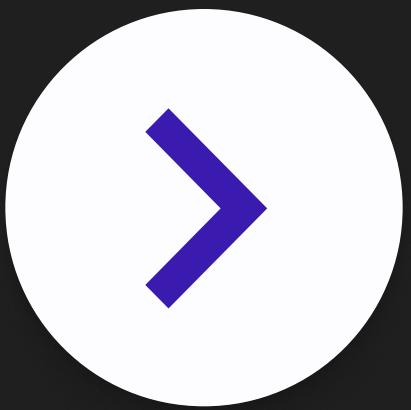


$${}_n P_r = \frac{n!}{(n - r)!}$$

Coding Interview Tips: Patterns

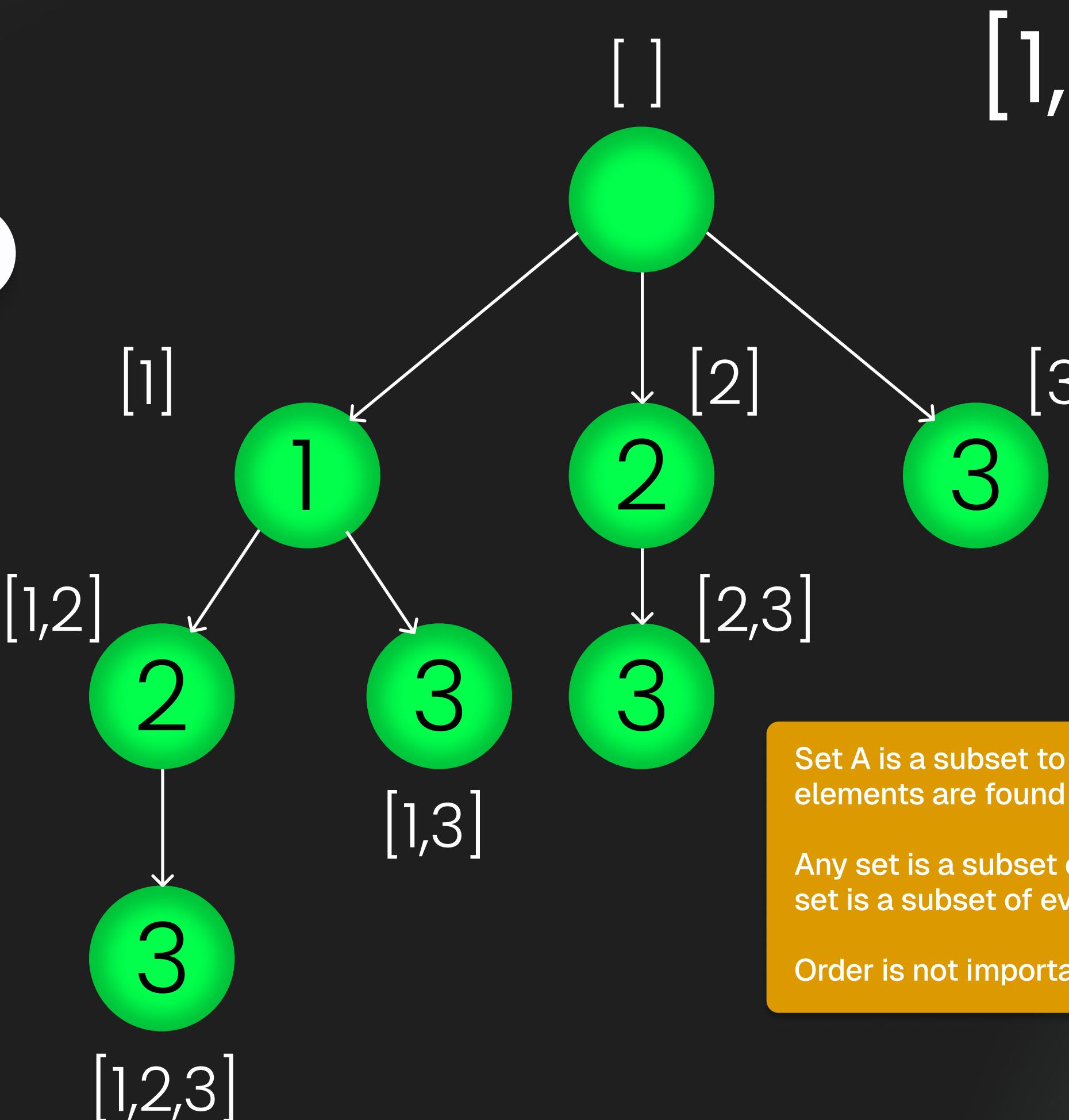
# 3 Backtracking Patterns In Coding Interviews



# 1. Subsets

Typically, you will be given a list of distinct, or non-distinct integers and asked to produce all the subsets.

**Explore all subsets down one path, then backtrack by removing the last element and explore other subsets excluding that element.**



Set A is a subset to Set B if all of its elements are found in Set B.

Any set is a subset of itself and an empty set is a subset of every set.

Order is not important in subsets.

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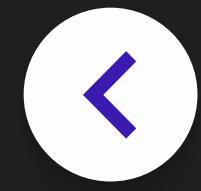
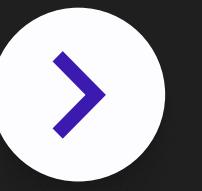


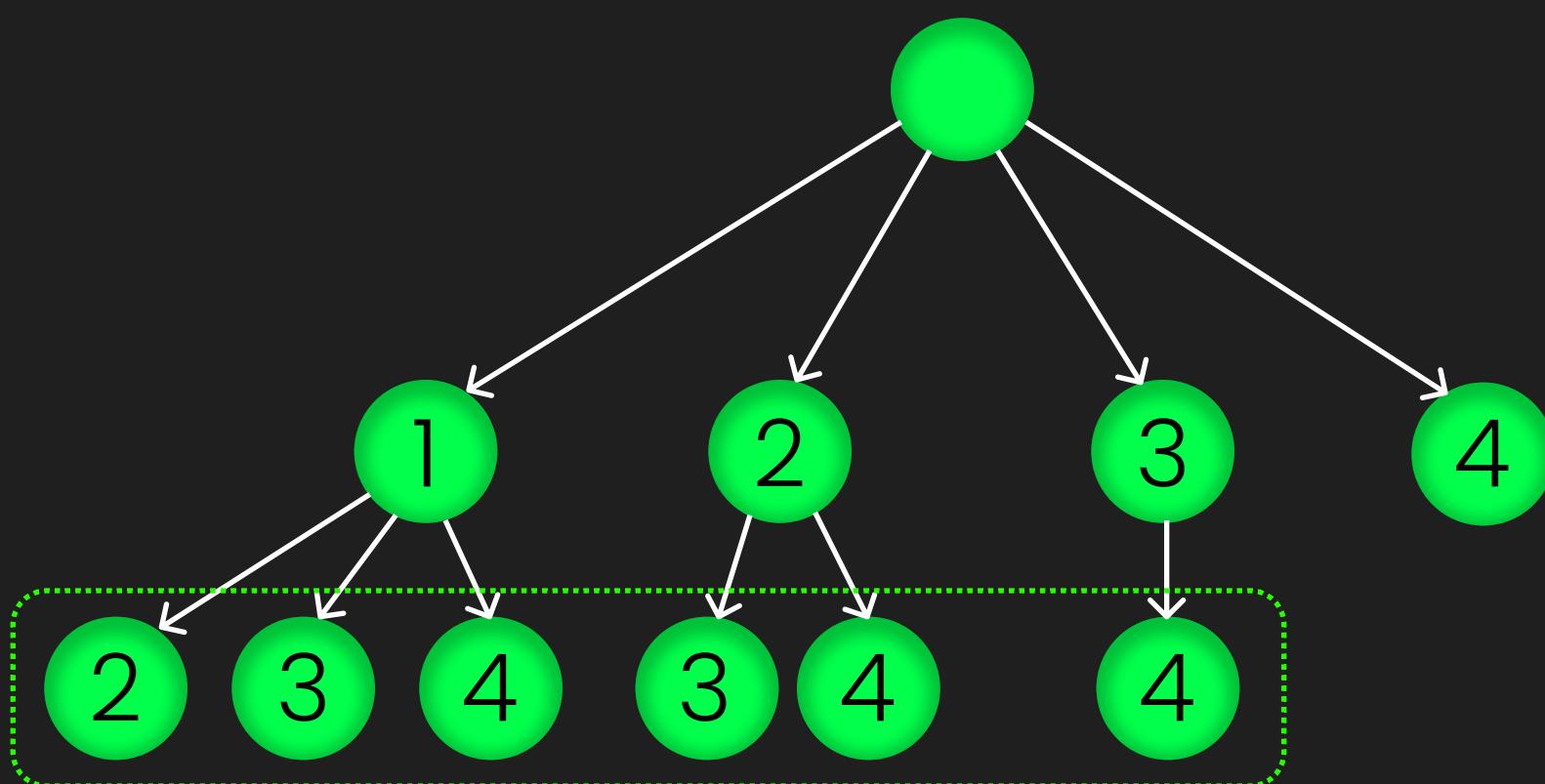
# 2. Combinations

We're given a range,  $[1,n]$  and asked to produce all possible combinations of length  $k$ .

Similar to generating subsets, but the depth of our backtracking tree is limited to  $k$ , ensuring that each combination contains exactly  $k$  elements.

**We explore all paths and backtrack to find other combinations once the size of the tree becomes  $k$ .**

  $n=4$   
 $k=2$  



$[1,2], [1,3], [1,4], [2,3], [2,4], [3,4]$

Given an array `nums` of unique integers, return all the possible combinations.

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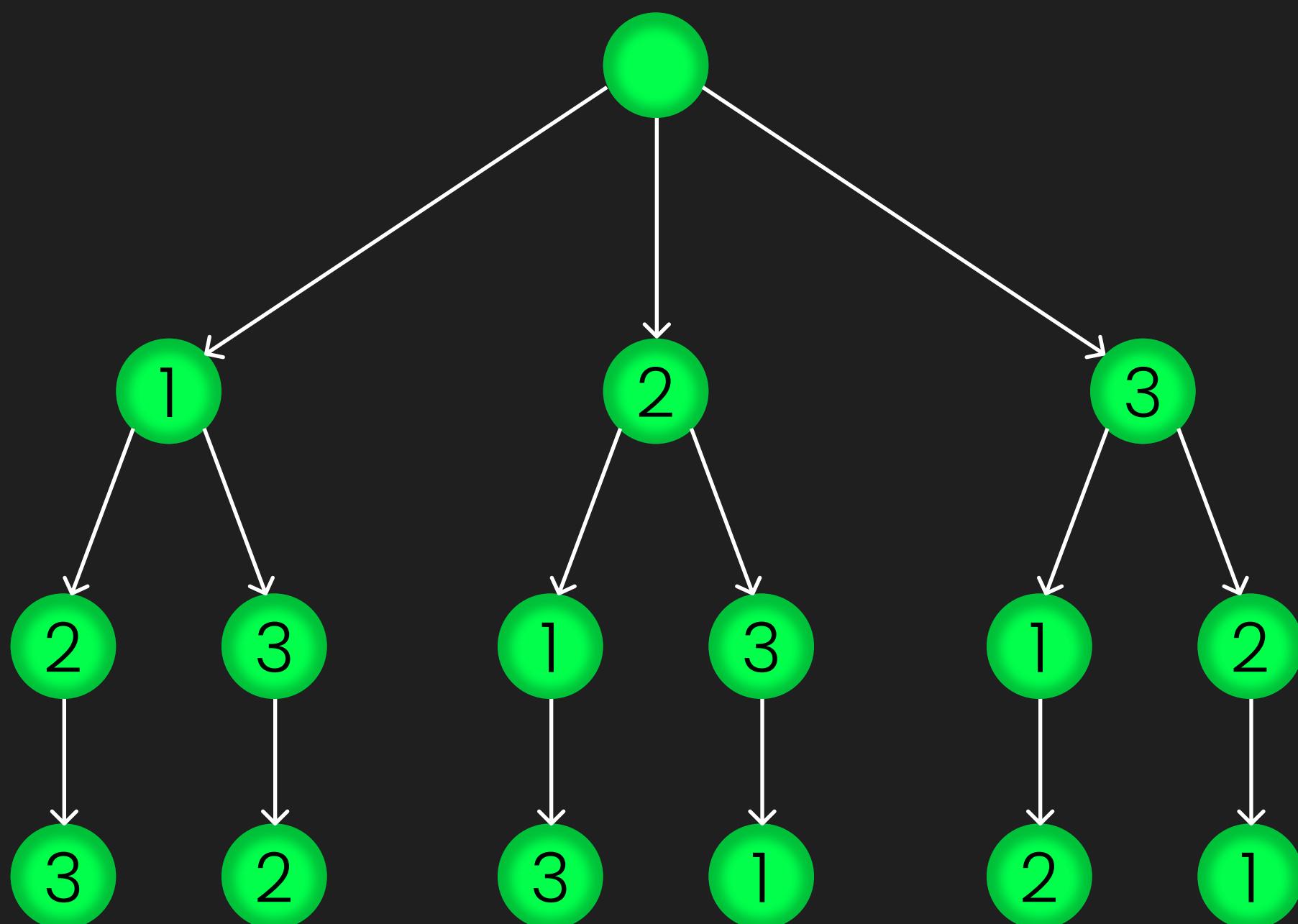


# 3. Permutations

A permutation is a unique arrangement of all the numbers in nums, where order matters and no duplicates are allowed.

For example, [1,2,3] and [1,3,2] are two distinct permutations of [1,2,3].

**In this case, the answer and the base case is the leaf nodes.**



[1,2,3], [1,3,2], [2,1,3], [2,3,1], [3,1,2], [3,2,1]

Given an array nums of unique integers, return all the possible permutations.

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