

Topic - Recursion

Easy – Difficulty: Powerset

Write a function that takes in an array of unique integers and returns its powerset. The powerset $P(X)$ of a set X is the set of all subsets of X . For example, the powerset of $[1,2]$ is $[[], [1], [2], [1,2]]$.

Note that the sets in the powerset do not need to be in any particular order.

Sample Input

```
array = [1, 2, 3]
```

Sample Output

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

Easy – Difficulty: Staircase Traversal

You're given two positive integers representing the height of a staircase and the maximum number of steps that you can advance up the staircase at a time. Write a function that returns the number of ways in which you can climb the staircase.

For example, if you were given a staircase of height = 3 and maxSteps = 2 you could climb the staircase in 3 ways. You could take 1 step, 1 step, then 1 step, you could also take 1 step, then 2 steps, and you could take 1 step, then 2 steps, and you could take 2 steps, then 1 step

Sample Input

```
height = 4
maxSteps = 2
```

Sample Output

```
5
// You can climb the staircase in the following ways:
// 1, 1, 1, 1
// 1, 1, 2
// 1, 2, 1
// 2, 1, 1
// 2, 2
```

Medium – Difficulty: Phone Number Mnemonics

If you open the keypad of your mobile phone, it'll likely look like this:

1	2	3	
	abc	def	

4	5	6	
ghi	jkl	mno	

7	8	9	
pqrs	tuv	wxyz	

	0		

Almost every digit is associated with some letters in the alphabet; this allows

certain phone numbers to spell out actual words. For example, the phone number 8464747328 can be written as timisgreat ; similarly, the phone number 2686463 can be written as antoine or as ant6463.

It's important to note that a phone number doesn't represent a single sequence of letters, but rather multiple combinations of letters. For instance, the digit 2 can represent three different letters (a, b, and c).

A mnemonic is defined as a pattern of letters, ideas, or associations that assist in remembering something. Companies oftentimes use a mnemonic for their phone number to make it easier to remember.

Given a stringified phone number of any non-zero length, write a function that returns all mnemonics for this phone number, in any order.

For this problem, a valid mnemonic may only contain letters and the digits 0 and 1. In other words, if a digit is able to be represented by a letter, then it must be. Digits 0 and 1 are the only two digits that don't have letter representations on the keypad.

Note that you should rely on the keypad illustrated above for digit-letter associations.

Sample Input

```
phoneNumber = "1905"
```

Sample Output

```
[
  "1w0j",
  "1w0k",
  "1w0l",
  "1x0j",
  "1x0k",
  "1x0l",
  "1y0j",
  "1y0k",
  "1y0l",
  "1z0j",
  "1z0k",
  "1z0l",
]
// The mnemonics could be ordered differently.
```