Foundations of Computer Science
Lecture 12

Counting

Bijection and Counting Sequences.
Product, Union and Division Rules.
Counting Subsets – Combinations.

"MATHEMATICS IS THE ART OF GIVING THE SAME NAME TO DIFFERENT THINGS."
JULES HENRI POINCARÉ (1854–1912)
1. Bipartite Graphs and Stable Marriage
   The Dating Algorithm favors men.

2. Coloring and Conflict Graphs.
   Every tree is 2-colorable.

3. Paths
   Shortest path (communicate quickly).
   Euler Path (Snow cleaning; pave all the roads).
   Hamiltonian Path (Travelling salesman).
   Paths in Trees.

4. Spanning trees of a graph.
   Especially counting sequences.

2. Product rule for counting sequences.
   Every tree is 2-colorable.
