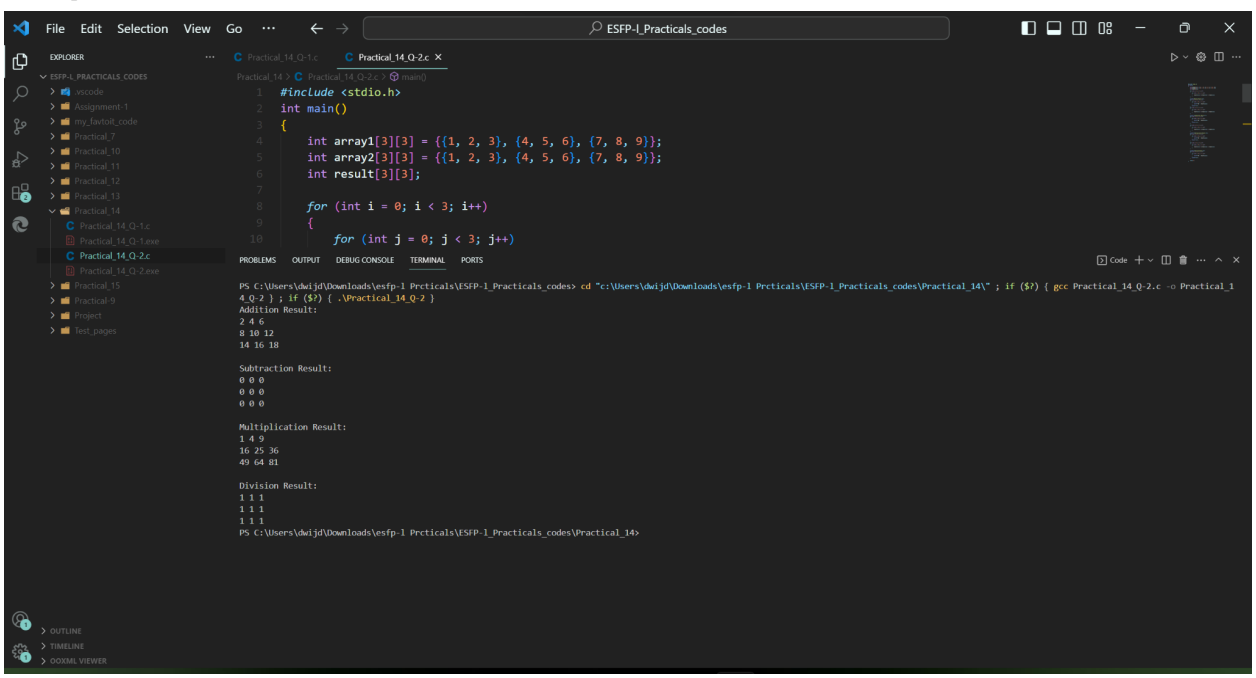
```
#include <stdio.h>
```

```c
int main()
{
    int array1[3][3] = {{1, 2, 3}, {4, 5, 6}, {7, 8, 9}};
    int array2[3][3] = {{1, 2, 3}, {4, 5, 6}, {7, 8, 9}};
    int result[3][3];

    for (int i = 0; i < 3; i++)
    {
        for (int j = 0; j < 3; j++)
        {
            result[i][j] = array1[i][j] + array2[i][j];
        }
    }

    printf("Addition Result:\n");
    for (int i = 0; i < 3; i++)
    {
        for (int j = 0; j < 3; j++)
        {
            printf("%d ", result[i][j]);
        }
        printf("\n");
    }
    for (int i = 0; i < 3; i++)
    {
        for (int j = 0; j < 3; j++)
        {
            result[i][j] = array1[i][j] - array2[i][j];
        }
    }

    printf("\nSubtraction Result:\n");
```

```
    for (int i = 0; i < 3; i++)
    {
        for (int j = 0; j < 3; j++)
        {
            printf("%d ", result[i][j]);
        }
        printf("\n");
    }

    for (int i = 0; i < 3; i++)
    {
        for (int j = 0; j < 3; j++)
        {
            result[i][j] = array1[i][j] * array2[i][j];
        }
    }

    printf("\nMultiplication Result:\n");
    for (int i = 0; i < 3; i++)
    {
        for (int j = 0; j < 3; j++)
        {
            printf("%d ", result[i][j]);
        }
        printf("\n");
    }

    for (int i = 0; i < 3; i++)
    {
        for (int j = 0; j < 3; j++)
        {
            result[i][j] = array1[i][j] / array2[i][j];
```

```
        }
    }

    printf("\nDivision Result:\n");
    for (int i = 0; i < 3; i++)
    {
        for (int j = 0; j < 3; j++)
        {
            printf("%d ", result[i][j]);
        }
        printf("\n");
    }

    return 0;
}
```

Output:



```
PS C:\Users\dwijd\Downloads\esfp-l Prcticals\ESFP-l_Practicals_codes> cd "c:\Users\dwi
4_Q-2 } ; if ($?) { .\Practical_14_Q-2 }
Addition Result:
2 4 6
8 10 12
14 16 18

Subtraction Result:
0 0 0
0 0 0
0 0 0

Multiplication Result:
1 4 9
16 25 36
49 64 81

Division Result:
1 1 1
1 1 1
1 1 1
PS C:\Users\dwijd\Downloads\esfp-l Prcticals\ESFP-l_Practicals_codes\Practical_14>
```

Q.3.Problem Definition:

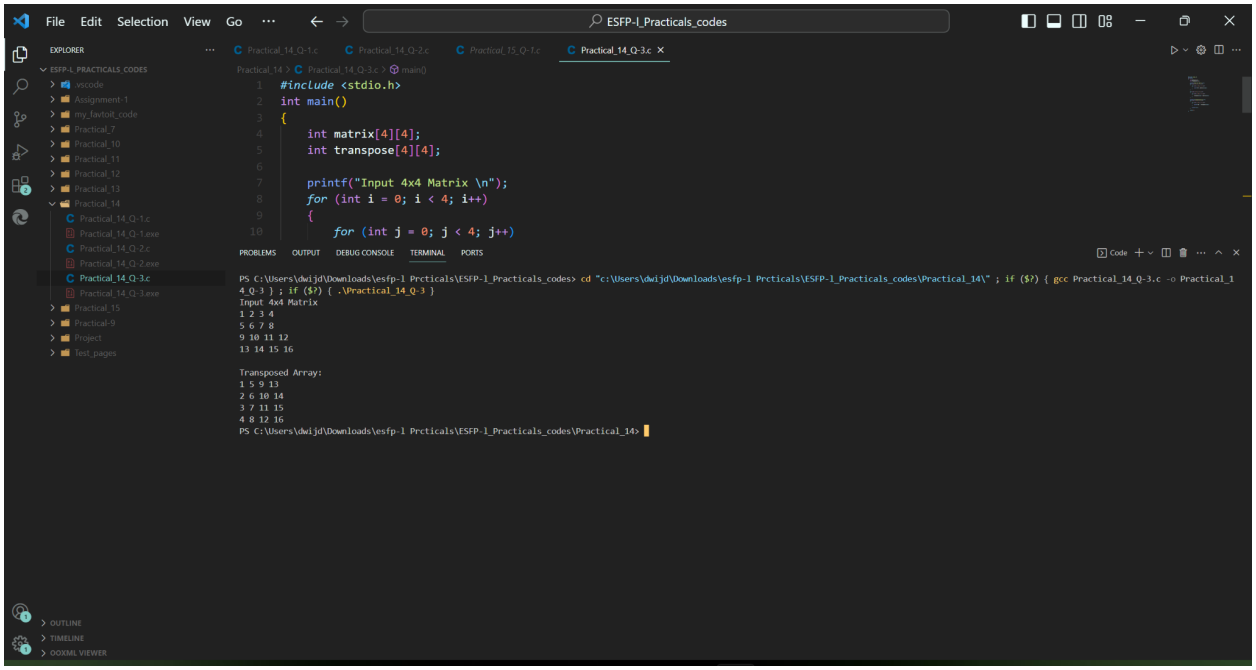
Make a program in C to accept any random 16 number from user in array list in the format of 4*4 matrix, and then calculate transpose of matrix and then print these all transposed array element in new array using 2-D array.

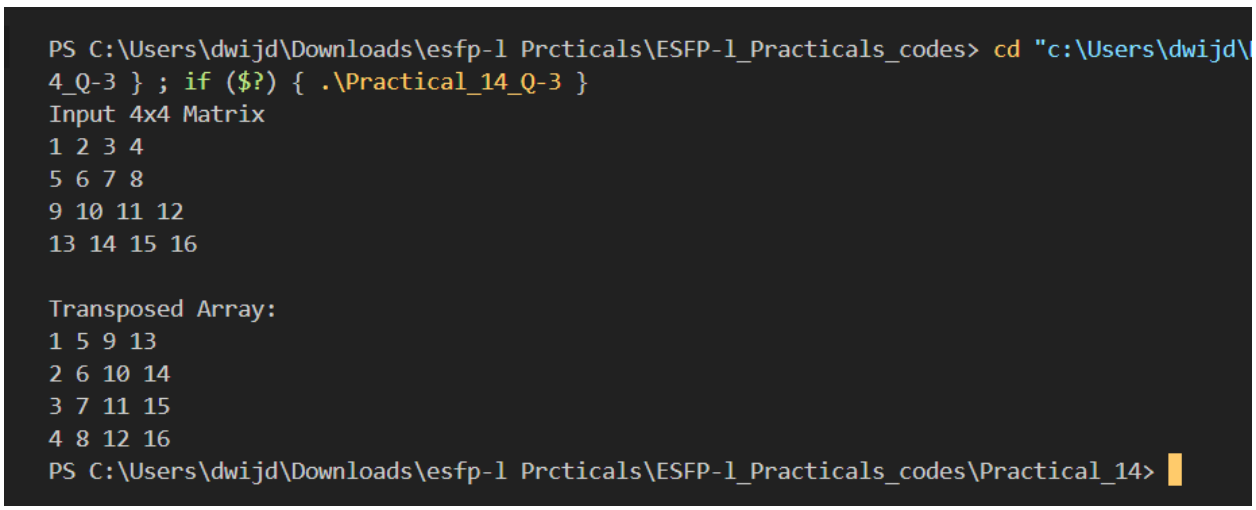
Code:

```c
#include <stdio.h>
int main()
{
    int matrix[4][4];
    int transpose[4][4];

    printf("Input 4x4 Matrix \n");
    for (int i = 0; i < 4; i++)
    {
```

```
        for (int j = 0; j < 4; j++)
        {
            scanf("%d", &matrix[i][j]);
        }
    }

    for (int i = 0; i < 4; i++)
    {
        for (int j = 0; j < 4; j++)
        {
            transpose[i][j] = matrix[j][i];
        }
    }

    printf("\nTransposed Array:\n");
    for (int i = 0; i < 4; i++)
    {
        for (int j = 0; j < 4; j++)
        {
            printf("%d ", transpose[i][j]);
        }

        printf("\n");
    }

    return 0;
}
```

Output:





Q.4.Problem Definition:

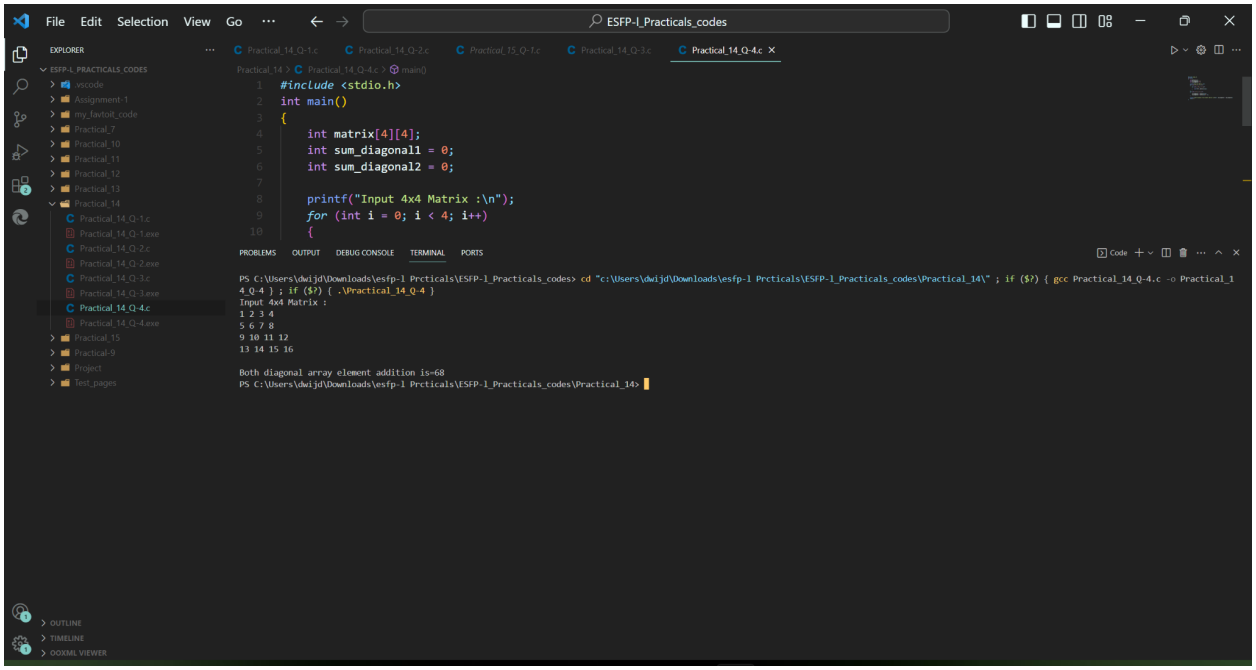
Make a program in C to accept any random 9 number from user in array list in the format of 4*4 matrix, and then calculate both diagonal element addition and then print these diagonal element addition result value on screen/terminal using 2-D array.

Code:

```
#include <stdio.h>
```

```c
int main()
{
    int matrix[4][4];
    int sum_diagonal1 = 0;
    int sum_diagonal2 = 0;

    printf("Input 4x4 Matrix :\n");
    for (int i = 0; i < 4; i++)
    {
        for (int j = 0; j < 4; j++)
        {
            scanf("%d", &matrix[i][j]);
        }
    }
    for (int i = 0; i < 4; i++)
    {
        sum_diagonal1 += matrix[i][i];
        sum_diagonal2 += matrix[i][3 - i];
    }

    printf("\nBoth diagonal array element addition
is=%d\n", sum_diagonal1 + sum_diagonal2);
    return 0;
}
```

Output:




```
PS C:\Users\dwijd\Downloads\esfp-l Prcticals\ESFP-l_Practicals_codes> cd "c:\Users\dwijd
4_Q-4 } ; if ($?) { .\Practical_14_Q-4 }
Input 4x4 Matrix :
1 2 3 4
5 6 7 8
9 10 11 12
13 14 15 16

Both diagonal array element addition is=68
PS C:\Users\dwijd\Downloads\esfp-l Prcticals\ESFP-l_Practicals_codes\Practical_14>
```