

Lists

Ordered selection of elements

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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
$[x_1, x_2, \dots, x_n]$	$\{x_1, x_2, \dots, x_n\}$
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?

1.	
2.	
3.	
4.	
⋮	
k	

- 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 a bishop to hold multiple dioceses. In how many different ways can the appointments be made?