《算法设计与分析》实验

1. 注册 POJ 账号（poj.org）
2. 根据教学进度，完成布置的题目
3. 做题主要在课下完成，实验课上进行答疑和检查。
4. 成果提交

最后提交一份实验总结报告，主要包括以下内容：

（1）在 poj.org 上通过题目列表的截图（截屏、贴图即可）

（2）总结部分：包括，但不限于以下内容

（2.1）做了哪些题目、总数量

（2.2）AC 了哪些题目、数量

（2.3）对没有 AC 的题目（如果有），找部分代表性题目（1 道及以上），分析一下没有 AC 的原因

（2.4）在算法设计和编程技术上的收获

（2.5）其他心得

要求：

（1）字数：不计图、表、程序段，文字描述（汉字数）不少于 1200 字；

（2）页数：正文小四、宋体、1.5 倍行距排版（标题字体大小不超过三号），总页数不少于 3 页。

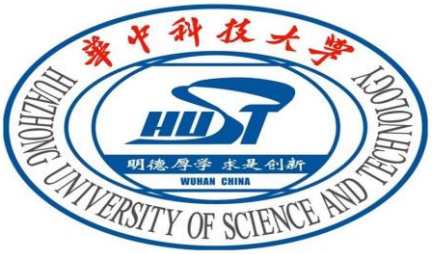
（3）打印，交纸质报告。

（4）总结报告封面如下。

華中科技大學

《算法设计与分析》

实 验 总 结 报 告



专业班级：_____

学　　号：_____

姓　　名：_____

指导教师：_____

完成日期：_____

计算机科学与技术学院

第 1 题：POJ 1000 A+B

A+B Problem

Time Limit: 1000MS Memory Limit: 10000K
Total Submissions: 489953 Accepted: 276589

Description

Calculate a+b

Input

Two integer a,b (0<=a,b<=10)

Output

Output a+b

Sample Input

```
1 2
```

Sample Output

```
3
```

第 2 题：1005 I Think I Need a Houseboat

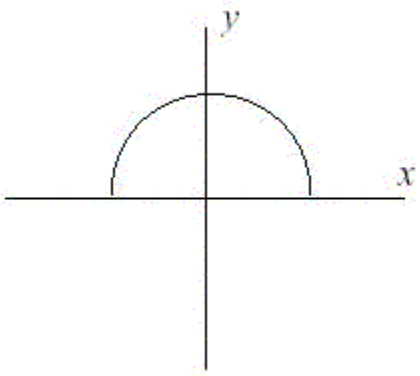
I Think I Need a Houseboat

Time Limit: 1000MS Memory Limit: 10000K
Total Submissions: 116579 Accepted: 50264

Description

Fred Mapper is considering purchasing some land in Louisiana to build his house on. In the process of investigating the land, he learned that the state of Louisiana is actually shrinking by 50 square miles each year, due to erosion caused by the Mississippi River. Since Fred is hoping to live in this house the rest of his life, he needs to know if his land is going to be lost to erosion.

After doing more research, Fred has learned that the land that is being lost forms a semicircle. This semicircle is part of a circle centered at (0,0), with the line that bisects the circle being the X axis. Locations below the X axis are in the water. The semicircle has an area of 0 at the beginning of year 1. (Semicircle illustrated in the Figure.)



Input

The first line of input will be a positive integer indicating how many data sets will be included (N). Each of the next N lines will contain the X and Y Cartesian coordinates of the land Fred is considering. These will be floating point numbers measured in miles. The Y coordinate will be non-negative. (0,0) will not be given.

Output

For each data set, a single line of output should appear. This line should take the form of: “Property N: This property will begin eroding in year Z.” Where N is the data set (counting from 1), and Z is the first year (start from 1) this property will be within the semicircle AT THE END OF YEAR Z. Z must be an integer. After the last data set, this should print out “END OF OUTPUT.”

Sample Input

```
2
1.0 1.0
25.0 0.0
```

Sample Output

```
Property 1: This property will begin eroding in year
1.
Property 2: This property will begin eroding in year
20.
END OF OUTPUT.
```

题目大意：

密西西比河岸某处陆地因为河水侵蚀，每年陆地面积都在减少，每年减少 50 平方英里，减少的陆地面积呈半圆形，即该半圆形面积以每年 50 平方英里的速度增长。在第一年初时，该半圆形面积为 0，半圆形的圆心坐标为（0,0），现在的任务是给定一个坐标，求出该坐标在哪一年年底会被河水侵蚀。假设给定的坐标到圆心的距离不会等于半圆的半径。

输入：

第一行输入坐标个数，第二行开始输入坐标，每个坐标占一行，每个坐标由横坐标和纵坐标组成，坐标值为浮点数，单位为英里。

输出：

输出该坐标会在哪一年年底开始被河水侵蚀。对应每个坐标输出一行，输出结束后输出 “END OF OUTPUT.”

第 3 题：POJ 1753 Flip Game

Flip Game

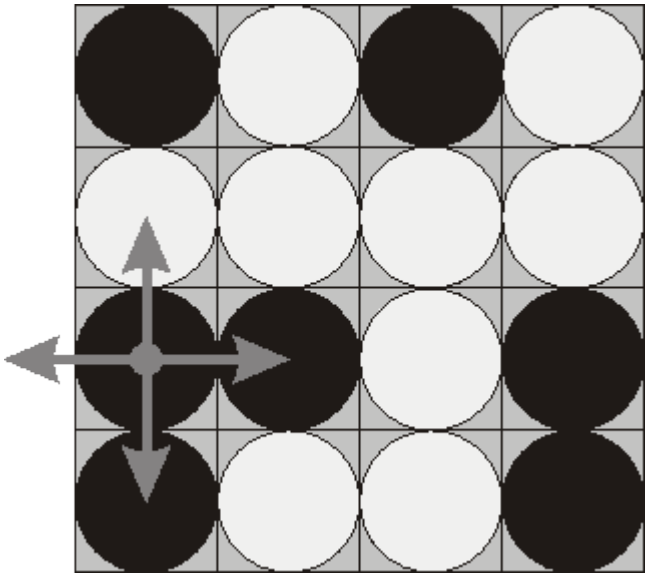
Time Limit: 1000MS Memory Limit: 65536K
Total Submissions: 56900 Accepted: 23752

Description

Flip game is played on a rectangular 4x4 field with two-sided pieces placed on each of its 16 squares. One side of each piece is white and the other one is black and each piece is lying either it's black or white side up. Each round you flip 3 to 5 pieces, thus changing the color of their upper side from black to white and vice versa. The pieces to be flipped are chosen every round according to the following rules:

1. Choose any one of the 16 pieces.
2. Flip the chosen piece and also all adjacent pieces to the left, to the right, to the top, and to the bottom of the chosen piece (if there are any).

Consider the following position as an example:



bwbw
wwww
bbwb
bwwb
Here "b" denotes pieces lying their black side up and "w" denotes pieces lying their white side up. If we choose to flip the 1st piece from the 3rd row (this choice is shown at the picture), then the field will become:

bwbw
bwww
wwwb
wwwb
The goal of the game is to flip either all pieces white side up or all pieces

black side up. You are to write a program that will search for the minimum number of rounds needed to achieve this goal.

Input

The input consists of 4 lines with 4 characters "w" or "b" each that denote game field position.

Output

Write to the output file a single integer number - the minimum number of rounds needed to achieve the goal of the game from the given position. If the goal is initially achieved, then write 0. If it's impossible to achieve the goal, then write the word "Impossible" (without quotes).

Sample Input

```
bwwb
bbwb
bwwb
bwww
```

Sample Output

```
4
```

题目大意：

有 4*4 的正方形，每个格子要么是黑色，要么是白色，当把一个格子的颜色改变(黑->白或者白->黑)时，其周围上下左右(如果存在的话)的格子的颜色也被反转，问至少反转几个格子可以使 4*4 的正方形变为纯白或者纯黑？

第 4 题：poj3295 重言式

Tautology

Time Limit: 1000MS Memory Limit: 65536K
Total Submissions: 15249 Accepted: 5878

Description

WFF 'N PROOF is a logic game played with dice. Each die has six faces representing some subset of the possible symbols K, A, N, C, E, p, q, r, s, t. A Well-formed formula (WFF) is any string of these symbols obeying the following rules:

- p, q, r, s, and t are WFFs
- if *w* is a WFF, N*w* is a WFF
- if *w* and *x* are WFFs, K*wx*, A*wx*, C*wx*, and E*wx* are WFFs.

The meaning of a WFF is defined as follows:

- p, q, r, s, and t are logical variables that may take on the value 0 (false) or 1 (true).
- K, A, N, C, E mean *and*, *or*, *not*, *implies*, and *equals* as defined in the truth table below.

Definitions of K, A, N, C, and E

w	x	Kwx	Awx	Nw	Cwx	Ewx
1	1	1	1	0	1	1
1	0	0	1	0	0	0
0	1	0	1	1	1	0
0	0	0	0	1	1	1

A *tautology* is a WFF that has value 1 (true) regardless of the values of its variables. For example, *ApNp* is a tautology because it is true regardless of the value of *p*. On the other hand, *ApNq* is not, because it has the value 0 for *p=0, q=1*.

You must determine whether or not a WFF is a tautology.

Input

Input consists of several test cases. Each test case is a single line containing a WFF with no more than 100 symbols. A line containing 0 follows the last case.

Output

For each test case, output a line containing *tautology* or *not* as appropriate.

Sample Input

```
ApNp
ApNq
0
```

Sample Output

```
tautology
not
```

大致题意：

*输入由 p、q、r、s、t、K、A、N、C、E 共 10 个字母组成的逻辑表达式，

*其中 p、q、r、s、t 的值为 1（true）或 0（false），即逻辑变量；

*K、A、N、C、E 为逻辑运算符，

*K --> and: x && y

*A --> or: x || y

*N --> not : ! x

*C --> implies : (!x)||y

*E --> equals : x==y

*问这个逻辑表达式是否为永真式。

*PS:输入格式保证是合法的