Finite Maps
Announcements

• Homework 3 is due MONDAY at 11:59:59pm

• Read collaboration policy on syllabus

• Midterm 1
  – Scheduled in class on Friday, February 15th
  – More details to follow!
Motivating Scenario

• Suppose you were writing some course-management software and needed to lookup the lab section for a student given the student’s PennKey?
  – Students might add/drop the course
  – Students might switch lab sections
  – Students should be in only one lab section

• How would you do it?
Finite Maps

• A finite map, aka dictionary, is a collection of bindings from distinct keys to values.
  – Operations to add & remove bindings, test for key membership, lookup a value by its key

• Example: an (ID, int) map might map a PennKey ID to the lab section.

• Like sets, such finite maps appear in many settings:
  – map domain names to IP addresses
  – map words to their definitions (a dictionary)
  – map user names to passwords
  – map game character unique identifiers to dialog trees
  – ...

Finite Map Demo

Using module signatures to preserve data structure invariants

mymap.ml
test_map.ml
Finite Map Interface

type ('k,'v) map

val empty : ('k,'v) map
val is_empty : ('k,'v) map -> bool
val mem : 'k -> ('k,'v) map -> bool
val find : 'k -> ('k,'v) map -> 'v
val add : 'k -> 'v -> ('k,'v) map -> ('k,'v) map
val remove : 'k -> ('k,'v) map -> ('k,'v) map

val from_list : ('k * 'v) list -> ('k,'v) map
val bindings : ('k,'v) map -> ('k * 'v) list