Ordered selection of elements

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July 7, 2014

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What do we mean by a list?

- LinkedList and ArrayList in the Java API
- Shopping list
- Collection of items?
- Elements are ordered
- Each element is *indexed* (numbered)
- A set?



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Lists and sets

List	Set
$\overline{[X_1,X_2,\ldots,X_n]}$	$\{x_1, x_2, \ldots, x_n\}$
Repeated elements allowed	An element is either in or out
Order defined	Unordered

- Programmers often use a list to represent a set.
 - Repeated elements must be ignored.
 - Differently ordered lists represent the same set.
 - A set cannot represent a list.



Passwords

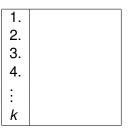
an example

An 8-bit password is a list.

- You have 8 slots (positions).
- Each slot is filled with one element from a character set.
- An element (character) may be used multiple times.

Counting possible lists

How many different lists of k elements from an n-set S exist?



- You have k slots to fill.
- Each slot gives you *n* options.
- Use the Product Principle

Exercise

Exercise

You are going to appoint bishops for three dioceses. There are five candidates, and it is possible for bishop to hold multiple dioceses. In how many different ways can the appointments be made?