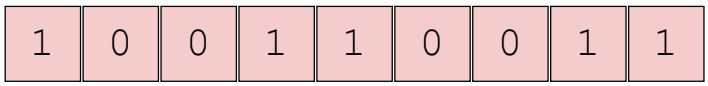
Exponential Complexity - O(2^n)

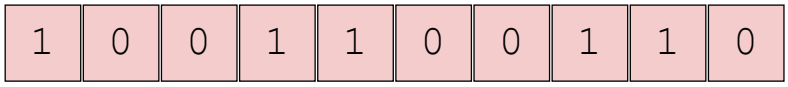
The runtime of the algorithm gets doubled after every addition in the input. (Reading time: 1 minute)

If an algorithm's time complexity is O(2^n), its runtime is doubled after every addition to the input size. If 5 items took 30 seconds, 6 items would take 60 seconds.

In the following example, the value of an element is either 0 or 1. The amount of possibilities with 0 and 1 that this array could have, is 2^9 = 512.

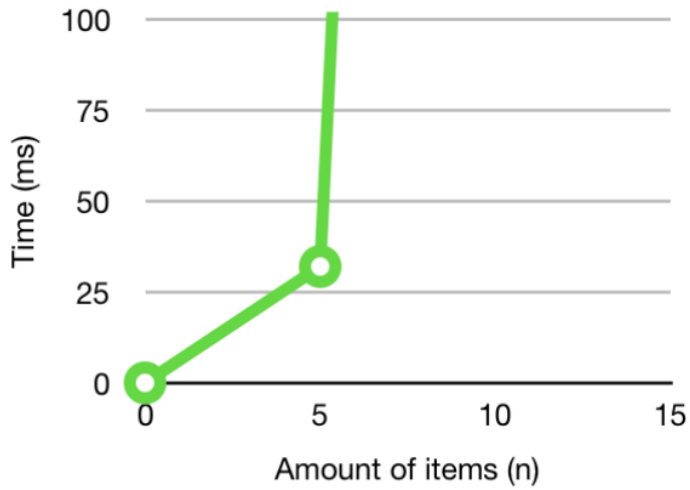


However, if we add just one more element, we have 2^10 = 1024 possibilities.



By just adding one element, we doubled the number of possibilities!

In a graph, it gets clear that this is extremely inefficient, as the runtime becomes double after every addition.



In the next chapter, I will discuss different sorting algorithms and their time complexities.