CO222: Programming Methodology

Lab 08: Arrays

January 22, 2024

1. Objective

The objective of this lab is to get hands-on experience with arrays, using C programming.

2. Tasks

Task 01

Create a C program to rotate the items **right** in an array.

Input format:

1. Size of the Array **(n>0)**
2. Values in the array
3. Number of right rotations **(rotations>0)**

Output:

- Print the Original Array
- Print the actual number of rotations needed (ex: Take n = 4 and rotations as 6. There is no need to rotate 6 times. Only need to rotate 2 times *(Refer to sample test case 01)*
- If a negative number or 0 is entered as the size of the array, print "Invalid Array". *(Refer to test case 02)*
- In cases where the same array is obtained after rotation, do not rotate and state that no rotation is needed. *(Refer to sample test case 03)*

Sample Test Case 01

```
4
8 25 989 566
6
Original Array: 8 25 989 566
Actual Rotations: 2
Rotated Array: 989 566 8 25
```

Sample Test Case 02

```
0
Invalid Array
```

Sample Test Case 03

```
7
4 8 5 33 52 5 10
343
Original Array: 4 8 5 33 52 5 10
No Rotation
```

Sample Test Case 04

```
3
4 85 65
-1
Original Array: 4 85 65
Invalid Rotations
```

Task 02

Create a C program to transpose a 2D real matrix.

Input format:

1. Size of the Matrix **(rows cols)** Max rows = 5, Max cols = 5
2. Matrix elements in one row (a b c d e f …….)

Output:

- Print the Original Matrix
- Print the Transpose Matrix
- Print whether both matrices are equal or not.

Sample Test Case 01

```
2 2
4 5 9 8
Original Matrix:
4 5
9 8
Transposed Matrix:
4 9
5 8
Matrices are different
```

Sample Test Case 02

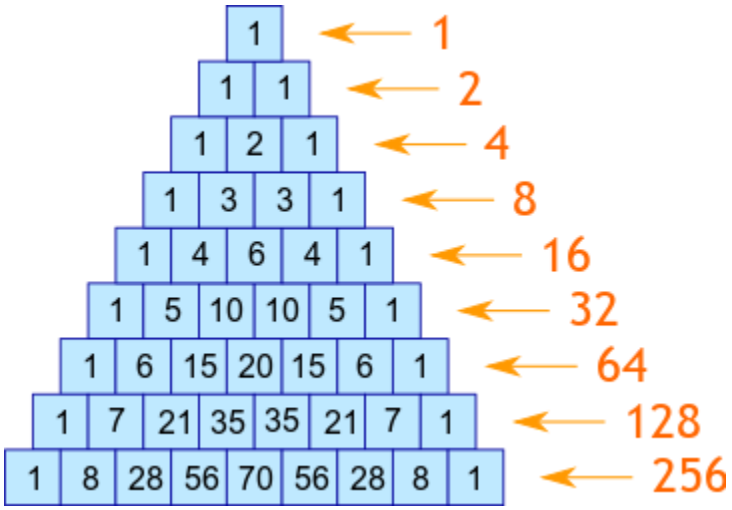
```
-1 2
Error: Both rows and cols must be greater than 0
```

Sample Test Case 03

```
2 2
4 5 5 4
Original Matrix:
4 5
5 4
Transposed Matrix:
4 5
5 4
Both matrices are the same
```

Task 03

Create a C program to print Pascal's Triangle.



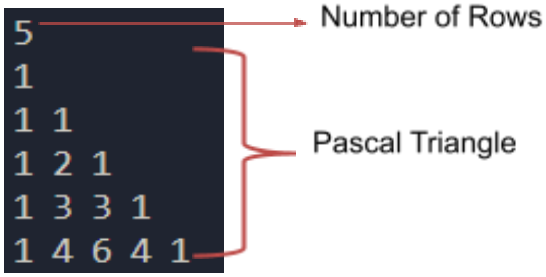
No need for the output to be triangular. Refer to sample test cases.

Input: Number of rows. (Max = 10 for this lab)

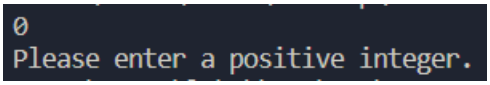
Output: Print the Pascal's Triangle.

- Handle errors for 0 and negative values
- Handle errors for character and string inputs

Sample Test Case 01



Sample Test Case 02



Sample Test Case 03

```
Batman Returns
Invalid input format. Terminating the program.
```

3. Submission

You need to complete and show your work for **task 01 and task 02** to instructors **during lab hours.**

Additionally, you will need to submit the codes for the completed tasks using HackerRank before the deadline.

4. Deadline

Refer to HackerRank for the Final Submission Date.