

**Preview of Lecture 02.29**

On 02.29, we will count the number of finite structures with universe of discourse  $\{1, \dots, n\}$  that satisfy various conditions. We have already noted that there are  $2^{n^2}$  graphs and  $2^{\binom{n}{2}}$  simple graphs with universe of discourse  $\{1, \dots, n\}$ . We will begin by showing that

- $|\text{mod}(\text{Fun}, n)| = n^n$ ;
- $|\text{mod}((\text{Fun} \wedge \text{Inj}), n)| = n!$ ;
- $|\text{mod}(\text{Tour}, n)| = 2^{\binom{n}{2}}$ ;
- $|\text{mod}(\text{SLO}, n)| = n!$ ;
- $|\text{mod}(\text{Bfun}, n)| = n^{n^2}$ .

We will then explore several classes of infinite strict linear orders and finite simple graphs, and, in the latter case, address further counting problems.