CS480

Compilers

February 2, 2009
Welcome to Compilers.

You are already behind!
Goals of the class

• Understand the theory behind compilers
  – Grammars
  – Parsing
  – Activation Records

• Build a compiler!
  – Semester long project
    • Each project builds on the previous
    • Don't fall behind (or I'll see you again in two years)
    • Eclipse/Subversion/Make/Linux/C/Dynamic Memory
  – First assignment Due Friday
    • Start early!

Compilers
Principles, Techniques, and Tools
Alfred V. Aho
Ravi Sethi
Jeffrey D. Ullman
Prerequisites

• CS 310 with a C or better
  – Grammars, parsing,

• CS 300
  – Hash tables, dynamic memory with C, Makefiles
  – Pointers, pointers, pointers

• CS 380
  – Efficiency, trees

• CS 430
  – Activation records, assembly language, stack

• Various
  – Eclipse, Linux, Subversion, ...
Restated....

I expect much more out of you in this class
Compiler Project

• Input:
  – Simple C-lite language (grammar provided)
  – int, if, else, for, return, input, output, …
  – functions

• Output:
  – Machine instructions for simple virtual machine
    • 150 quads and 500 words of data
  – Quads
    • operator operand1 operand2 operand3
    • Various addressing modes
  – Add, subtract, multiply, branch, …
Breakdown

• Symbol Table & Error Handler
• Lexical Analyzer
• Recursive Descent Parser (top down)
• Operator Precedence Parser (bottom up)
• Semantic Actions for Declarations
• Semantic Actions for Expressions
• Remaining Semantic Actions
• Final Integration
• Each worth 1/8 of project grade*
Design

• Design is very important
  – What are your function prototypes?
  – What are your data structures?
  – What data gets passed around to whom?

• All pieces must work apart and together

• Easy to code yourself into a corner
  – Short cuts today will cause problems later
Testing

• I will post a few public test cases
  – With correct output

• You need to come up with good test cases
  – What makes an interesting test case?
  – I may ask the class for test cases …
Message Boards

- Use them

- Don't post source code for your compiler

- I will monitor the messages
  - Answer questions
  - Post questions

- Only available from within campus
Coding Standards

• 30% of your project grade is style points

• Readable code is a must
  – For me and for you

• Comments cannot be an afterthought
Subversion/Make/Eclipse/C

• In class lab Wednesday
  – 222 Strain

• Some of this will be review

• Some of this will be new

• All will be of vital importance to the project

• Read handouts before class!
Today's Project....
Recommendations (of the letter writing type)

• Ask me in person
  – I'll tell you how positive/negative it will be

• I need:
  – Consent form
  – Up to date resume
    • Grades in CS classes I have not taught
  – Information on receiver (U/job/scholarship)
  – SIX WEEK NOTICE
CS Lab

• Printers Work!
• WinXP (32 bit)
• Updated Linux (64 bit)
• New monitors
  – With speakers!
• Be mindful of others
• Clean your dishes
• Print double sided
• Turn off monitors