

Discrete Mathematical Structures

CS 3233 Lecture 30

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Counting

- We are beginning Chapter 4 today
- Basic question: how can we determine how many configurations or procedures are possible in a given system?

Product Rule

- Suppose a system or a procedure can be broken down in to two components. If there are n_1 possible ways of configuring the first component, and n_2 ways of configuring the second, then the overall system has $n_1 n_2$ configurations

Examples

- 32 computers with 24 ports each have a total of 768 ports
- Number of bit strings of length 7 is 128
- License plates
- One to one functions
- Nested for loops
- Subsets of a finite set

The Sum Rule

- Given two disjoint sets, one of size n_1 , the other of size n_2 , the number of ways to choose one element from one of the two sets is $n_1 + n_2$

Examples

- How many characters are there if upper and lowercase alphabets and numbers are allowed?