1) Insert the following numbers in an empty hash table of size 19.

\[
\begin{align*}
22 & \quad 80 & \quad 18 & \quad 9 & \quad 90 & \quad 12 & \quad 22 & \quad 57 & \quad 86 & \quad 36 & \quad 32 & \quad 88 & \quad 20 & \quad 6 & \quad 62 & \quad 24
\end{align*}
\]

(a) Use chaining and the hash function \( h(k) = k \mod 19 \).

(b) Use open addressing with the hash function \( h(k, i) = ((k \cdot 181) + (i \cdot k \cdot 113)) \mod 19 \).

2) You have given two arrays \( A \) and \( B \). Create two lists \( D \) and \( S \) such that \( S \) contains all the singles (i.e., numbers only in \( A \) or only in \( B \)) and \( D \) contains all the doubles (i.e., numbers in \( A \) and in \( B \)). Your algorithm should run in linear time.

3) You are given an array \( A \) of numbers and a number \( k \). Note that \( A \) is not necessarily sorted. Find two numbers \( x, y \in A \) such that \( x + y = k \). Your algorithm should run in linear time.