Problem  Consider a game of Nim in which there are 3 piles with 11, 8 and 6 chips. What should be the first move of the first player? Does the first player have a winning strategy?
Solution  The exclusive-or of the pile contents is computed as follows.

\[
\begin{array}{c}
1 & 0 & 1 & 1 \\
\oplus \\
1 & 0 & 0 & 0 \\
\oplus \\
0 & 1 & 1 & 0 \\
= \\
0 & 1 & 0 & 1 \\
\end{array}
\]

\(=11\)

\(=8\)

\(=6\)

\(=u\)

Since \(u\) is non-zero, the first player has a winning strategy. The only pile that has a 1 in the leading bit position of \(u\) is the one with 6 chips. It will be replaced by \(0110 \oplus u = 0110 \oplus 0101 = 0011 = 3\) chips. That is, the only winning move by the first player is to remove 3 chips from the pile with 6 chips.