
Counting it up

In the game of poker a ‘hand’ of five cards is drawn from a ‘pack’ of 52 cards. How many different hands are possible?

This is an example of an important general problem. If we have some number, n , of cards, all different from each other (the pack) and a smaller number, k , drawn from these, in how many ways can this be done?

The answer, well known to mathematicians, is called $\binom{n}{k}$ (or, in older texts, nC_k) and has as a formula:

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

The symbol “!” indicates the factorial:

$$x! = 1 \times 2 \times 3 \times 4 \times \cdots \times x$$

Task

Write and test a computer program using 64-bit integers that displays the value of $\binom{n}{k}$ for given n and k . Your program should not access any multiple precision features of your chosen language such as `BigInteger` in Java.

The program should run as follow: `java CountingUp < test.txt`

The file “test.txt” contains values of n and k on each line. The values might be separated with a tab or a space.

(Pair)