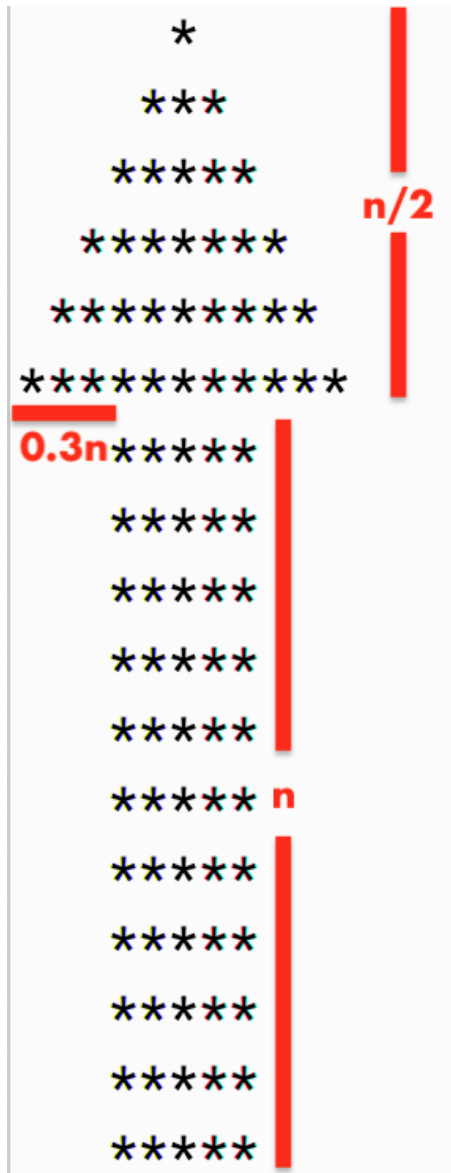


CATH CON 2020 Reference Questions - Senior Category

[There are a total of 5 questions in this document]

1. Up

The program has to print an upward facing arrow with the following dimensions. An input n will be taken.



2. Roman Numeral

The user has to enter a valid roman numeral as a string. If the number is invalid then the program has to state that and give the user another chance. On getting a valid roman numeral it has to convert it into a decimal number and display it.

3. Chess

An input of 2 index positions in a 2d Array of size 8x8 will be taken. The program should then check which chess piece can move from the first index to the second in 1 move.

The chess pieces move as follows:

King - 1 space in any direction

Queen - any number of spaces in forward, backward, left, right and diagonal directions

Bishop - any number of spaces in diagonal directions

Knight - 2 spaces in forward, backward, left or right directions followed by 1 space perpendicular to it.

Rook - any number of spaces in forward, backward, left and right directions

Pawn - 1 space in the forward direction only.

This is the sample input/output.

Enter Position of starting point

1

4

Enter Position of ending point

2

3

.....

....S....

...F....

.....

.....

.....

.....

.....

King

Queen

Bishop

4. Concentric Characters

Given a positive integer n , print the matrix filled with rectangle pattern as shown below:

```
a a a a a
a b b b a
a b c b a
a b b b a
a a a a a
```

where $a = n$, $b = n - 1$, $c = n - 2$ and so on.

Examples:

Input : $n = 4$

Output :

```
4 4 4 4 4 4 4
4 3 3 3 3 3 4
4 3 2 2 2 3 4
4 3 2 1 2 3 4
4 3 2 2 2 3 4
4 3 3 3 3 3 4
4 4 4 4 4 4 4
```

Input : $n = 3$

Output :

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

5. Fibonacci Alphabets

An input of the number of rows will be taken. The program must print the fibonacci series in a simple right triangle as shown below, but instead of number, the equivalent letter must be used. Eg. $1 \rightarrow A$, $2 \rightarrow B$ $26 \rightarrow Z$, $27 \rightarrow A$ and so on.