Example:

In how many ways can 5 children be arranged in a line such that

(i)   two particular children of them are always together
(ii) two particular children of them are never together.

Solution:

(i) We consider the arrangements by taking 2 particular children together as one and hence the remaining 4 can be arranged in 4! = 24 ways. Again two particular children taken together can be arranged in two ways. Therefore, there are 24 × 2 = 48 total ways of arrangement.

(ii) Among the 5! = 120 permutations of 5 children, there are 48 in which two children are together. In the remaining 120 – 48 = 72 permutations, two particular children are never together.