Bitwise Operators ★

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In this challenge, you will use logical bitwise operators. All data is stored in its binary representation. The logical operators, and C language, use 1 to represent true and 0 to represent false. The logical operators compare bits in two numbers and return true or false, 0 or 1, for each bit compared.

- `Bitwise AND operator &` The output of bitwise AND is 1 if the corresponding bits of two operands is 1. If either bit of an operand is 0, the result of corresponding bit is evaluated to 0. It is denoted by &.
- `Bitwise OR operator |` The output of bitwise OR is 1 if at least one corresponding bit of two operands is 1. It is denoted by |.
- `Bitwise XOR (exclusive OR) operator ^` The result of bitwise XOR operator is 1 if the corresponding bits of two operands are opposite. It is denoted by $\oplus$.

For example, for integers 3 and 5,

```
3 = 00000011 (In Binary)
5 = 00000101 (In Binary)

AND operation        OR operation         XOR operation
  00000011             00000011             00000011
& 00000101           | 00000101           ^ 00000101
  --------             --------             --------
  00000001  = 1        00000111  = 7        00000110  = 6
```

You will be given an integer n, and a threshold, k. $For each number i from 1 through n$, $find the maximum value of the logical and, or and xor when compared against all integers through n that are greater than i$. $Consider a value only if the comparison returns a result less than k$. Print the results of the and, or and exclusive or comparisons on separate lines, in that order.

Example

$n = 3$

$k = 3$

The results of the comparisons are below:

```
a b   and or xor
1 2   0   3  3
1 3   1   3  2
2 3   2   3  1
```

For the `and` comparison, the maximum is 2. For the `or` comparison, none of the values is less than k, so the maximum is 0. For the `xor` comparison, the maximum value less than k is 2. The function should print:

```
2
0
2
```

Function Description

Complete the calculate_the_maximum function in the editor below.

calculate_the_maximum has the following parameters:

- int n: the highest number to consider
- int k: the result of a comparison must be lower than this number to be considered

Prints

Print the maximum values for the `and`, `or` and `xor` comparisons, each on a separate line.

Input Format

The only line contains 2 space-separated integers, n and k.

Constraints

- $2 \leq n \leq 10^3$
- $2 \leq k \leq n$

Sample Input 0

```
5 4
```

Sample Output 0

```
2
3
3
```

Explanation 0

$n = 5, k = 4$

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

All possible values of a and b are:

1. $\mathbf{a} = 1, \mathbf{b} = 2;\ \mathbf{a} \,\&\, \mathbf{b} = 0;\ \mathbf{a} \mid \mathbf{b} = 3;\ \mathbf{a} \oplus \mathbf{b} = 3;$
2. $\mathbf{a} = 1, \mathbf{b} = 3;\ \mathbf{a} \,\&\, \mathbf{b} = 1;\ \mathbf{a} \mid \mathbf{b} = 3;\ \mathbf{a} \oplus \mathbf{b} = 2;$
3. $\mathbf{a} = 1, \mathbf{b} = 4;\ \mathbf{a} \,\&\, \mathbf{b} = 0;\ \mathbf{a} \mid \mathbf{b} = 5;\ \mathbf{a} \oplus \mathbf{b} = 5;$
4. $\mathbf{a} = 1, \mathbf{b} = 5;\ \mathbf{a} \,\&\, \mathbf{b} = 1;\ \mathbf{a} \mid \mathbf{b} = 5;\ \mathbf{a} \oplus \mathbf{b} = 4;$
5. $\mathbf{a} = 2, \mathbf{b} = 3;\ \mathbf{a} \,\&\, \mathbf{b} = 2;\ \mathbf{a} \mid \mathbf{b} = 3;\ \mathbf{a} \oplus \mathbf{b} = 1;$
6. $\mathbf{a} = 2, \mathbf{b} = 4;\ \mathbf{a} \,\&\, \mathbf{b} = 0;\ \mathbf{a} \mid \mathbf{b} = 6;\ \mathbf{a} \oplus \mathbf{b} = 6;$
7. $\mathbf{a} = 2, \mathbf{b} = 5;\ \mathbf{a} \,\&\, \mathbf{b} = 0;\ \mathbf{a} \mid \mathbf{b} = 7;\ \mathbf{a} \oplus \mathbf{b} = 7;$
8. $\mathbf{a} = 3, \mathbf{b} = 4;\ \mathbf{a} \,\&\, \mathbf{b} = 0;\ \mathbf{a} \mid \mathbf{b} = 7;\ \mathbf{a} \oplus \mathbf{b} = 7;$
9. $\mathbf{a} = 3, \mathbf{b} = 5;\ \mathbf{a} \,\&\, \mathbf{b} = 1;\ \mathbf{a} \mid \mathbf{b} = 7;\ \mathbf{a} \oplus \mathbf{b} = 6;$
10. $\mathbf{a} = 4, \mathbf{b} = 5;\ \mathbf{a} \,\&\, \mathbf{b} = 4;\ \mathbf{a} \mid \mathbf{b} = 5;\ \mathbf{a} \oplus \mathbf{b} = 1;$

- The maximum possible value of $a \& b$ that is also $< (k = 4)$ is 2, so we print 2 on first line.
- The maximum possible value of $a | b$ that is also $< (k = 4)$ is 3, so we print 3 on second line.
- The maximum possible value of $a \oplus b$ that is also $< (k = 4)$ is 3, so we print 3 on third line.

Change Theme

```
            if(and > max_and && and < k)
            max_and=and;
            if(or > max_or && or < k)
            max_or=or;
            if(exor > max_exor && exor < k)
            max_exor=exor;
        }
    }
    printf("%d\n",max_and);
    printf("%d\n",max_or);
    printf("%d",max_exor);

}

int main() {
    int n, k;

    scanf("%d %d", &n, &k);
    calculate_the_maximum(n, k);

    return 0;
}

```

Line: 39 Col: 1

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Test case 0

Test case 1

Test case 2

Test case 3

Test case 4

Test case 5

Test case 6

Compiler Message

Success

Input (stdin) Download

```
5 4
```

Expected Output Download

```
2
3
3
```