

Basic concept of permutation & combination:

(I) Suppose we have 10 different books. We plan to order them. For example we want to distribute them among 10 persons. Obviously there are 10! ways to do this.

(II) Now suppose that Jack want to choose 4 books of these 10 books.

there are $\binom{10}{4} = \frac{10!}{4!(10-4)!} = \frac{10!}{4!6!}$ ways to do that.

*** please note that in this part order is not important.

i.e. ~~ex~~; Jack just picks up 4 books, no matter which one is the first one, which one is second &

(III) Finally, suppose that once Jack chose the books, he decides to give the books to four persons, named A, B, C & D.

unless of part (II), the order is important in this question.

there are $\frac{10!}{(10-4)!} = \frac{10!}{6!}$ ways to do this.

literaly, there are $\binom{10}{4} \times (4!)$ ways. because after choosing 4 books, we have to order them.

Hint: AS you see when we consider order (when the order is important to us), we have more ways rather than ^{when} the order isn't important.

in other word; $\frac{10!}{6!} > \frac{10!}{6!4!}$

this is natural, since ~~when~~ when the order is important, by permutation among the chosen books we achieve more states/ways.