1. An sorted array of integers was rotated an unknown number of times.

Given such an array, find the index of the element in the array in faster than linear time. If the element doesn't exist in the array, return null.

For example, given the array [13, 18, 25, 2, 8, 10] and the element 8, return 4 (the index of 8 in the array).

You can assume all the integers in the array are unique.

2.

Given a multiset of integers, return whether it can be partitioned into two subsets whose sums are the same.

For example, given the multiset `{15, 5, 20, 10, 35, 15, 10}`, it would return true, since we can split it up into `{15, 5, 10, 15, 10}` and `{20, 35}`, which both add up to `55`.

Given the multiset `{15, 5, 20, 10, 35}`, it would return false, since we can't split it up into two subsets that add up to the same sum

3.There is an N by M matrix of zeroes. Given N and M, write a function to count the number of ways of starting at the top-left corner and getting to the bottom-right corner. You can only move right or down.

For example, given a 2 by 2 matrix, you should return 2, since there are two ways to get to the bottom-right:

- Right, then down
- Down, then right

Given a 5 by 5 matrix, there are 70 ways to get to the bottom-right.

4.Given a 2D matrix of characters and a target word, write a function that returns whether the word can be found in the matrix by going left-to-right, or up-to-down.

For example, given the following matrix:

[['F', 'A', 'C', 'I'],

['O', 'B', 'Q', 'P'],

['A', 'N', 'O', 'B'],

['M', 'A', 'S', 'S']]

and the target word 'FOAM', you should return true, since it's the leftmost column. Similarly, given the target word 'MASS', you should return true, since it's the last row.

5.

Given a N by M matrix of numbers, print out the matrix in a clockwise spiral.

For example, given the following matrix:

```
[[1,  2,  3,  4,  5],
 [6,  7,  8,  9,  10],
 [11, 12, 13, 14, 15],
 [16, 17, 18, 19, 20]]
```

You should print out the following:

```
1
2
3
4
5
10
15
20
```

19
18
17
16
11
6
7
8
9
14
13
12