2026/2027 SOUTHERN CALIFORNIA REGIONAL INTERNATIONAL COLLEGIATE PROGRAMMING CONTEST

Problem 9
TriStar

A figurate number is a number that can be displayed by arranging dots on a grid to make a geometric pattern.

Triangular numbers, as shown in Figure 1, are an example of figurate numbers. They form a nice sequence:

$$1, 3, 6, 10, 15, 21, 28, \ldots$$

Another, more interesting example, are star numbers as shown in Figure 2. They form another sequence:

$$1, 13, 37, 73, 121, 181, 253, \ldots$$

Star and triangular numbers are related. A star consists of six points. Each point of the star consists of two triangular figures, with each figure composed of the same triangular number of dots. Triangular figures for two points are shown in the 37-dot star of Figure 2. The triangular figures are composed of 3 dots each.

There are also infinitely many numbers that are both a triangular number and a star number. That sequence:

$$1, 253, 49141, 9533161, \ldots$$

Your team's job is to write a program that will take a list of numbers and report whether each number is triangular, star, both, or neither.

Input to your program is a series of lines terminated by end of file. Each line consists of one to twenty positive integers, n, separated by white space. Each integer n: $1 \leq n < 2^{61} - 1$. No input line is longer than 100 characters. There will be at least 1 and no more than 200 integers in the input.

For each integer, print a line with n, a single space, and one of the following results:

- "`t`" if the number is triangular only,
- "`s`" if the number is star only,
- "`ts`" if the number is both triangular and star, or
- "`n`" if the number is neither.

Sample Input

```
1   3 6 10 15
    13 37    73 121 181
   253 49141  9533161   1849384153
2305843009213693950 13501987525271953
660721321 523 83 536887296 36877296
```

Problem 9
TriStar (continued)

Output for the Sample Input

```
1 ts
3 t
6 t
10 t
15 t
13 s
37 s
73 s
121 s
181 s
253 ts
49141 ts
9533161 ts
1849384153 ts
2305843009213693950 n
13501987525271953 ts
660721321 n
523 n
83 n
536887296 t
36877296 n
```

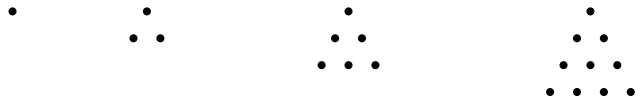


Figure 1. Triangular Numbers.

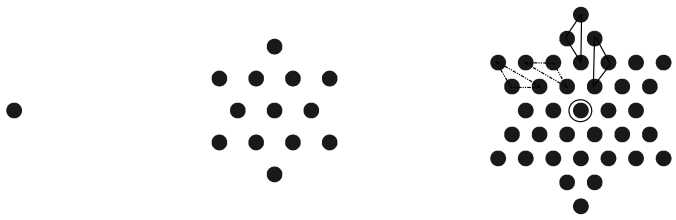


Figure 2. Star Numbers.