

CS112: Computing Laboratory

Assignment :- 11

Date: 29/04/2020

For proper indentation and commenting in the code: 10 marks

For below questions: 10+10+10+10 =40 marks

Total marks: 40 + 10 = 50 marks

Basic Information:

- 1. Spiral matrix:** A spiral matrix is $n \times n$ square matrix formed by placing the number $1, 2, 3, \dots, n^2$ in spiral form starting from the leftmost column and topmost row.
- 2. Magic matrix:** A square matrix is magic matrix if all the elements in it are distinct and the sum of elements in row, column and diagonal are equal.
 - The elements of magic matrix are $1, 2, 3, \dots, n^2$ and each number can occur in the matrix only once.
 - The sum of elements of every row, column, and diagonal are equal. The sum is always equal to $n(n^2+1)/2$.

Example of Spiral Matrix:

1	2	3	4	5
16	17	18	19	6
15	24	25	20	7
14	23	22	21	8
13	12	11	10	9

Example of Magic Matrix:

2	7	6	→15	
9	5	1	→15	
4	3	8	→15	
↙15	↓15	↓15	↓15	↘15

Questions

1. WAP to accept 10 records with the structure:

```
struct {  
char *name;  
int *age;  
float salary;  
}
```

Display the records before sorting and after sorting. Note that sorting is performed based on primary key “name” (dictionary order) and secondary key “age”.

Example: (Raam, 24), (Ram, 26), (Ram, 28), (Sham, 22).

2. WAP to generate random matrix (the elements of matrix should be generated randomly in between 1 to 100) of 5*5 using pointer. Check whether the generated matrix is magic matrix or not?

3. WAP which uses only pointers and generates a magic matrix of 5*5.

4. WAP which uses only pointers and generates a spiral matrix of 7*7.

Instructions to follow:

1. Implement all the above programs and give the file names as follows:
 - a. Name of program file: question_1.c
 - b. Name of output file: output_1.out
 - c. Run with few sample inputs and mention the details: execution_1.txt

*** Note that the format of details in execution_1.txt would be:

Run1: Input: 4 Output: 567

Run 2: Input: 19 Output: 5678

2) Create a zip file which includes all the above files naming it **<Student_EmailID>.zip** and upload the zip file through google form:

3) **Deadline of submission :- 7 PM 30/04/2020 (sharp).**

4) Feel free to contact your respective TA for any query.