

## Objective

Welcome to the last day! Today, we're discussing bitwise operations. Check out the [Tutorial](#) tab for learning materials and an instructional video!

## Task

Given set  $S = \{1, 2, 3, \dots, N\}$ . Find two integers,  $A$  and  $B$  (where  $A < B$ ), from set  $S$  such that the value of  $A \& B$  is the maximum possible *and also less than a given integer,  $K$* . In this case,  $\&$  represents the *bitwise AND* operator.

## Input Format

The first line contains an integer,  $T$ , the number of test cases.

Each of the  $T$  subsequent lines defines a test case as **2** space-separated integers,  $N$  and  $K$ , respectively.

## Constraints

- $1 \leq T \leq 10^3$
- $2 \leq N \leq 10^3$
- $2 \leq K \leq N$

## Output Format

For each test case, print the maximum possible value of  $A \& B$  on a new line.

## Sample Input

```
3
5 2
8 5
2 2
```

## Sample Output

```
1
4
0
```

## Explanation

$N = 5, K = 2 \ S = \{1, 2, 3, 4, 5\}$

All possible values of  $A$  and  $B$  are:

1.  $A = 1, B = 2; A \& B = 0$
2.  $A = 1, B = 3; A \& B = 1$
3.  $A = 1, B = 4; A \& B = 0$
4.  $A = 1, B = 5; A \& B = 1$
5.  $A = 2, B = 3; A \& B = 2$
6.  $A = 2, B = 4; A \& B = 0$
7.  $A = 2, B = 5; A \& B = 0$
8.  $A = 3, B = 4; A \& B = 0$
9.  $A = 3, B = 5; A \& B = 1$
10.  $A = 4, B = 5; A \& B = 4$

The maximum possible value of  $A \& B$  that is also  $< (K = 2)$  is **1**, so we print **1** on a new line.