10.19 In Chapter 5 we developed Euclid’s Greatest Common Divisor (GCD) algorithm using iteration. Euclid’s algorithm is naturally described recursively:

\[
gcd(a, b) = \begin{cases} 
a & \text{if } b = 0 \\
gcd(b, a \% b) & \text{otherwise} \\
\end{cases}
\]

Using this recursive definition, implement recursive function \texttt{rgcd()} that takes two non-negative numbers \(a\) and \(b\), with \(a > b\), and returns the GCD of \(a\) and \(b\):

\[
\begin{align*}
>>> & \texttt{rgcd(3,0)} \\
& 3 \\
>>> & \texttt{rgcd(18,12)} \\
& 6
\end{align*}
\]

10.20 Write a method \texttt{rem()} that takes as input a list containing, possibly, duplicate values and returns a copy of the list in which one copy of every duplicate value removed.

\[
\begin{align*}
>>> & \texttt{rem([4])} \\
& [] \\
>>> & \texttt{rem([4, 4])} \\
& [4] \\
>>> & \texttt{rem([4, 1, 3, 2])} \\
& [] \\
>>> & \texttt{rem([2, 4, 2, 4, 4])} \\
& [2, 4, 4]
\end{align*}
\]

10.21 You’re visiting your hometown and are planning to stay at a friend’s house. It just happens that all your friends live on the same street. In order to be efficient, you would like to stay at the house of a friend who is in a central location in the following sense: the same number of friends, within 1, live in either direction. If two friends’ houses satisfy this criterion, choose the friend with the smaller street address.

Write function \texttt{address()} that takes a list of street numbers and returns the street number you should stay at.

\[
\begin{align*}
>>> & \texttt{address([2, 1, 8, 5, 9])} \\
& 5 \\
>>> & \texttt{address([2, 1, 8, 5])} \\
& 2 \\
>>> & \texttt{address([1, 1, 1, 2, 3, 3, 4, 4, 4, 5])} \\
& 3
\end{align*}
\]

10.22 Write a recursive method \texttt{base()} that takes a nonnegative integer \(n\) and a positive integer \(1 < b < 10\) and prints the base-\(b\) representation of integer \(n\).

\[
\begin{align*}
>>> & \texttt{base(0, 2)} \\
& 0 \\
>>> & \texttt{base(1, 2)} \\
& 1 \\
>>> & \texttt{base(10, 2)} \\
& 1010 \\
>>> & \texttt{base(10, 3)} \\
& 101
\end{align*}
\]