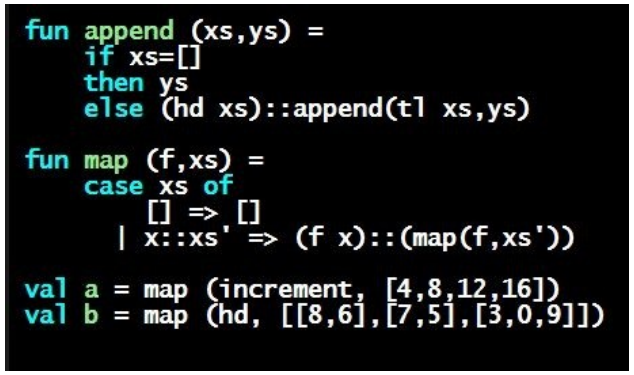

```
fun append (xs,ys) =
    if xs=[]
    then ys
    else (hd xs)::append(tl xs,ys)

fun map (f,xs) =
    case xs of
        [] => []
      | x::xs' => (f x)::(map(f,xs'))

val a = map (increment, [4,8,12,16])
val b = map (hd, [[8,6],[7,5],[3,0,9]])
```

Programming Languages

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2013

Introduction to Racket

Racket

Next two sections will use the Racket language (not ML) and the DrRacket programming environment (not Emacs)

- Installation / basic usage instructions on course website

- Like ML, functional focus with imperative features
  - Anonymous functions, closures, no return statement, etc.
  - But we will not use pattern-matching

- Unlike ML, no static type system: accepts more programs, but most errors do not occur until run-time

- Really minimalist syntax

- Advanced features like macros, modules, quoting/eval, continuations, contracts, …
  - Will do only a couple of these

Racket vs. Scheme

- Scheme and Racket are very similar languages
  - Racket “changed its name” in 2010
  - Please excuse any mistakes when I speak

- Racket made some non-backward-compatible changes…
  - How the empty list is written
  - Cons cells not mutable
  - How modules work
  - Etc.

  … and many additions

- Result: A modern language used to build some real systems
  - More of a moving target (notes may become outdated)
  - Online documentation, particular “The Racket Guide”

Getting started

DrRacket “definitions window” and “interactions window” very similar to how we used Emacs and a REPL, but more user-friendly

- DrRacket has always focused on good-for-teaching
- See usage notes for how to use REPL, testing files, etc.
- Easy to learn to use on your own, but lecture demos will help

Free, well-written documentation:

- http://racket-lang.org/
- The Racket Guide especially, http://docs.racket-lang.org/guide/index.html

File structure

Start every file with a line containing only

```
#lang racket
```

(Can have comments before this, but not code)

A file is a module containing a *collection of definitions* (bindings)…