1 AVL insertions

Show an AVL Tree as each of the following keys are added (in the order given). You may ignore their corresponding values.

\{13, 17, 14, 19, 22, 18, 11, 10, 21\}

Show the tree at each step.
2 Hashtable Insertions

Insert data with integer hash values 21, 44, 74, 16, 9, 20, 90 in the given order into a table of size 10. Insert using linear probing, quadratic probing and separate chaining with linked lists.
3 Secondary Hashing

Consider the following table which inserts values using secondary hashing with a primary hash function \( h(k) = k \mod 10 \) and a secondary hash function \( g(k) = 7 - (k \mod 7) \). Insert the following values: 21, 36, 36, 11, 6 into the hashtable.

1. Give a single integer that, when we attempt to insert it into the table results in an infinite loop.

\[
\begin{align*}
0 & 21 \\
1 & \_ \\
2 & \_ \\
3 & \_ \\
4 & \_ \\
5 & 11 \\
6 & 36 \\
7 & 36 \\
8 & 6 \\
9 & \\
\end{align*}
\]

\[
5 \quad g(k) = 7 - 2 = 5
\]

2. Is there any way we can avoid double-hashing resulting in an infinite loop? Explain your answer.

\[
\text{If } g(k) \geq \text{table size} = 0, \text{ then we set } g(k) = 1 \text{ (use linear probing)}
\]