DMOPC '19 Contest 1 P2 - Good Writing

Time limit: 1.0s **Memory limit:** 64M

A teacher once said: "Good writing is good writing is good writing."
Hence, the teacher defines $f_0 =$ "Good writing is good writing is good writing."
To make the quote more interesting the teacher defines $f_n =$ "Good writing is good " $+ f_{n-1} +$ " writing is good " $+ f_{n-1} +$ " is good writing." for all $n \geq 1$.

For example, f_1 is

```
Good writing is good Good writing is good writing is good writing. writing is good Good writing is good writing is good writing. is good writing.
```

Note that the quotation marks are not part of f_1.

The teacher wants to ask q questions. Each time she wants to find the k^{th} character of f_n.
Characters are indexed starting at 1. If f_n consists of less than k characters, output `.`.

Constraints

$1 \leq q \leq 10$
$0 \leq n \leq 30$
$1 \leq k \leq 2^{31} - 1$

Input Specification

The first line contains an integer, q.
The following q lines each contains two integers, n and k in that order.

Output Specification

On the i^{th} line, output the answer to the i^{th} question.

Sample Input 1

```
3
0 4
1 100
1 1111111
```

Sample Output 1

```
d
g
.
```

Sample Input 2

```
3
0 6
1 13
1 22
```

Sample Output 2

```
w

G
```