

CS2104 - Programming Language Concepts

HOMEWORK 2

August 16, 2002

Guidelines

Please prepare your homework according to the following guidelines:

1. Please prepare your answers in MSWord (.doc file) or plain text (.txt file) format.
 2. All answers should be placed in a single .doc file or .txt file.
 3. You have to upload your homework before the deadline. **No late submission is allowed!**
 4. You must upload your homework using the file name given below. **If you do not respect the convention then your homework won't be graded!**
 5. To upload your homework, follow the link **Workbin** from the course web-site:
<http://www.comp.nus.edu.sg/~cs2104>
 6. Upload your file into the **HW2** folder of workbin. For file transfer, please FTP only in binary mode (not in ASCII mode).
 7. **In the “Description” of the file just input a single digit indicating your tutorial group number.**
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Questions

Deadline: Thu 22 Aug 2001, 11:59 PM (*i.e.* before midnight)

The system might be busy just before the deadline.

It is your responsibility to submit well ahead of deadline.

File name: <NUSNet (Windows) user-name>.doc (for example: isc90000.doc) OR
<NUSNet (Windows) user-name>.txt (for example: isc90000.txt)

QUESTION 1 Consider the programming language IMP presented in class. Which of the following grammars for IMP are ambiguous and why ?

(a) Grammar for arith. expr. (b) Grammar for Boolean Expr (c) Grammar for commands

QUESTION 2 Consider the operational semantics rule for evaluating the meaning of logical conjunction in IMP. A straightforward application of this rule will lead to inefficient evaluation because even if one of the operands is *false*, it will evaluate the other operand. Propose new operational semantics rule(s) for logical conjunction which remove this problem.

QUESTION 3 Describe the operational semantics of the program fragment given in question 3.6 (page 79 of textbook). You can ignore the keyword “int” in the program (and other minor syntactic issues such as the “{” in the while loop). The programming language IMP covered in class contained no “int” keyword or “{”

Show the applications of all the rules. Assume that in the initial state all the variables are 0.