Question #15387 A group of 5 boys and 4 girls are to be photographed. In how many ways can they be arranged such that:

(i) No two girls sit together?

(ii) No two boys sit together?

Solution. i) Analyzing the situation one can see that, our arrangement can be only done if they placed as the following:

(B,B,G,B,G,B,G,B,G) or (B,G,B,G,B,G,B,G,B) or (G,B,G,B,G,B,G,B,B). So, choose, two special boys that are at the end or at the beginning. this can be done in $\binom{5}{2}$ and then arrange girls and boys by permutation, to sum it up $3\binom{5}{2}3!4!$.

ii) The principle of arrangement here is (B,G,B,G,B,G,B,G,B), hence we have to arrange girls and boys by permutations 5!4!.