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Subject: Data Structures

Practical – 7

Aim: Program to allocating memory dynamically for 2D array and print in spiral manner.

Program:

```c
#include <stdio.h>
#include <stdlib.h>
#define R 4
#define C 5
void spiralOfMatrix(int enrow, int encol, int **arr1)
{
    int i, rowind = 0, colind = 0;
    while (rowind < enrow && colind < encol)
    {
        for (i = colind; i < encol; ++i)
        {
            printf("%d ", arr1[rowind][i]);
        }
        rowind++;
        for (i = rowind; i < enrow; ++i)
        {
            printf("%d ", arr1[i][encol - 1]);
        }
        encol--;
        if (rowind < enrow)
        {
            for (i = encol - 1; i >= colind; --i)
            {
                printf("%d ", arr1[enrow - 1][i]);
            }
            enrow--;
        }
        if (colind < encol)
        {
            for (i = enrow - 1; i >= rowind; --i)
            {
                printf("%d ", arr1[i][colind]);
            }
```

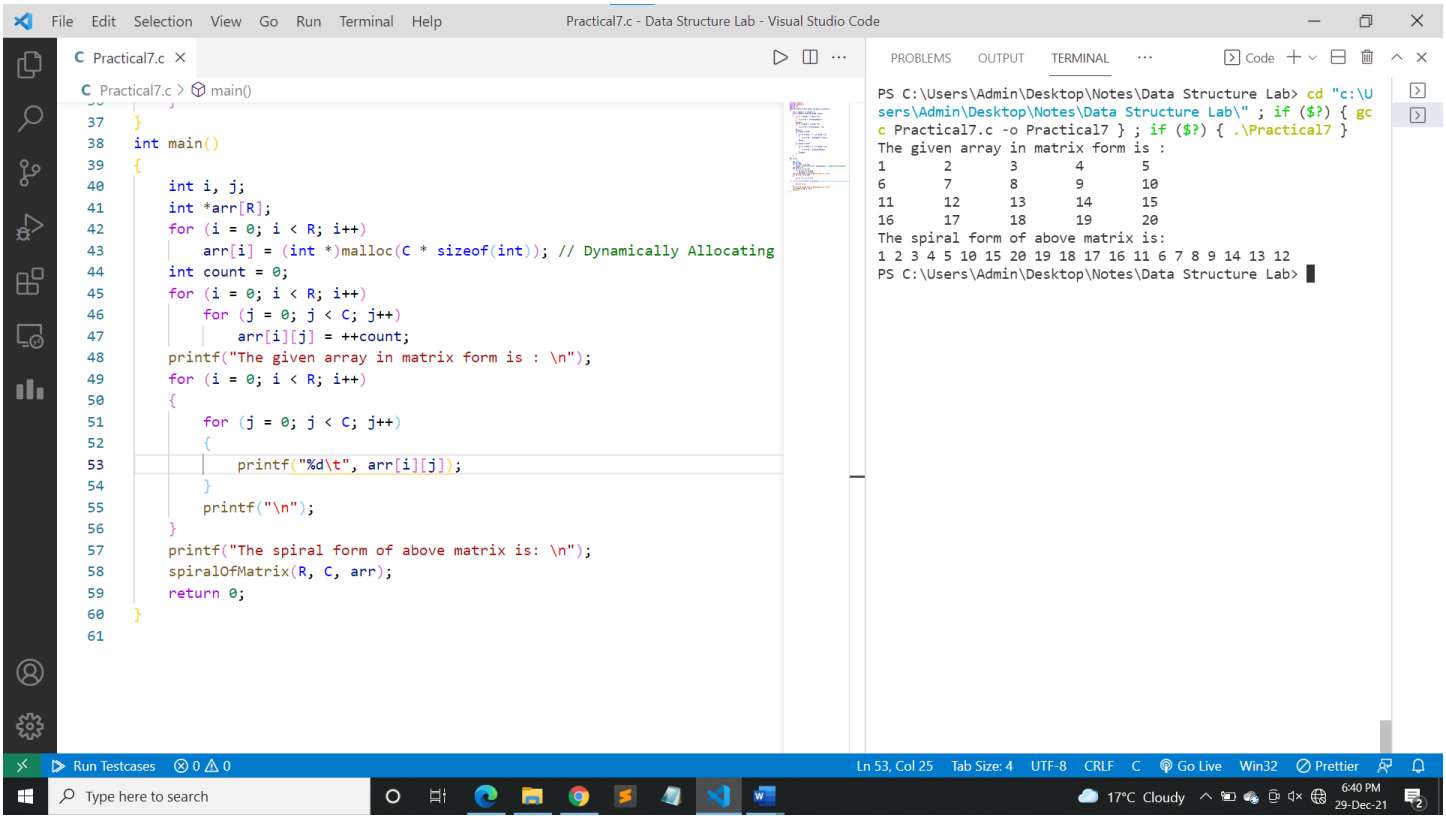
```
            colind++;
        }
    }
}
int main()
{
    int i, j;
    int *arr[R];
    for (i = 0; i < R; i++)
        arr[i] = (int *)malloc(C * sizeof(int)); // Dynamically Allocating
    int count = 0;
    for (i = 0; i < R; i++)
        for (j = 0; j < C; j++)
            arr[i][j] = ++count;
    printf("The given array in matrix form is : \n");
    for (i = 0; i < R; i++)
    {
        for (j = 0; j < C; j++)
        {
            printf("%d\t", arr[i][j]);
        }
        printf("\n");
    }
    printf("The spiral form of above matrix is: \n");
    spiralOfMatrix(R, C, arr);
    return 0;
}
```

Output:

```
The given array in matrix form is :
1    2    3    4    5
6    7    8    9    10
11    12    13    14    15
16    17    18    19    20

The spiral form of above matrix is:
1 2 3 4 5 10 15 20 19 18 17 16 11 6 7 8 9 14 13 12
```

Screenshot:



Conclusion: I have successfully completed practical 7.