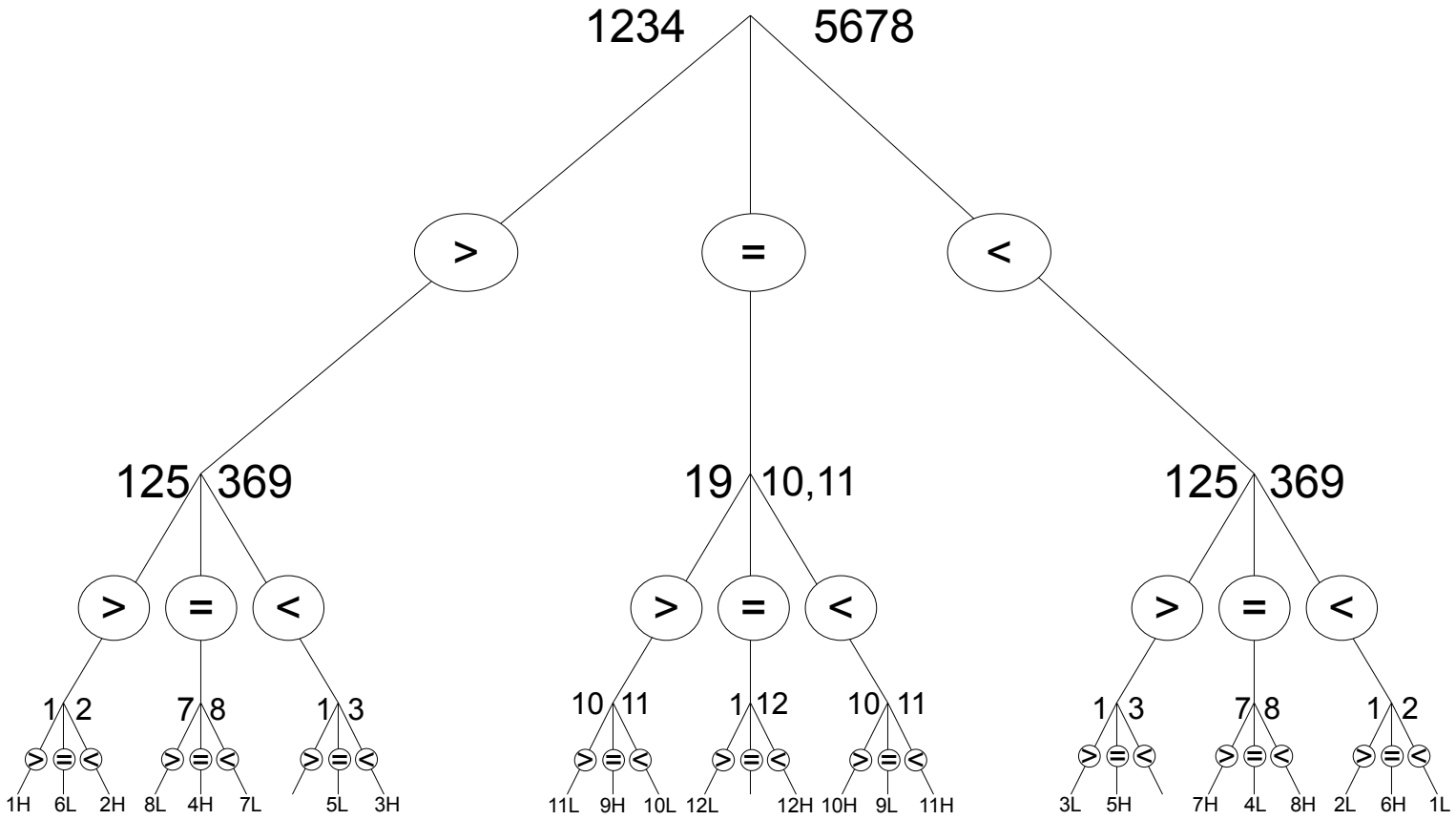
Question: Assume that you have 12 numbered coins which otherwise look identical but you know that one of those twelve coins is either heavier or lighter. Say also that you have a scale with two balance pans which allows you to weigh equal numbers of coins against each other and determine if the left pan is heavier, right pan is heavier or if the two balance pans are equal. Determine a procedure for determining which is the odd coin and whether it is heavier or lighter using the scale a minimum number of times.



The above image represents a decision tree for the '12 coin problem.' To the left and right of each of the nodes the coins which will be weighed in the left and right pan (respectively) are listed. If the left pan is heavier than the right, then the next decision will be the node on the left branch; if the right pan is heavier than the left, the next decision will be the node on the right branch; otherwise the two pans have equal weight and the subsequent weighing will be the node on the middle branch. The leaves of this tree represent the coin with the odd weight and whether it is heavier or lighter is labelled with an L or an H.

Solve the analogous 13 coin problem! It can also be done in 3 weighings.*