$$\left(x[k] = 1\right) \Leftrightarrow \left(X[n] = K \sum_{m \in \mathbb{Z}} \delta[n - m\,K]\right) \Leftrightarrow \left(\left\{\begin{array}{rcl} X[0] & = & K \\ X[n] & = & 0, \quad n \in [1 \ldots K-1] \end{array}\right.\right)$$