CS2104 - Programming Language Concepts

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.

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 **HW6** 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.**

Questions

Deadline:	Thu 3 Oct 2002, 11:59 PM (*i.e.* befor 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`)
First two lines of file:	Your name (first line), Your matric (second line)

QUESTION 1 (1 mark) Consider the following type definitions in an imperative language

```
Type   Rec1 : record   a : real;  b: array [-5..5] of integer   end
       Rec2 : record  f1 : real;  f2 : array[-5..5] of integer   end
```

What can you say about the equivalence of types Rec1 and Rec2 ? Explain your answer.

QUESTION 2 (1 mark) Exercise 3.1 of textbook (page 79). Note that this is slightly different from the rule based style of type checking discussed in class.

QUESTION 3 (1 mark) A binary operator 'op' is said to be associative if

$$(a \ op \ b) \ op \ c = a \ op \ (b \ op \ c)$$

for any operands a, b, c. Thus, in theory, the integer addition operator is associative. Can you think of a situation where in practice it is not so ? Also, is the floating point addition operator always associative in practice ?

QUESTION 4   (2 marks) Let the function FUN be defined as

```
function FUN(var K: integer) : integer;
begin
   K := K + 4;
   return (3*K -1)
end
```

Suppose FUN is used in a program as:

```
I := 10;
SUM1 := (I/2) + FUN(I);
J := 10;
SUM2 :=  FUN(J) + (J/2);
```

What will be the values of SUM1 and SUM2 if the expressions are evaluated (a) left-to-right (b) right-to-left ?