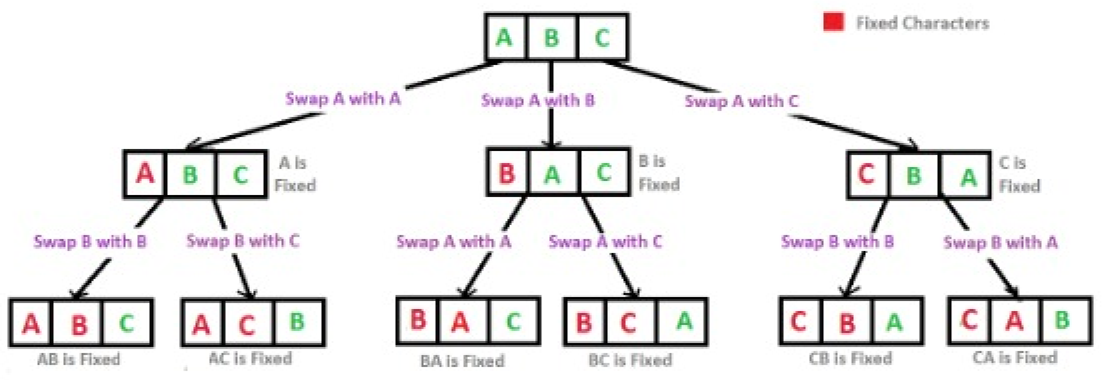
Write a program to print all permutations of a given string

A permutation, also called an “arrangement number” or “order,” is a rearrangement of the elements of an ordered list S into a one-to-one correspondence with S itself. A string of length n has n! permutation.
Source: Mathword(http://mathworld.wolfram.com/Permutation.html)

Below are the permutations of string ABC.
ABC ACB BAC BCA CBA CAB

We strongly recommend that you click here and practice it, before moving on to the solution.

Here is a solution that is used as a basis in backtracking.



Recursion Tree for Permutations of String "ABC"

C/C++ Python

```c
// C program to print all permutations with duplicates allowed
#include <stdio.h>
#include <string.h>

/* Function to swap values at two pointers */
void swap(char *x, char *y)
{
    char temp;
    temp = *x;
    *x = *y;
    *y = temp;
}

/* Function to print permutations of string
   This function takes three parameters:
   1. String
   2. Starting index of the string
   3. Ending index of the string. */
void permute(char *a, int l, int r)
{
   int i;
   if (l == r)
     printf("%s\n", a);
   else
   {
       for (i = l; i <= r; i++)
       {
          swap((a+l), (a+i));
          permute(a, l+1, r);
          swap((a+l), (a+i)); //backtrack
       }
   }
}

/* Driver program to test above functions */
int main()
{
    char str[] = "ABC";
    int n = strlen(str);
    permute(str, 0, n-1);
    return 0;
}
```

Run on IDE

Output:

```
ABC
ACB
BAC
BCA
CBA
CAB
```

Algorithm Paradigm: Backtracking
Time Complexity: O(n*n!) Note that there are n! permutations and it requires O(n) time to print a a permutation.

Note : The above solution prints duplicate permutations if there are repeating characters in input string. Please see below link for a solution that prints only distinct permutations even if there are duplicates in input.