CSCI 330 Fall 2001

Homework 1

Assigned Wednesday, 01/9/5. Due Monday, 01/9/10

(All references are to the textbook. Some of the questions are taken from other sources, including Robert W. Sebesta's *Concepts of Programming Languages: Fourth Edition*, Addison-Wesley, 1999.)

1. Write a short paper on the costs of programming. Discuss both the costs involved in developing and maintaining programs and the costs involved in running programs. Discuss the role of the programming language for both. [Textbook, p.32]

2. List the main features of your favorite programming language that can help make programs easily maintainable. Also discuss features that hinder maintainability.

3. Write a program that shows why the optimization mentioned in section 1.5.3 cannot be done in general for C or Java (your choice!).

4. What are the arguments for writing efficient programs even though hardware is relatively inexpensive.

5. Recall that computer architecture is a major influence on programming languages, and "[most] programming languages can be viewed as abstractions of an underlying von Neumann architecture" [textbook, p.8]. Why the von Neumann architecture? Also, comment on the following statement, which Patterson and Hennessy label as a "fallacy": "Computers have been built in the same, old-fashioned way for too long, and this antiquated model of computation is running out of steam." (Reference: Patterson, David A. and John L. Hennessy. *Computer Organization and Design*, p.29. Morgan Kaufmann, 1998.)

6. Short answer questions on history.

1. Which language is based on the principle of orthogonality?
2. Which language was designed by John McCarthy?
3. Name two languages designed by John Backus. (You may need to do a little research for this!)
4. What has been the dominant programming language for business applications from 1960 to 1990 (at least)?
5. Name a declarative (logic-based) language.
6. Which two of the five languages you listed above were designed by committee?