Exercise solution

Permutations and lists

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The problem

Exercise

You take part in an urban orienteering race, where you have to visit three out of five control points in any order. The control points are, say, Fjellstuen, the church at Aspøya, Kremmergården, Gågaten, and Byparken.
How many iteneraries are possible.

Mathematical formulation

$C = \{ B, G, F, K, C \}$

$\ell = (x_1\ x_2\ x_3)$ $\quad x_i \in C$

$x_i \neq x_j$ if $i \neq j$

ℓ is list or 3-permutation on C

Conclusion

k-permutation on a n-set

$k = 3$ $\quad |C| = n = 5$

No. of k-permutations on an n-set is

$$H = \frac{n!}{(n-k)!} = \frac{5!}{2!} = \frac{120}{2} = \underline{\underline{60}}$$