

Curse the Recursion

Given the value of n , find the k^{th} number in the sequence produced by the code below.

```
void fun(int n)
{
    if(n>0)
    {
        fun(n-1);
        printf("%d ",n);
        fun(n-1);
    }
}
```

Input

First line contains T (no of test-cases, $1 \leq T \leq 10^5$)

Next T lines contains two space separated integers n ($1 \leq n \leq 10^{18}$) and k ($1 \leq k \leq 10^{18}$)

Output

For each test-case, print an integer representing the k^{th} number in sequence if it exists otherwise print 0

Example

Input:

```
5
2 1
2 10
5 4
5 1
5 2
```

Output:

```
1
0
3
1
2
```