Program Analysis and Verification

Course 0368-4479 / 2013/14 - Semester B

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Home Work Assignment #2

Due: 28-April-2014

In the following, we refer to the “Semantics with Application” book as “the book”.
The book can be found here: http://www.daimi.au.dk/~bra8130/Wiley_book/wiley.html.

1. Solve Ex 6.10, 6.11, 6.14, 6.15 and 6.25 in the book.

2. Provide axioms for backward-reasoning and forward reasoning for the statement `random(x)`. Prove that your axioms are sound wrt to the natural semantics (ininfite set of axioms):

   $\langle \texttt{random(x),s} \rangle \texttt{ -> s[x}\mapsto n\texttt{]} \quad n \in \mathbb{Z}$

3. Give a (non-trivial) specification for the following program and prove it using Owicki-Gries logic

   $$\{X=A \wedge Y=B\}\ \texttt{x:=X; Y:=1} \parallel \texttt{y:=Y; X:=x}\ \{ \ldots \}\ .$$

4. Bonus: Solve Ex 6.26 in the book.