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Day 29: Bitwise AND 🔖

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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 $S = \{1, 2, 3, \ldots, N\}$. 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.

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Current Buffer (saved locally, editable) 🕙   Java 8

```java
import java.util.Scanner;

public class Solution {
    public static void main(String[] args) {
        Scanner in = new Scanner(System.in);
        int t = in.nextInt();
        for(int a0 = 0; a0 < t; a0++){
            int n = in.nextInt();
            int k = in.nextInt();
            if(((k-1)|k) > n && k%2==0){
                System.out.println(k-2);
            }else{
                System.out.println(k-1);
            }
        }
    }
}
```

Line: 17 Col: 2

⬆ Upload Code as File   ☐ Test against custom input   Run Code   Submit Code

Testcase 0 ✔	Testcase 1 ✔

Congratulations, you passed the sample test case.

Click the **Submit Code** button to run your code against all the test cases.

Input (stdin)

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

Your Output (stdout)

```
1
4
0
```

Expected Output

```
1
4
0
```

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