Name _____

Student number _____

SE 2AA4 Winter 2007

Quiz 10 Answer Key

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You have 10 minutes to complete this quiz consisting of 2 pages and 5 questions. You may *not* use your notes and textbooks, nor may you use any calculators or other electronic devices. Circle the *best* answer for the multiple choice questions, and write the answer in the space provided for the other questions. Good luck!

(1) [4 pts.] Suppose that a Java program has a class C containing a private static nested class C'. If C' is taken out of C and made into a separate non-nested class, the behavior of the Java program will almost certainly change. Is this statement true or false?

(a) True.

(b) False.

(2) [4 pts.] Let $\mathbf{Z}$ denote the set of integers and $\mathbf{R}$ denote the set of real numbers. The floor function f on $\mathbf{R}$ takes a real number r as input and returns the largest integer less than or equal to r as output. Which of the following is a definitional specification of this function?

(a) $f = (\lambda\, x : \mathbf{R}\ .\ \mathrm{I}\, y : \mathbf{Z}\ .\ (0 \leq x - y) \wedge (x - y < 1))$.

(b) $\forall\, x : \mathbf{R}\ .\ f(x) \leq x$.

(c) $f = \{(x, y) \in \mathbf{R} \times \mathbf{Z} \mid y \leq x\}$.

(d) $\forall\, x : \mathbf{R}\ .\ \exists\, y : \mathbf{Z}\ .\ (y \leq x) \wedge (x < y + 1)$.

(3) [4 pts.] Fill in the blank. A procedure without **side-effects** can be specified as a function that maps inputs to outputs.

Quiz continues on next page.

(4) [4 pts.] Let **N** denote the set of natural numbers and x, y, z be variables of type **N**. Using beta-reduction compute the value of the expression

$$(\lambda\, x : \mathbf{N}\ .\ x^y + 2 * x * z)(5).$$

Answer:

$$\begin{aligned}(\lambda\, x : \mathbf{N}\ .\ x^y + 2 * x * z)(5) &= 5^y + 2 * 5 * z \\ &= 5^y + 10 * z\end{aligned}$$

(5) [4 pts.] What is a *blackbox* description of a software product?

Answer: A blackbox description of a software product is a description of only the properties of the product that are externally visible.

Quiz ends here. **2/2**