Problem  Function $sum$ is defined over non-negative integers. If $n$ is even, $sum \ n$ is the sum of all even integers from 0 through $n$, and if $n$ is odd it is the sum of all odd integers from 0 through $n$.

\[
\begin{align*}
sum \ 0 & = 0 \\
sum \ n & = n + sum \ (n-2)
\end{align*}
\]

Is this program correct?

Solution  This program is incorrect, because no provision has been made for the case $sum \ 1$. The correct definition is:

\[
\begin{align*}
sum \ 0 & = 0 \\
sum \ 1 & = 1 \\
sum \ n & = n + sum \ (n-2)
\end{align*}
\]