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**Section: B**

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**Subject: Data Structures**

## **Practical – 7**

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

**Program:**

```
#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

```

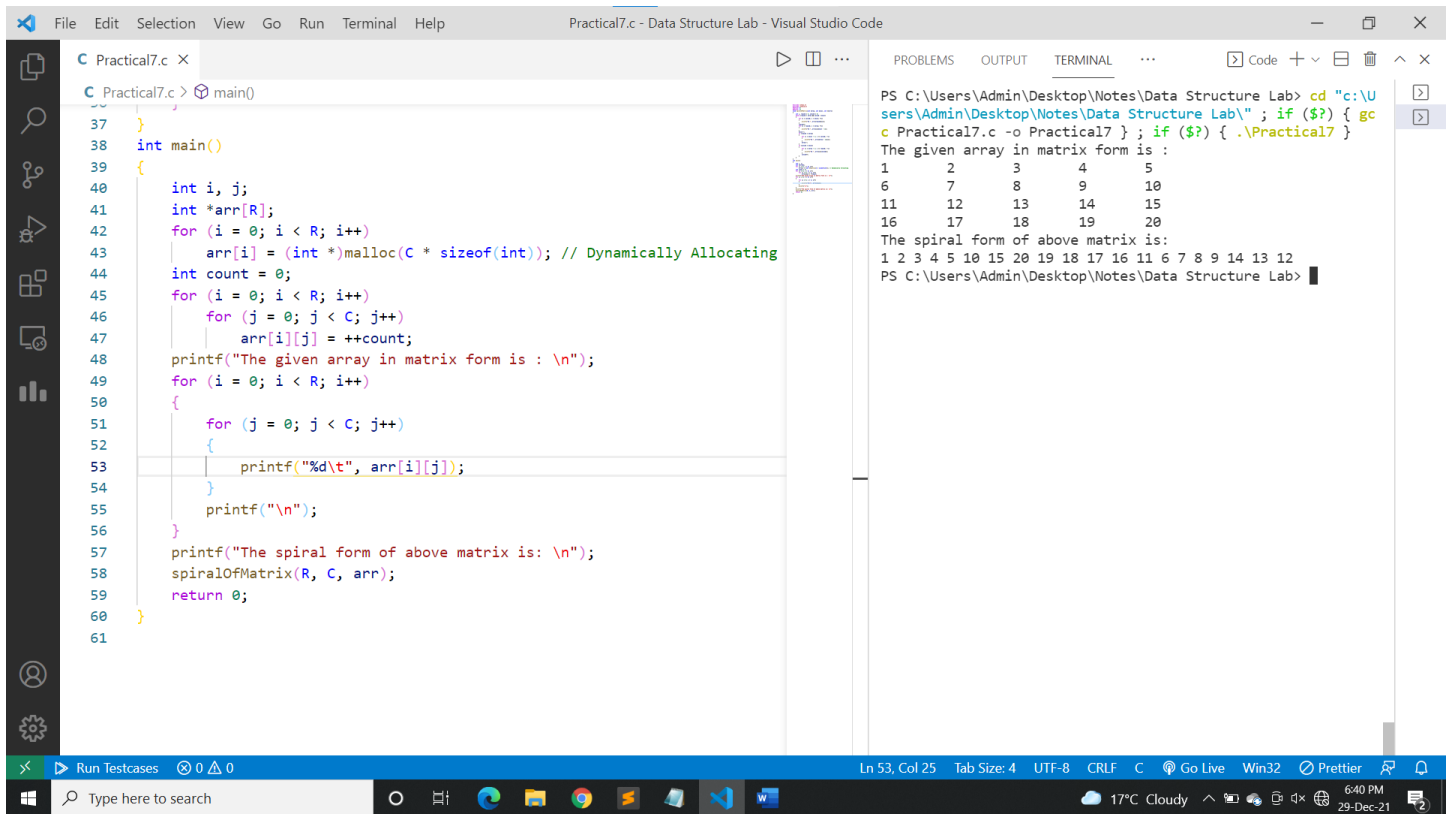
The spiral form of above matrix is:

```

1 2 3 4 5 10 15 20 19 18 17 16 11 6 7 8 9 14 13 12

```

## Screenshot:



```
File Edit Selection View Go Run Terminal Help
Practical7.c - Data Structure Lab - Visual Studio Code

C Practical7.c X
C Practical7.c > main()
37 }
38 int main()
39 {
40     int i, j;
41     int *arr[R];
42     for (i = 0; i < R; i++)
43     {
44         arr[i] = (int *)malloc(C * sizeof(int)); // Dynamically Allocating
45         int count = 0;
46         for (i = 0; i < R; i++)
47         {
48             for (j = 0; j < C; j++)
49             {
50                 arr[i][j] = ++count;
51             }
52             printf("The given array in matrix form is : \n");
53             for (i = 0; i < R; i++)
54             {
55                 for (j = 0; j < C; j++)
56                 {
57                     printf("%d\t", arr[i][j]);
58                 }
59                 printf("\n");
60             }
61             printf("The spiral form of above matrix is: \n");
62             spiralOfMatrix(R, C, arr);
63             return 0;
64         }
65     }
66 }
```

PROBLEMS OUTPUT TERMINAL ...

```
PS C:\Users\Admin\Desktop\Notes\Data Structure Lab> cd "c:\Users\Admin\Desktop\Notes\Data Structure Lab\" ; if ($?) { gcc Practical7.c -o Practical7 } ; if ($?) { .\Practical7 }
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
PS C:\Users\Admin\Desktop\Notes\Data Structure Lab>
```

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**Conclusion:** I have successfully completed practical 7.