CSCE 330 Spring 2005

Homework 2

Assigned Tuesday, 05-02-01. Due Tuesday, 05-02-08

1. 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 "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.)

2. The questions below refer to the following paper: Rajlich, V., N. Wilde, M. Buckellew. and H. Page. "Software Cultures and Evolution." *Computer*, 34, 9 (September 2001), pp.24–28. (A local copy of this paper is available on the course web site.) Please be concise.

   (a) List and describe briefly the three models of program development explained in class on January 13. Which of the three models do the authors present at the beginning of their paper?

   (b) Map the requirement of "effective comprehension" to one or more of the goals and qualities of programming languages that are described in Section 1.5 of your textbook.

   (c) The textbook mentions several "tools provided by the software development environment." List them. The paper describes briefly a tool for software maintenance. What is it called? What is it used for?

   (d) What is "code decay" and why does it make maintenance of software more difficult?

   (e) Explain the use of "common blocks" in the Convert program. Common blocks address well a certain quality of software that was of paramount importance when Convert was originally written, but have a substantial negative impact on a different quality of software. Explain this trade-off.

   (f) The paper mentions the GOTO statement in Fortran and C. Does Java have a GOTO statement?

   (g) List the five "obsolete program plans" described in the paper.

(h) What is the solution that the authors propose to solve the code decay problem? In your opinion, is this a practical solution? Explain your answer.

3. Short answer questions on history.

   (a) Which major language is based on the principle of orthogonality?

   (b) Which major language was designed by John McCarthy?

   (c) Name two languages designed by John Backus.

   (d) What has been the dominant programming language for business applications from 1960 to 1990 (at least)?

   (e) Name two logic languages.

   (f) Which two of the six languages you listed above were designed by committee?