Preview of Lecture 02.29

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

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

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