Assignment 8: Pointer

Submitted By: U19CS012 (D-12)

1. Write a program in C to print all permutations of a given string using pointers.

The permutations of the string are: abcd abdc acbd acdb adcb adbc bacd badc bcad bcda

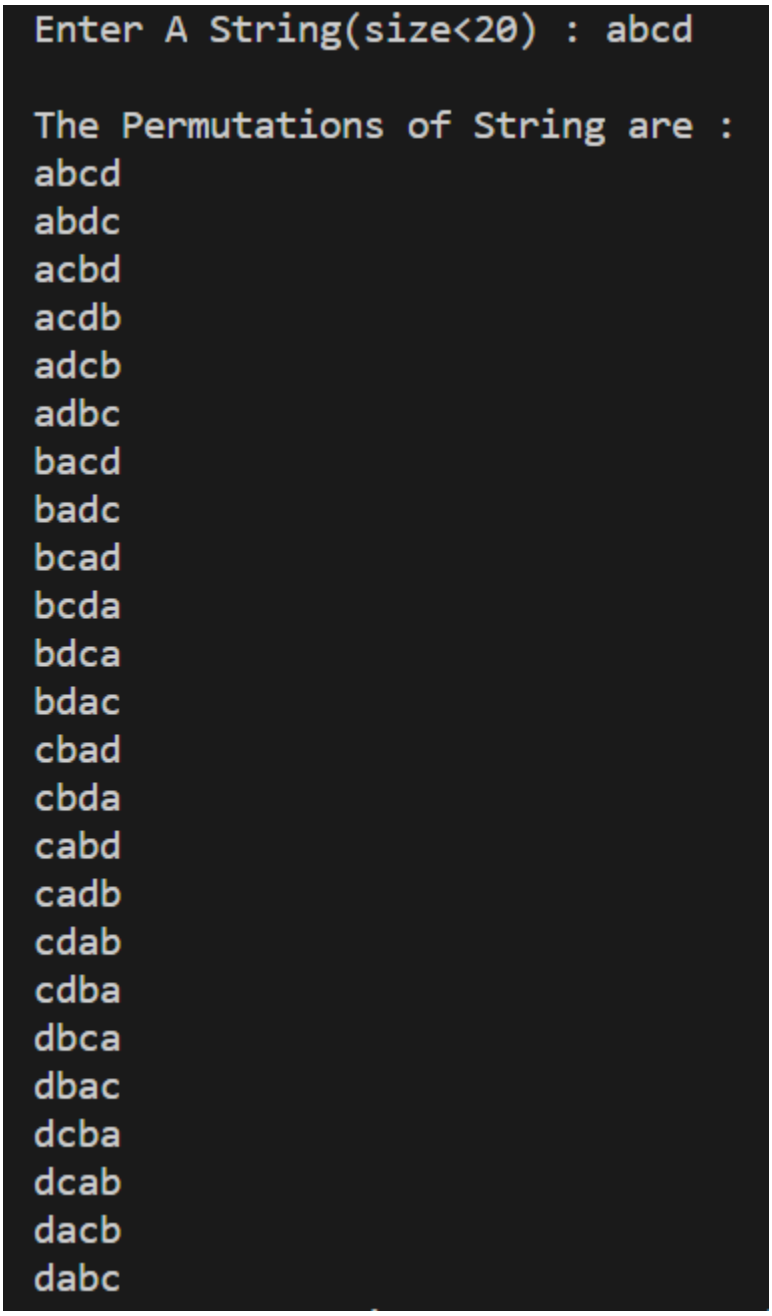
bdca bdac cbad cbda cabd cadb cdab cdba dbca dbac dcba dcab dacb dabc

Code:

```c
// Reference : https://www.geeksforgeeks.org/write-a-c-program-to-print-all-permutations-of-a-given-string/

#include <stdio.h>
#include <string.h>

//  A string of length n has n! permutation

// Pointers Used Only for Swapping
void swap(char *x, char *y)
{
    char temp;
    temp = *x;
    *x = *y;
    *y = temp;
}

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
        }
    }
}

void main()
{
    char str[20]; //Since Time Complexity is O(N*(N!))
    printf("Enter A String(size<20) : ");
    scanf("%s", &str);
    int len = strlen(str);
```

```
    printf("\nThe Permutations of String are : \n");
    permute(str, 0, len - 1);
}
```

Output:



2. Program to create, initialize, assign and access a pointer variable.

Code:

```
#include <stdio.h>

void main()
{
```

```
    int Integer;
    int *Pointer; /*Create Pointer */
    Pointer = &Integer; /*Initialise and Assign Pointer*/
    Integer = 250;
    printf("Using variable 'Integer' :\n");
    printf("Value of Integer : %d \nAddress of Integer : %u\n", Integer, &Integer);
    // Access Pointer Variable
    printf("Using pointer 'Pointer' :\n");
    printf("Value of Pointer : %d\nAddress of Pointer : %u\n", *Pointer, Pointer);
    // *Pointer is Dereferencing
}
```

Output:

```
Using variable 'Integer' :
Value of Integer : 250
Address of Integer : 6422296
Using pointer 'Pointer' :
Value of Pointer : 250
Address of Pointer : 6422296
```

3. Program to swap two numbers using pointers.

Code:

```
#include <stdio.h>

void main()
{
    int a = 0, b = 0;
    printf("\nEnter Number 1 : ");
    scanf("%d", &a);
    printf("\nEnter Number 2 : ");
    scanf("%d", &b);

    printf("\nBefore Swapping : \n");
    printf("\n Number 1 : %d ", a);
    printf("\n Number 2 : %d ", b);

    int *add_a, *add_b;
    int temp;

    add_a = &a;
    add_b = &b;

    temp = *add_a;
    *add_a = *add_b;
```

```
    *add_b = temp;

    printf("\nAfter Swapping : \n");
    printf("\n Number 1 : %d ", a);
    printf("\n Number 2 : %d ", b);
}
```

Output:

```
 Enter Number 1 : 123

 Enter Number 2 : 456

 Before Swapping :

  Number 1 : 123
  Number 2 : 456
 After Swapping :

  Number 1 : 456
  Number 2 : 123
```

4. Modify value stored in other variable using pointer in C

a. Initialize the pointer with the other (normal variable whose value we have to modify) variable's address.

b. Update the value

Code:

```
#include <stdio.h>

void main()
{
    int var1 = 99;
    int *ptr = &var1;
    //Initialize the pointer with the variable's address
    printf("\nValue of Variable : %d\n", var1);
    printf("\nValue of Variable(using pointer) : %d\n", *ptr); //Dereferencing
    //updating the value
    *ptr = 100;
    printf("\nValue of Variable : %d\n", var1);
    printf("\nvalue of Variable(using pointer) : %d\n", *ptr);
}
```

Output:

```
Value of Variable : 99

Value of Variable(using pointer) : 99

Value of Variable : 100

value of Variable(using pointer) : 100
```

5. Solve the following

```
void increment(int *v) {
(*v)++;
}
int main() {
int a;
scanf("%d", &a);
increment(&a);
printf("%d", a);
return 0;
}
```

You have to complete the function void update(int *a,int *b), which reads two integers as argument, and sets ***a*** with the sum of them, and ***b*** with the absolute difference of them.

a' = a + b

b' = |a – b|

Input Format

Input will contain two integers, ***a*** and ***b*** , separated by a newline.

Output Format

You have to print the updated value of, ***a*** and ***b*** , on two different lines.

Code:

```c
#include <stdio.h>
#include <stdlib.h>

void increment(int *v)
{
    (*v)++;
}
```

```c
void update(int *a, int *b)
{
    //Value of Variable **a
    int val_a = *a;
    int val_b = *b;
    int temp = val_a+val_b;
    int temp2 = abs(val_a-val_b);
    *a = temp;
    *b = temp2;
}
void main()
{
    // int a;
    // scanf("%d", &a);
    // increment(&a);
    // printf("%d", a);
    int num1, num2;
    printf("\nEnter Number 1 : ");
    scanf("%d", &num1);
    printf("\nEnter Number 2 : ");
    scanf("%d", &num2);
    update(&num1, &num2);
    printf("\nThe Update Values of Number 1 and Number 2 are :\n");
    printf("\t Number 1 : %d \n", num1);
    printf("\t Number 2 : %d \n", num2);

}
```

Output:

```
Enter Number 1 : 34

Enter Number 2 : 12

The Update Values of Number 1 and Number 2 are :
        Number 1 : 46
        Number 2 : 22
```


Submitted By:

Bhagya Rana

U19CS012 (D-12) (CSE, SVNIT)