CS 474: Object Oriented Programming Languages and Environments

Homework #1

Due time: 7:00 pm on 2/1/2014
Submit (pdf or MS Word file) using assignment submission in Blackboard page
Total points: 70
Instructor: Ugo Buy

TA: Venkat Srinivasan

1. (30 points) Read the article titled *Beat the averages* available under *Course documents* in this course's Blackboard web page and answer the following questions.

   Briefly discuss two reasons why the company *Viaweb* choose LISP as their main development language.

   Explain in detail the "Blub paradox". In your explanation make sure to distinguish the concepts of "programming language power" from "Turing-machine power".

   Briefly discuss 4 innovative features that LISP had with respect to previous languages when it was first introduced in the 1960s. Which of the features are gaining widespread acceptance in modern programming languages? In so far as you can tell at this point in the course, does Smalltalk share some of those features?

   Write a short reflection (about 1 page) on the article you read. Do you believe that you fall into the Blub paradox? Is there a language that plays the role of Blub for you? How will you avoid the pitfalls of the Blub paradox in your professional career? Please make sure to explain your answers thoroughly.

2. (20 points) In his famous 12/1972 CACM article D. Parnas lucidly outlines the potential advantages of program design based on object decompositions. Answer the following questions about the article.

   (a) What is the purpose of the KWIC system described in the article?

   (b) Provide one example of input and output for the KWIC system. Your input should consist of at least 2 rows containing at least 5 words each)

   (c) Describe the modules obtained with the two decompositions.

   (d) Describe at least three advantages and one disadvantage of the second decomposition with respect to the first one.

3. (20 points) Consider the following kinds of identifiers for the language ANSI C.

   (a) An identifier defined within a file file1.c, but not within a function contained in file1.c, not declared static.

   (b) An identifier defined within a function, declared static.

   (c) A pointer identifier defined in a function, not declared static.

For each of the above kinds of identifiers, answer the following questions. Please justify your answers in detail.

A. What is the scope of the identifier?

B. What is the lifetime of the identifier's referent?

C. What is the allocation method of the identifier's referent?