York University COSC6117 February 25, 2002

Homework Exercise
Due: March 11, 2002

6. The SB object type has three states, $\perp, 0, 1$, and one operation, called $\mathrm{set}(b)$, where $b \in \{0, 1\}$. If the object is in state $\perp$, then the $\mathrm{set}(b)$ operation changes the state to b and returns b. If the object is in state s (where $s \in \{0, 1\}$), the $\mathrm{set}(b)$ operation changes the state to $s \wedge \neg b$ and returns $s \wedge \neg b$.

Show that $\mathrm{cons}(\mathrm{SB}) = \infty$ by proving the following lemma: If there is a wait-free consensus algorithm for n processes that uses k registers and j SB objects, then there is a wait-free consensus algorithm for $n + 1$ processes that uses $k + 2$ registers and $j + 1$ SB objects.