

OPSI Systems

Rosebank Code Wars

29 November 2016

There are three questions. You can submit as many as you want. All correct answers will give full marks, and if there are any mistakes the judges will award partial marks.

You can use any language and as long as your program runs for less than one minute.

The winner and runner up will get Takealot vouchers of R 500 and R 250 respectively.

The judge's decision is final and no correspondence will be entered into.

Have fun.



Problem 1: 5 points

Introduction

Peter's Popular Prime Pepper Plant provides packs of peppers in packages of 6, 11, or 13 peppers. The price to prepare each package is the same, regardless of size.

Your program should take as input an integer less than 1000. It should find the cheapest combination of packages to ship that number of peppers.

Sample Input

The input will consist of a single integer, representing the count of peppers.

Example 1

42

Example 2

55

Example 3

27

Example 4

88

Sample Output

The program should display the cheapest combination of packages to ship the count of peppers. If the same minimum number of packages can be obtained in two ways, choose the one that uses more of the size-13 packages.

Example 1

42 peppers can be packed most economically in:
1 package of 13
1 package of 11
3 packages of 6
5 total packages.

Example 2

55 peppers can be packed most economically in:
5 packages of 11
5 total packages.

Example 3

27 peppers cannot be packed.

Example 4

88 peppers can be packed most economically in:
5 packages of 13
1 package of 11
2 packages of 6
8 total packages.

Introduction

The military wants to use highly trained giraffes in their latest campaign. However, giraffes are extremely poor navigators. Your task is to create a Giraffe Positioning System with turn by turn directions.

Problem 2: 13 Points

You will be given a number of giraffes that you need to plan routes for, followed by a name and height (in feet) for each giraffe. Then, you will be told the dimensions of the field in sectors (height first, then width). The field will be denoted by numbers representing the height of the lowest branch (in feet) in that sector. Your giraffes will remove any branches up to their height, anything more would be too slow and the mission would surely fail. Each foot of delicious foliage consumed will slow your team as though they moved through one sector. The insertion point is denoted by an S and the mission objective by an F, these can occur anywhere in the sector.

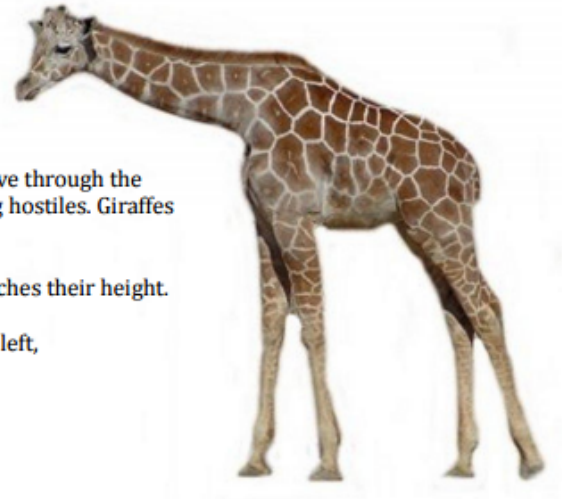
Your goal is to select the paths so that the cumulative movements of the giraffes are minimized. In other words, it's possible that, for example, the first giraffe may take a less than optimal path in order to optimize the total travel time of the entire group. Only one Giraffe can move through the combat zone at a time. Anything else would risk alerting hostiles. Giraffes will be released in the order provided by the roster.

Giraffes will move into a sector and then eat until it matches their height.

U = move up, D = move down, R = move right, L = move left,
and E = eat (once per foot of foliage).

Sample Input

```
3
Irving 10
George 12
Geoffrey 15
4 4
S 5 11 11
11 6 11 11
11 11 11 11
11 14 11 F
```



Sample Output

On each line, print the giraffe's name, the number of moves it made, and all of its moves separated by spaces. Then print the total number of moves for the team.

```
Irving, 6: D D D R R R
George, 10: D E D E D E R R E R
Geoffrey, 19: D E E E D E E E D E E E R E R E E E R
Total moves: 35
```

Problem 3: 7 points

Summary

A "diamond in the rough" is someone or something having desirable qualities or potential but lacking experience, refinement or polish. When interviewing college graduates, technology companies usually make an effort to distinguish the diamonds in the rough from the lumps of coal.

Write a program that can generate diamond patterns of different sizes.

Input

Each line of input contains three positive integers: the size of the diamonds and the number of rows and columns of diamonds to be drawn. Due to the way the diamonds are drawn, the diamond size will always be an even integer. All values will be less than one hundred. The input ends with three zeros.

```
6 2 4
2 3 7
0 0 0
```

Output

The program must print diamonds in a rectangular grid using the slash and backslash characters for the bodies of the diamonds. A diamond of size two has exactly two slashes and two backslashes arranged in a diamond pattern. For diamonds larger than size two, the program should fill the spaces between the diamonds with hash characters to represent lumps of coal. The diamond grid must match the input rows and columns.

```
##/\####/\####/\####/\##
#/\####/\####/\####/\##
//\####/\####/\####/\##
\\/\####/\####/\####/\##
#\\/\####/\####/\####/\##
##\####/\####/\####/\##
#/\####/\####/\####/\##
#/\####/\####/\####/\##
//\####/\####/\####/\##
\\/\####/\####/\####/\##
#\\/\####/\####/\####/\##
##\####/\####/\####/\##
```

```
/\/\/\/\/\/\
\\/\/\/\/\/\
/\/\/\/\/\/\
\\/\/\/\/\/\
/\/\/\/\/\/\
\\/\/\/\/\/\
```