Workshop 4 - Binomial Coefficient Calculation

The binomial coefficient is defined by the following formula:

$$\binom{n}{k} = \frac{n!}{k!(n-k)!}.$$

In this workshop, your tasks include

1. write a validation function that allow users to enter two numbers, n, k, and guarantee that
   - they are positive integers,
   - $0 \leq n, k \leq 50$, and
   - $k \leq n$.

   The user is required to re-enter the data until all above conditions are satisfied. Below are some errors your program needs to notify users when they enter invalid data:
   - "`The data you entered is not an integer. Please try again!`"
   - "`The data you entered is not a positive number. Please try again!`"
   - "`The number you entered is out of the range [0, 50]. Please try again!`"
   - "`n must be greater than or equal to k. Please try again!`"
2. write a function that takes as input n, k and returns $\binom{n}{k}$ (try to find out an optimal algorithm)
3. use the above functions to take n, k from the user, then calculate $\binom{n}{k}$

Below is an example of running your program:

```
Enter n, k:  12.34 56
The data you entered is not an integer.  Please try again!

Enter n, k:  -12 34
The data you entered is not a positive number.  Please try again!

Enter n, k:  123 45
The number you entered is out of the range [0, 50].  Please try again!

Enter n, k:  2 5
n must be greater than or equal to k.  Please try again!

Enter n, k:  5 2
The result is 10
```

---**o0o**---