ASSIGNMENT -5

1) Return parentheses
https://codingninjas.in/app/practice/468/84/return-parentheses

2) Generate all parentheses (print)
https://codingninjas.in/app/practice/468/366/generate-all-parenthesis

3) Combination sum
https://practice.geeksforgeeks.org/problems/combination-sum/0

4) Combination sum 2
https://practice.geeksforgeeks.org/problems/combination-sum-part-2/0

5) Return Permutations - String

Given a string S, find and return all the possible permutations of the input string.

Note 1 : The order of permutations is not important.

Note 2 : If original string contains duplicate characters, permutations will also be duplicates.

Input Format :

String S

Output Format :

All permutations (in different lines)

Sample Input :

abc

Sample Output :

abc
acb
bac
bca
cab
cba

6) Print Permutations - String

Given a string, find and print all the possible permutations of the input string.

Note : The order of permutations are not important. Just print them in different lines.
Sample Input :

```
abc
```

Sample Output :

```
abc
acb
bac
bca
cab
cba
```

7) Interleavings

Given two strings S (of length m) and T (of length n), you need to find and print out all the possible inter leavings that are possible of length (m + n).

Inter leaving means - all possible combination of characters from both strings such that it contain all characters from both strings and, the respective ordering of characters of one string should remain same as in original.

For eg.

S = ab

T = cd

You need to find all strings of length 4 that contain all characters 'a', 'b', 'c' & 'd'. The only constraint on ordering of characters is - 'a' should always come before 'b' and 'c' should always come before 'd'.

Note : Print all strings in different lines.

Sample Input :

```
abc
def
```

Sample Output :

```
abcdef
abdcef
abdecf
abdefc
adbcef
adbecf
adbefc
adebcf
adebfc
adefbc
dabcef
dabecf
dabefc
daebcf
daebfc
daefbc
deabcf
deabfc
deafbc
defabc
```

8)Complex Number Class

A ComplexNumber class contains two data members : one is real part (R) and other is imaginary (I) (both integer).

Implement the Complex numbers class that contains following functions -

1. constructor

You need to create the appropriate constructor.

2. plus -

This function adds two given complex numbers and updates the first complex number.

E.g.

if C1 = 4 + i5 and C2 = 3 +i1

C1.plus(C2) results in:

C1 = 7 + i6 and C2 = 3 + i1

3. multiply -

This function multiplies two given complex numbers and updates the first complex number.

E.g.

C1 = 4 + i5 and C2 = 1 + i2

C1.multiply(C2) results in:

C1 = -6 + i13 and C2 = 1 + i2

4. print -

This function prints the given complex number in the following format :

a + ib

Note : There is space before and after '+' (plus sign) and no space between 'i' (iota symbol) and b.

Input Format :

Line 1 : Two integers - real and imaginary part of 1st complex number
Line 2 : Two integers - real and imaginary part of 2nd complex number
Line 3 : An integer representing choice (1 or 2) (1 represents plus function will be called and 2 represents multiply function will be called)

Sample Input 1 :

```
4 5
6 7
1
```

Sample Output 1 :

```
10 + i12
```

Sample Input 2 :

```
4 5
6 7
2
```

Sample Output 2 :

```
-11 + i58
```