2020-09-13 - Handout – BackTracking

Q1. Conditional Combinations

Link: https://www.techiedelight.com/find-combinations-of-elements-satisfies-given-constraints

Given a positive number N, find all combinations of 2*N elements such that every element from 1 to N appears exactly twice and distance between its two appearances is exactly equal to value of the element.

Example

Input: N=3

Output:

3 1 2 1 3 2

2 3 1 2 1 3

Input: N = 4

Output:

4 1 3 1 2 4 3 2

2 3 4 2 1 3 1 4

Q2. Subsets

Link: https://leetcode.com/problems/subsets/

Given a set of **distinct** integers, *nums*, return all possible subsets (the power set).

Note: The solution set must not contain duplicate subsets.

Example:

```
Input: nums = [1,2,3]
```

```
Output:
[
  [3],
  [1],
```

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

Q3. Combination Sum

Link: https://leetcode.com/problems/combination-sum/

Given a **set** of candidate numbers (`candidates`) **(without duplicates)** and a target number (`target`), find all unique combinations in `candidates` where the candidate numbers sums to `target`.

The **same** repeated number may be chosen from `candidates` unlimited number of times.

Note:

- All numbers (including `target`) will be positive integers.
- The solution set must not contain duplicate combinations.

Example 1:

```
Input: candidates = [2,3,6,7], target = 7,
A solution set is:
[
  [7],
  [2,2,3]
]
```

Example 2:

```
Input: candidates = [2,3,5], target = 8,
A solution set is:
```

3

```
[
  [2,2,2,2],
  [2,3,3],
  [3,5]
]
```

Constraints:

- `1 <= candidates.length <= 30`
- `1 <= candidates[i] <= 200`
- Each element of `candidate` is unique.
- `1 <= target <= 500`