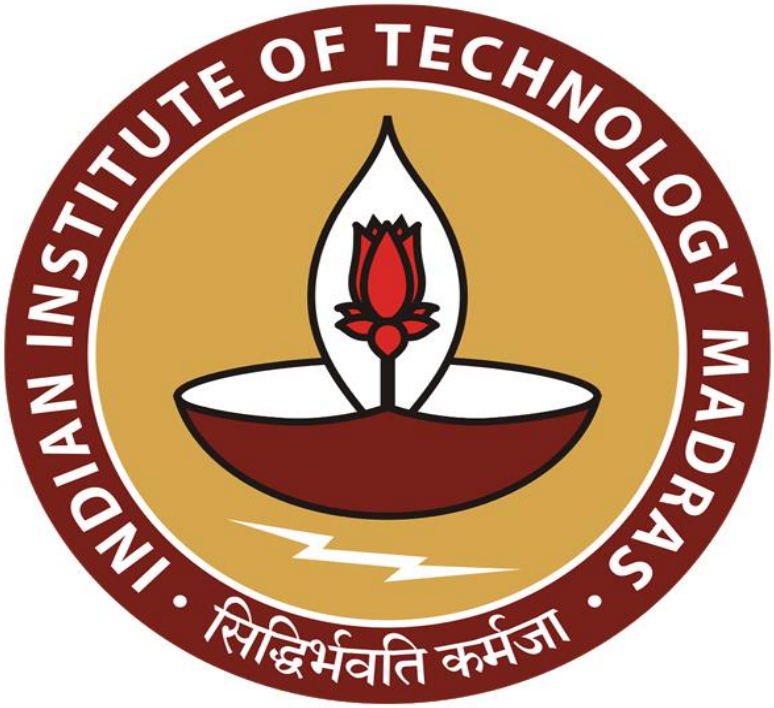

IIT Madras

ONLINE DEGREE

Statistics for Data Science - 1
Prathyush P
Support Team
Indian Institute of Technology, Madras
Week - 5 Tutorial - 5

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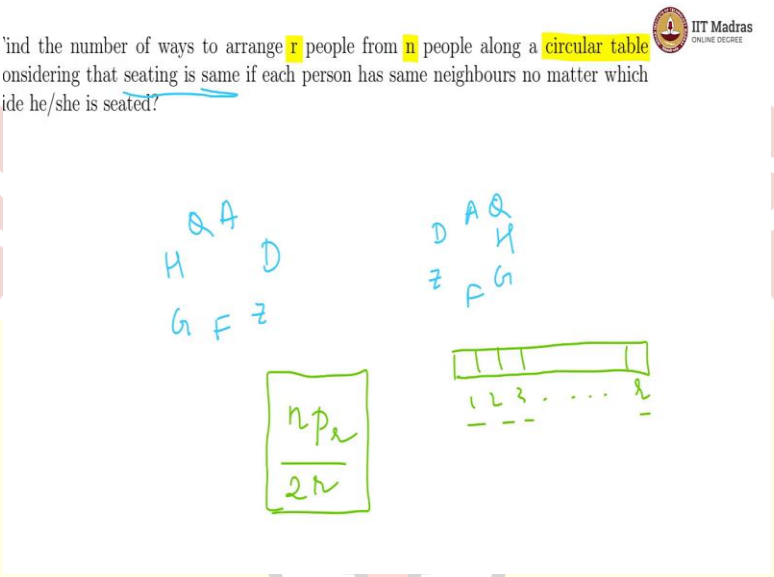

In this question, we are expected to arrange r people from n people along a circular table. So it is a circular permutation. However, they are saying that the seating is same if each person has same neighbors no matter which side he is seated.

So let us consider this. We have, say, A, D, Z, F, G, H, and Q sitting together like this. According to what their saying, as long as the person has same neighbors, so if I flip this instead of clockwise to anti-clockwise; suppose I have A, and this side that is D, there is Z, and then F, and G, and H, and Q.

So now, A has the same neighbors D and Q, so here also Q and D; H has the same neighbors Q and G, Q and G; similarly, F has G and Z, and F has G and Z. So what has happened here is this is clockwise and this is anti-clockwise and they both are supposed to be considered the same. So the number of circular permutations we will get, first of all, if we look at it is taking r out of n people.

So we can first arrange them as nP_r, which will give us in a sequence like this. So this is 1, 2, 3, so on till r. Now, in a circular permutations, you get r repetitions because it does not matter

which person you start from. So each of these can be the starting point and it will be the same circular permutation, so we will get r repetitions. So, therefore, divided by r.

And now, since clockwise and counter-clockwise does not matter, each of these is repeated once which means you have to divide by 2. So this will be the answer for our question. Thank you.