Department of Computer Science & Engineering

Problem Solving with C Laboratory-UE19CS152

Week-10

Objective: Students will learn 2D and 3D array,multiple files usage and demonstration of GDB.

1)Write a C program to generate Pascal triangle.

Input1:

Enter the n value:

4

Output1:

```
   1
  1 1
 1 2 1
1 3 3 1
```

Input2:

Enter the n value:

5

Output2:

```
    1
   1 1
  1 2 1
 1 3 3 1
```

1 4 6 4 1

2)Write a C program to perform matrix addition using three-dimensional array.

Input:

Enter the s,m and n value for a

2

3

2

Enter the p,q and r value for b

2

3

2

Read matrix a

1 2 3 4 5 6 7 8 9 10 11 12

Read matrix b

1 2 3 4 5 6 7 8 9 10 11 12

Output:

Matrix A elements are

1 2 3 4 5 6

7 8 9 10 11 12

Matrix B elements are

1 2 3 4 5 6

7 8 9 10 11 12

resultant matrix

2 4 6 8 10 12

14 16 18 20 22 24

3) Write a C program to generate spiral form of the matrix.

Input:

enter the row of matrix

2

enter the col of matrix

3

read matrix arr1

1 2 3

4 5 6

Output:

display matrix arr1

1 2 3

4 5 6

The spiral form of matrix is:

1 2 3 6 5 4

Practice programs:

1) Write a C program to generate magic square.

A magic square of order n is an arrangement of n^2 numbers, usually distinct integers, in a square, such that the n numbers in all rows, all columns, and both diagonals sum to the same constant.

A magic square contains the integers from 1 to n^2.The constant sum in every row, column and diagonal is called the magic constant or magic sum, M.

For normal magic squares of order n = 3, 4, 5, ..., the magic constants are: 15, 34, 65, 111, 175, 260, ...

We can generate a magic square of size n.

Consider the below examples:

Magic Square of size 3

---

2 7 6

9 5 1

4 3 8

Sum in each row & each column = 3*(3^2+1)/2 = 15

Magic Square of size 5

---

9 3 22 16 15

2 21 20 14 8

25 19 13 7 1

18 12 6 5 24

11 10 4 23 17

Sum in each row & each column = 5*(5^2+1)/2 = 65

2)Debug the following programs using gdb and execute commands in gdb.

a)

```
#include<stdio.h>
int sum(int n);
int main(void)
{
        int n;
        int c;
        printf("Enter the value of n\n");
        scanf("%d",&n);
        c=sum(n);
        printf("%d\n",c);
        return 0;
}
```

```
int sum(int n)
{
	int result;
	int i;
	for(i=0;i<n;i++)
	{
		result += i;
	}
	return result;
}
```

b)

```
#include<stdio.h>
int fact(int n);
int main(void)
{
	int n;
	int m;
	printf("Enter the value of n\n");
	scanf("%d",&n);
	m=fact(n);
	printf("%d",m);
	return 0;
}
int fact(int n)
{
	int i;
	int f;
```

```
        for (i=1;i<n;i++)
        {
                f=f*i;
        }
        return f;
}
```