1. You are given an unsorted array of n integers and an arbitrary integer k. Determine whether there is pair(s) of elements in the array that sums to exactly k. Array elements can be positive, negative, or zero and the pair should consist of two different array elements. Duplicates may present in the array. Also count how many such pairs exist. For example, given the array [1, 3, 7] and k = 8, the answer is “yes,” but given k = 6 the answer is “no.” For example, if the given array is [3, 5, 2, -4, 8, 11] and k = 7, your program should return [[11, -4], [2, 5]] because 11 + -4 = 7 and 2 + 5 = 7. Write a program to implement an $O(n^2)$ time, O(n log n) time and O(n) time algorithm to find all pair(s) with given sum in the array.

Input

The given array : {6, 8, 4, -5, 7, 9}

The given sum : 15

Output

(6, 9)

(8, 7)

Input

The given array : {-5, 1, -40, 20, 6, 8, 7}

The given sum : 15

Output

(7, 8)

(-5, 20)

Input

The given array : {-5, 4, -2, 16, 8, 9}

The given sum : 15

Output

There is no pair of elements whose sum is equal to 15

Input

The given array : {1, 5, 7, -1}

The given sum : 6

Output

(1, 5)

(7, -1)

Input

The given array : {1, 5, 7, -1, 5}

The given sum : 6

Output

(1, 5)

(7, -1)

(1, 5)

2. You have given two unsorted arrays A and B of n distinct integers, and an integer x. You have to find whether there exists a pair, i.e. an element from A and an element from B whose sum is exactly x, otherwise the program display a message that ”There are no such elements exists in the arrays”. There may be multiple elements in A and B for which A[i]+B[j]=x. Write a program that implements an O(nlogn) time algorithm.

Input

A={5, 3, 14, 8, 22, 9, 15}   B={7, 10, 2, 20, 6, 13, 4}   x=20

Output

(14, 6)

Input

A={5, 3, 14, 8, 22, 9, 15}   B={1, 10, 2, 20, 6, 12, 4}   x=22

Output

There are no such elements exists in the arrays

Input

A={5, 3, 14, 18, 22, 9, 15}   B={1, 8, 2, 21, 7, 12, 4}   x=25

Output

(18, 7)

3. You have given two unsorted arrays A and B of n distinct integers, and an integer x. You have to find all pairs, i.e. an element from A and an element from B whose sum is exactly x, otherwise the program display a message that ”There are no such elements exists in the arrays”. There may be multiple elements in A and B for which A[i]+B[j]=x. Write a program that implements an $O(n^2)$ time algorithm. Also count how many such pairs exist.

Input

A={5, 3, 14, 8, 22, 9, 15}   B={7, 10, 2, 20, 6, 12, 4}   x=20

Output

(14, 6)   (8,12)

Input

A={-1, -2, 4, -6, 5, 7}   B={6, 3, 4, 0}   x = 8

Output

(4, 4) (5, 3)

Input

A={1, 2, 4, 5, 7}   B={5, 6, 3, 4, 8}   x = 9

Output

(1, 8) (4, 5)   (5, 4)

Input

A={1, 2, 3, 7, 5, 4 }   B={0, 7, 4, 3, 2, 1}   x = 8

Output

(1, 7)   (7, 1)   (5, 3)   (4, 4)

4. You have given an unsorted array X = {x_1, x_2 ,…, x_n} of **n distinct positive integers** and another **positive integer d**. The problem is to check if there exists a sub array X' of X whose elements sum to d and find the sub array(s) if there's any.
A naive approach is to solve the subset sum problem by the brute force technique where it finds all the possible 2^n subset of n element set. Iterate over all the 2^n subsets and find the sum of each subset and compare it with the target sum.
The most naïve algorithm would be to traverse through all sub arrays of n numbers and, for every one of them, check if the subarray sums to the target number. The running time is of order $O(n.2^n)$, since there are 2^n subarrays and, to check each subarray, we need to sum at most n elements.
Write a C/Python program to solve this problem.

Test cases
A = {8, 6, 7, 5, 3, 10, 9} and d = 15,
The subsets whose sum is 15 : {8,7}, {7,5,3}, {6,9}, {5,10}.

A = {8, 6, 7, 5, 10, 9} and d = 11
No solution

A = {2, 4, 6, 8, 10} and d=20
The subsets whose sum is : {2, 4, 6, 8}, {2, 8, 10}, {4, 6, 10}.

5. Given a set of n positive integers, not necessarily be distinct, find **two subsets** such that the sum of elements in both subsets is same. The elements need not to be contiguous within this subset. There may be multiple solutions also. Write a program to implement this problem.

Examples
Input : A = {1, 5, 11, 5}
Output: {1, 5, 5}, {11}

Input : A = {1, 5, 3}
Output: Partition not possible

Input : A = {1,7,5,11}
Output: {1,11}, {7,5}

Input : A = {3,1,1,2,2,1}
Output : {1,1,1,2}, {2,3}, {3,1,1}, {2,2,1}

Input : A = {1,7,2,5}
Output : Partition not possible