Organization of Programming Languages

Course Number: 20-ECES-403
Instructor: Hongwei Xi
University of Cincinnati
hwxi@ececs.uc.edu

Winter 2001

Here is some administrative information on the course.

Classroom 821B Rvschl
Time MWF 10-10:50AM
Office Hours W 3-6PM
Midterm 9th Feb. 2000
Final 8-10AM, Monday, March 12, 2001
Grade Homework(25%) + Midterm(25%) + Final(50%)

Organization of Programming Languages is really a course on the principles of programming languages. Thus, it is probably more appropriate to rename the course as Principles of Programming Languages.

It is an undeniable fact that the demand for software is skyrocketing at present. Unfortunately, the current practice of software construction seems far inadequate to meet such a demand. For instance, faulty and fragile software is becoming more and more common, security breaches are happening at an alarming rate, programming productivity stagnates at an incredibly low level, and software maintenance cost is soaring rapidly. Effective approaches to addressing these problems have been highly sought after since they possess the potential to significantly impact the future software industry.

Evidently, programming languages have a tremendous impact on software construction. Ideally, a programming language should be simple and general, and it should permit extensive error checking, facilitate proofs of program properties and possess a correct and efficient implementation. Invariably there will be some conflicts among these goals which must be resolved with careful attention to the needs of the user. This prompts us to study the principles that are fundamental to the design and implementation of programming languages as well as to software construction.

The purpose of this course is to introduce the basic principles and results in programming language studies to students who have already become familiar with programming. Given the limited time, it is certain that we can only cover a small portion of various significant and interesting topics in programming languages. Therefore, I intend for students to concentrate on a few topics that can lead to both a basic understanding of programming language theory and an appreciation for the rigorous analysis of programming concepts.

The following are some major topics that are to be covered in this course.

1. Introduction to modern programming languages
2. Parameter passing mechanisms
3. Scoping rules
4. Type disciplines
5. Run-time environments
6. Concurrency (potentially)

Please find more information on the homepage for the course at:

http://www.ececs.uc.edu/~hwxi/academic/courses/eces-403/eces-403.html