Advanced Programming Techniques

CS 265 Winter 2004

Course Description and Syllabus
Instructor: Krzysztof Nowak
Office: Korman 236
Office Hours: MWF 2:00 pm - 2:50 pm (or by an appointment)
e-mail: knowak@cs.drexel.edu

Teaching Assistant: Servesht Tiwari
Office: Korman Resource Center
Office Hours: Thursday 4:00 pm – 4:50 pm
e-mail: st86@drexel.edu

Lectures: MW 12:00 pm - 12:50 pm, Korman 111F (section 001)
MW 3:00 pm - 3:50 pm, Korman 105D(M), 104C(W) (section 002)
Labs: F 12:00 pm - 12:50 pm, Korman 111F (section 001)
F 3:00 pm - 3:50 pm, Korman 105D (section 002)

Prerequisites: CS 171, CS 172, CS 260

The course discusses the basic components of programming practice: testing, debugging, portability, performance, design alternatives and style. It also addresses the importance of simplicity, clarity and generality, the basic principles of programming process, which apply at all levels of computing.

- Simplicity – keep programs short and manageable
- Clarity – write programs which are easy to understand
- Generality – make sure your programs work in a broad range of situations and adapt to new situations as well
- Automation – free yourself from doing work, let the machine do it

We will deal with several programming languages: C, C++, Java and Perl. C++ and Java are the descendants of C, adding richer type structures and libraries, and Perl is a scripting language, which fills the gap between low-level and high-level programming. The course is split into two parallel streams. In the first stream we start with an introduction to UNIX, next we move to Perl and then to Java. In the second stream we discuss the principles of programming practice. The course is based on examples reinforced by lab programming problems.
Required Text
Title: *The Practice of Programming*
Authors: Brian W. Kernighan and Rob Pike
Publisher: Addison Wesley
Publication Date: February 1999
ISBN: 0-201-61586-X

Reference texts:
   Author: Arnold Robbins
   Publisher: O'Reilly
   Publication Date: September 1999
2. Title: Learning Perl, 3rd Edition
   Authors: Randal L. Schwartz & Tom Phoenix
   Publisher: O'Reilly
   Publication Date: July 2001
   ISBN: 0-596-00132-0
3. Title: Core Java Volumes I, II
   Authors: Cay S. Horstmann, Gary Cornell
   Publisher: Prentice Hall PTR
   Publication Date: December 2000, December 2001
   ISBN: 0130894680, 0130927384
4. Title: Algorithms in C++, 3rd Edition
   Author: Robert Sedgewick
   Publisher: Addison Wesley
   Publication Date: April 2001
   ISBN: 0201350882s

Syllabus
Weeks 1-3:
Unix Topics: The File System, I/O redirection, Filters, Elements of Shell Programming
Perl Topics: Lists, Arrays, Hashes, I/O Basics, Regular Expressions
Programming Practice: Running, Debugging, Testing, Timing, Profiling and Evaluating Performance of C++ Programs in UNIX Environment – Initial Examples

Weeks 4-7:
Java Topics: Fundamental Programming Structures, Objects and Classes, Inheritance, Interfaces
Programming Practice: Style, Algorithms and Data Structures, Design and Implementation, Interfaces
Weeks 8-10:
Java Topics: Streams and Files, Collections
Programming Practice: Timing, Profiling and Evaluating Performance of Perl, Java and C++ Programs

Midterm 1: 01/26/04
Midterm 2: 02/23/04

Course Grade and Exams
There will be seven programming assignments, two midterm exams and the final. The final exam will be comprehensive. The final grade will be computed as follows:
Midterm Exams 30%
Final Exam 30%
Labs/Programming Assignments 35%
Attendance 5%

Course Website