CSci 550 : Program Semantics & Derivation
Spring Semester 2006, Assignment #5
Due Tuesday, 2 May

1. Derive a program fragment S that does not contain the multiplication operator. Show the derivation and a proof of the correctness of your solution.

$$
\begin{array}{l}
|[\ \textbf{con}\ X, Y\ :\ int\ \{\ X \geq 0 \wedge Y \geq 0\ \}\ ; \\
\quad \textbf{var}\ z :\ int\ ; \\
\qquad S \\
\quad \{\ z :\ z = X * Y\ \} \\
]|
\end{array}
$$

2. Derive a program fragment S that does not contain an exponentiation. Show the derivation and the proof obligations.

$$
\begin{array}{l}
|[\ \ \textbf{con}\ N :\ int\ \{\ N \geq 0\ \}\ ; \\
\quad \textbf{var}\ b[0..N) : \textbf{array of}\ int\ ; \\
\qquad S \\
\quad \{\ z :\ z = (\Sigma\, i :\ 0 \leq i < N :\ (-1)^i * b.i\ )\ \} \\
]|
\end{array}
$$