```
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

Dan Grossman

Map and Filter

Map (see the course logo)

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

```
val map : ('a -> 'b) * 'a list -> 'b list
```

Map is, without doubt, in the "higher-order function hall-of-fame"

- The name is standard (for any data structure)
- You use it *all the time* once you know it: saves a little space, but more importantly, *communicates what you are doing*
- Similar predefined function: **`List.map`**
  - But it uses currying (coming soon)

Filter

```
fun filter (f,xs) =
    case xs of
      [] => []
    | x::xs' => if f x
                then x::(filter(f,xs'))
                else filter(f,xs')
```

```
val filter : ('a -> bool) * 'a list -> 'a list
```

Filter is also in the hall-of-fame

- So use it whenever your computation is a filter
- Similar predefined function: **`List.filter`**
  - But it uses currying (coming soon)