

Watches are designed so that they remain water-tight under water up to a certain depth, but if a scuba diver wearing the watch goes deeper, the increase in water pressure will cause the watch to leak.

Define the water-resistance of a watch to be the maximum depth such that the watch does not leak when used by a scuba diver at that depth for one hour.

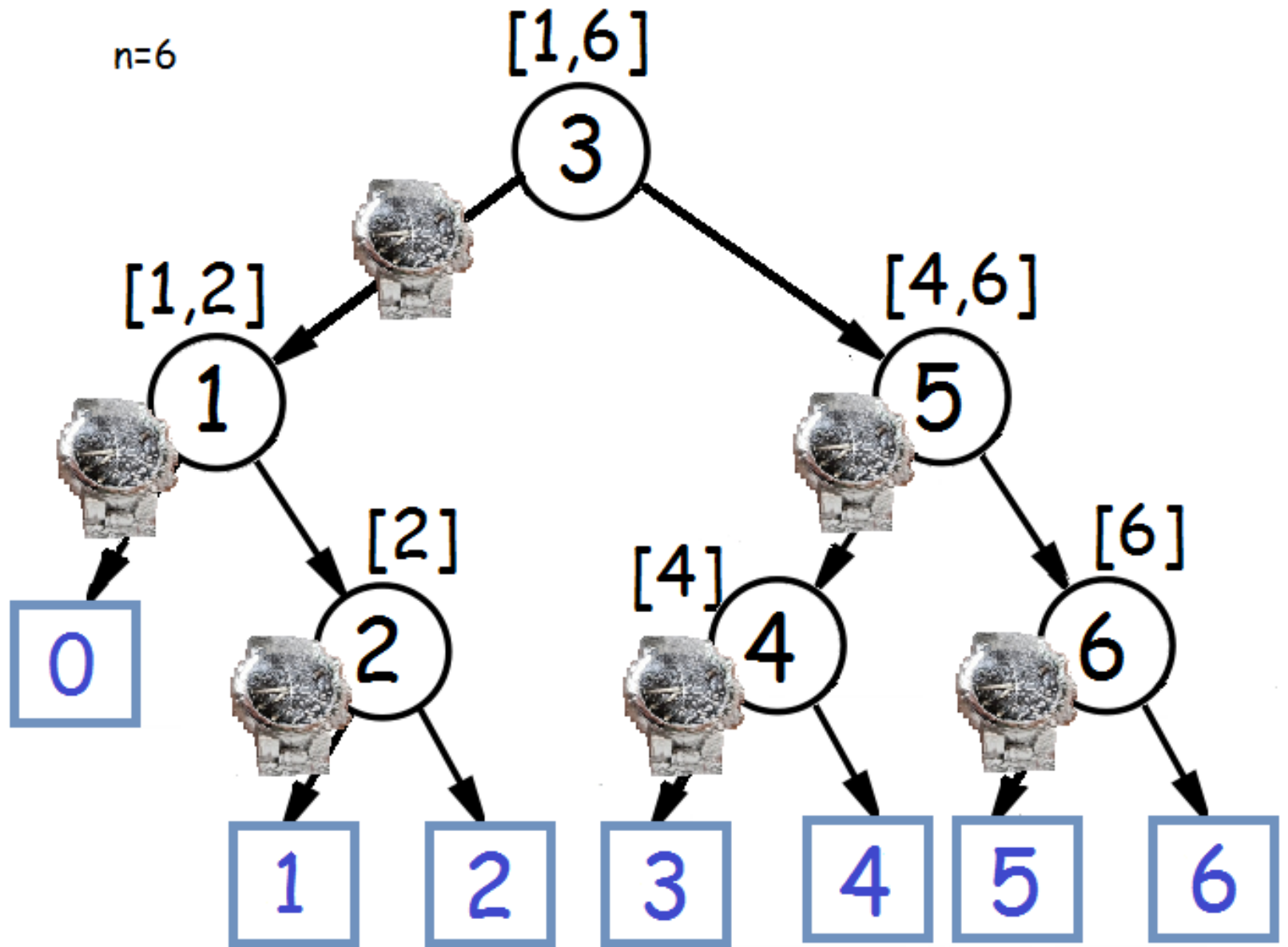
The watch manufacturer wants to determine an integer value for the water-resistance that falls into a range 0 to  $n$ .

The water-resistance is 0 if the watch leaks when submersed one meter under water. If the watch does not leak even at the depth of  $n$  meters, the water resistance is defined to be  $n$ .

To test the water resistance at a depth  $k$ , a scuba diver does a dive at  $k$  meters and stays under water at that depth for one hour. If the watch leaks, it is discarded. If it does not leak, it can be reused in another experiment.

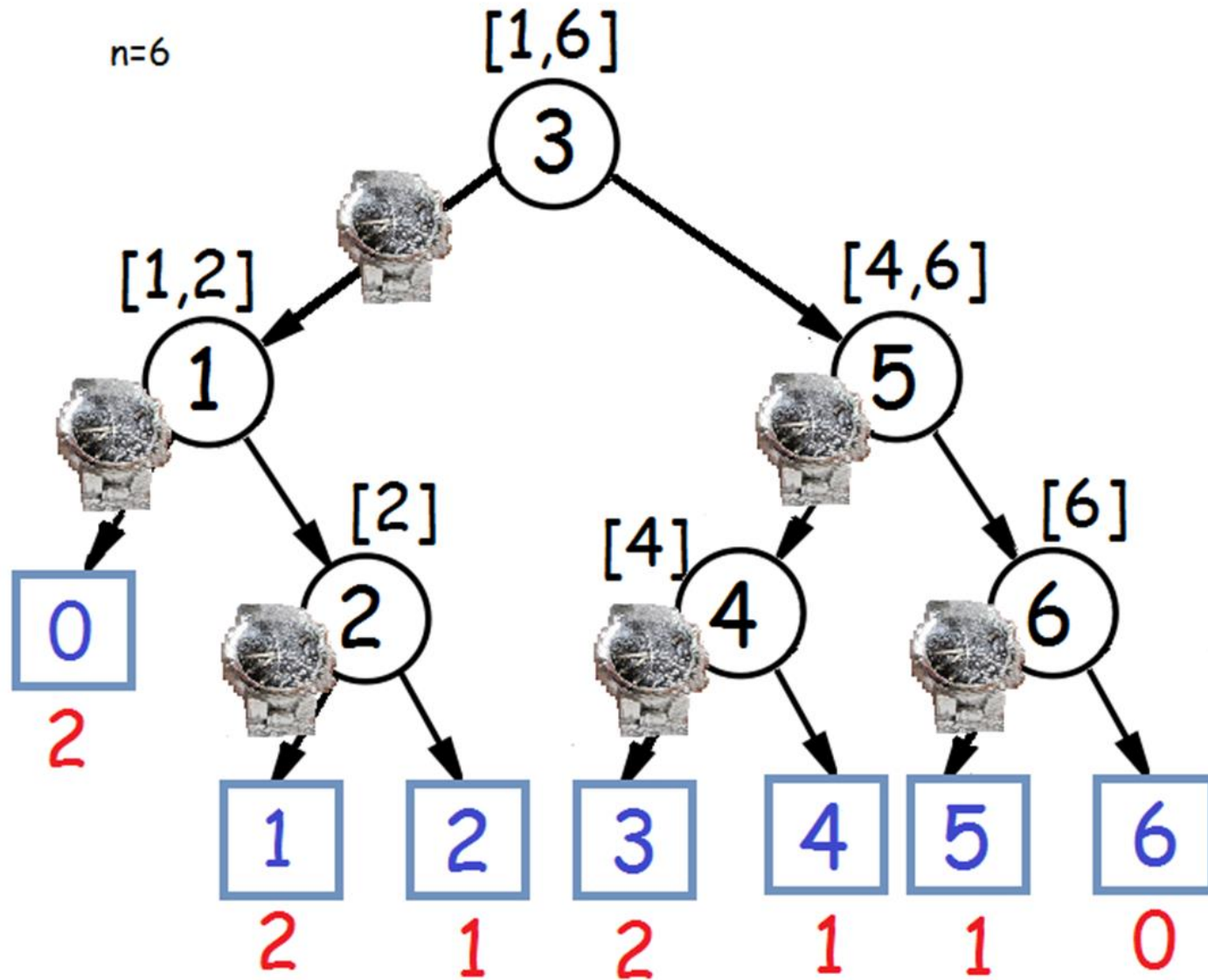
Binary Search:  $mid = \lfloor (lower + upper) / 2 \rfloor$ .

$n=6$



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