1. (10 points) Suppose that we draw two numbers uniformly at random (with replacement) from the set \( \{1, 2\} \). Let \( X \) be the minimum of the two numbers we select. Find the cumulative distribution function of \( X \).

**Solution:** The probability mass function of \( X \) is

\[
f_X(k) = \begin{cases} 
 3/4 & k = 1 \\
 1/4 & k = 2 \\
 0 & \text{otherwise}
\end{cases}
\]

The cumulative distribution function is

\[
F_X(x) = \begin{cases} 
 0 & x < 1 \\
 3/4 & 1 \leq x < 2 \\
 1 & x \geq 2
\end{cases}
\]