

Educational Event of
“The Fourth Week of Doha for Education”
22nd – 26th February’ 2009
Programming Contest

PROBLEM A:
HARDNESS LEVEL : EASY

POINTS
50

Your mathematics teacher gives you the below Rhombus, asking you to use one of the common languages such as C++ or JAVA to draw this Rhombus on the screen.

You are requested to fill the Rhombus with Letters (A,B,C,D). As a result the teacher will find the Rhombus filled with letters as below.

A
AB
ABC
ABCD
ABCDE
ABCD
ABC
AB
A

.....

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PROBLEM B:
HARDNESS LEVEL : MEDUIM

POINTS
150

You have a file that contains the numbers from 1 to 100 in an unordered form, but there is a number in this sequence of numbers which is missing.

Design a program that reads this file and transfers the numbers into one array and prints out this missing number that is supposed to be included in the file.

Taking into consideration to use only one loop in the whole program with ‘N’ complexity.

The given file will be located in :

C:\Contest\numbers.txt

Your output must be like that :

The Missing Number is “ Result “

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PROBLEM C :
HARDNESS LEVEL : ADVANCED

POINTS

250

The Problem

Given the dimensions of a rectangular grid and a sequence of robot positions and instructions, you are to write a program that determines for each sequence of robot positions and instructions the final position of the robot.

A robot *position* consists of a grid coordinate (a pair of integers: x-coordinate followed by y-coordinate) and an orientation (N,S,E,W for north, south, east, and west). A robot *instruction* is a string of the letters ' L ', ' R ', and ' F ' which represent, respectively, the instructions:

- *Left* : the robot turns left 90 degrees and remains on the current grid point.
- *Right* : the robot turns right 90 degrees and remains on the current grid point.
- *Forward* : the robot moves forward one grid point in the direction of the current orientation and maintains the same orientation.

The direction *North* corresponds to the direction from grid point (x,y) to grid point (x,y+1). Since the grid is rectangular and bounded, a robot that moves “off” an edge of the grid is lost forever.

The Input

The first line of input is the upper-right coordinates of the rectangular world, the lower-left coordinates are assumed to be 0,0.

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The remaining input consists of a sequence of robot positions and instructions (two lines per robot). A position consists of two integers specifying the initial coordinates of the robot and an orientation (N,S,E,W), all separated by white space on one line. A robot instruction is a string of the letters 'L', 'R', and 'F' on one line.

Each robot is processed sequentially, i.e., finishes executing the robot instructions before the next robot begins execution.

Input is terminated by end-of-file.

You may assume that all initial robot positions are within the bounds of the specified grid. The maximum value for any coordinate is 50. All instruction strings will be less than 100 characters in length.

The Output

For each robot position/instruction in the input, the output should indicate the final grid position and orientation of the robot. If a robot falls off the edge of the grid the word “LOST” should be printed after the position and orientation.

Sample Input

```
5 3
1 1 E
RFRFRFRF
3 2 N
FRRFLLFFRRFLL
0 3 W
LLFFFLLFLFL
```

Sample Output

```
1 1 E
3 3 N LOST
2 3 S
```

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PROBLEM D :
HARDNESS LEVEL : EASY

POINTS

100

You are given an excel sheet which contains staff salaries. You are requested to identify the biggest and lowest salaries in the sheet.

You have faced a difficulty in using the functions to fulfill the task.

Given this problem, you decided to design a program using (C++, JAVA) languages to do the task.

write a program that calls `bignum()` and `littlenum()` which determine, respectively, the highest and the smallest of a sequence of numbers read in from the terminal.

Sample Output :

The Biggest Number is **result**

The lowest Number is **result**

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PROBLEM A:
HARDNESS LEVEL : EASY

POINTS
50

write a program that Produces a multiplication table.

Be note that the top left hand corner will show 1x1 and the bottom right shows 12x12.

Sample Output :

1	2	3	4	5	6	7	8	9	10	11	12
2	4	6	8	10	12	14	16	18	20	22	24
3	6	9	12	15	18	21	24	27	30	33	36
4	8	12	16	20	24	28	32	36	40	44	48
5	10	15	20	25	30	35	40	45	50	55	60
6	12	18	24	30	36	42	48	54	60	66	72
7	14	21	28	35	42	49	56	63	70	77	84
8	16	24	32	40	48	56	64	72	80	88	96
9	18	27	36	45	54	63	72	81	90	99	108
10	20	30	40	50	60	70	80	90	100	110	120
11	22	33	44	55	66	77	88	99	110	121	132
12	24	36	48	60	72	84	96	108	120	132	144