Programming Languages and Techniques (CIS120e)

Lecture 12
Oct 4, 2010

MapReduce II
Imperative Programming
Announcements

• Homework 4 is due *Thursday* at 11:59:59pm.

• Homework 5 will be announced Wednesday (due next Wednesday)

• Midterm 1 will be in class on Friday, October 15th.
More on MapReduce
MapReduce Steps

• (i) iteration over the input;
• (ii) computation of key/value pairs from each piece of input;
• (iii) grouping of all intermediate values by key;
• (iv) iteration over the resulting groups;
• (v) reduction of each group.
MapReduce slides by Jeff Dean and Sanjay Ghemawat
Demo
Imperative Programming
Course Overview

- **Declarative programming**
  - *persistent* data structures
  - *recursion* is main control structure
  - heavy use of functions as data

- **Imperative programming**
  - *mutable* data structures
  - *iteration* is main control structure

- **Object-oriented programming**
  - pervasive “abstraction by default”
  - mutable data structures / iteration
  - heavy use of functions (objects) as data
Declarative Programming: The Good

- Simpler (more robust, more maintainable)
- Typecheckers give more helpful errors
- Easier to parallelize and distribute
Declarative Programming: The Bad (Demo)

see lec12.ml