4.2 Let $n$ be a natural variable, and let $b$ be a binary variable. Write a program to determine whether 3 is a factor of $n$ (whether 3 divides evenly into $n$ with no remainder), reporting the answer as the final value of $b$. Your program can use addition, subtraction, comparison, and binary operators, but not multiplication, division, \textit{div}, or \textit{mod}. (Your non-program specifications can use anything.)

(a) Write a formal specification.

\[
b' = (\text{mod } n \text{ mod } 3 = 0)
\]

(b) Refine your specification to obtain a program. You do not need to prove the refinements.

\[
b' = (\text{mod } n \text{ mod } 3 = 0) \iff \begin{array}{l}
\text{if } n < 3 \text{ then } b := (n = 0) \\
\text{else } n := n - 3. \quad b' = (\text{mod } n \text{ mod } 3 = 0)
\end{array}
\]