

Compiler Construction CSCI-GA.2130-001 Fall 2011 hw1

Assigned We 9/7/2011, due Fr 9/16/2011 at 1pm.

Reading Assignments

- For lecture on 9/7/2011: Dragon-book 1.1-1.2 (12 pages)
 - For lecture on 9/14/2011: Dragon-book 2.1-2.5 (35 pages)
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Homework Assignments

1. Language Processors (6 = 3 + 3 points)
 - 1a. (3 points) Some compilers use C as the target language, instead of assembly or machine code. What advantages does targeting C bring?
 - 1b. (3 points) On the other hand, what advantages does it bring to compile all the way to assembly or machine code, instead of using C as the target language?
 2. Compiler Phases (18 = 3 + 3 + 3 + 3 + 3 + 3 points)

This question is based on Figure 1.7 on Page 7 of the Dragon-book. Your task is to show the output of each of the compiler phases, but for a different source code statement. The source code statement is `price = (sticker - coupon) * tax`. We assume that variable `coupon` has type `int`, and all the other variables have type `float`.

 - 2a. (3 points) What sequence of tokens does the lexical analyzer output?
 - 2b. (3 points) What abstract syntax tree does the syntax analyzer output?
 - 2c. (3 points) What is the abstract syntax tree after the semantic analyzer modifies it?
 - 2d. (3 points) What sequence of three-address instructions does the IR generator output?
 - 2e. (3 points) What sequence of three-address instructions does the optimizer output? For this question, you can assume that `coupon` is the constant integer 2.
 - 2f. (3 points) What sequence of machine instructions does the code generator output? Again, assume that `coupon` is the constant integer 2. You can improvise your own pseudo-assembler syntax for this question, as long as the overall idea is clear.
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<http://cs.nyu.edu/courses/fall11/CSCI-GA.2130-001/hw1.pdf>

Total points: 24.