DSA LAB – 3

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1)Question: (with Library functions)

Code:

```
#include<iostream>
#include<cstring>
using namespace std;

void stringLen(char a[]){
   cout << "The length of first string : " << strlen(a);
}

void stringCopy(char a[], char b[]){
   strcpy(b,a);
   cout << "String 1 : " << a << endl;
   cout << "String 2 : " << b << endl;
   cout << "First string is copied into Second string";
}

void stringConcatenation(char a[], char b[]){
   strcat(a,b);
   cout << a;
}

void stringReverse(char a[]){
   cout << "The reverse of String : " << strrev(a) << endl;
}

void stringPalindrome(char a[]){
   char b[50];
   strcpy(b,a);
   strrev(b);
   int check = strcmp(a,b);
   if(check == 0) cout << "The string entered is a Palindrome.";
   else cout << "The string is not a Palindrome.";
}

void stringCompare(char a[], char  b[]){
   int check = strcmp(a,b);
   if(check == 0) cout << "Strings are equal";
   if(check < 0) cout << "String 1 is greater than String 2";
   if(check > 0) cout << "String 1 is less than String 2";
}

int Substring(char a[], char b[]){
   int count = 0,sub_len = strlen(b);
   char *mainstr = a;
   char *substr = b;
   if(sub_len){
      while(mainstr = strstr(mainstr,substr)){
         mainstr = mainstr + sub_len;
         count++;
```

```
        }
    }
    //cout << count;
    return count;
}

int main(){
    cout << "\n***MENU FOR STRING OPERATIONS***\n" << endl;
    cout << "1. String Length\n2. String Copy\n3. String Concatenation\n4. String Reverse\n";
    cout << "5. String Palindrome\n6. String Compare\n7. Substring\n" << endl;
    cout << "Select which operation you want to perform : ";
    int choice;
    cin >> choice;
    char str1[50], str2[50];
    cout << "\nEnter a string : ";
    cin >> str1;
    switch (choice)
    {
    case 1:
        stringLen(str1);
        break;
    case 2:
        stringCopy(str1,str2);
        break;
    case 3:
        cout << "Enter another string : ";cin >> str2;
        stringConcatenation(str1, str2);
        break;
    case 4:
        stringReverse(str1);
        break;
    case 5:
        stringPalindrome(str1);
        break;
    case 6:
        cout << "Enter another string : ";cin >> str2;
        stringCompare(str1, str2);
        break;
    case 7:
        cout << "Enter sub string : ";cin >> str2;
        cout << "The substring occurred " << Substring(str1, str2);
        cout << " times in main string" << endl;
        break;
    default:
        cout << "Enter a valid choice" << endl;
        break;
    }
    return 0;
}
```

Input & Output:

```
PS C:\Users\DELL\OneDrive\Desktop\Labs> cd "c:\Users\DELL\OneDrive\Desktop\Labs\DSA LAB\LAB 3\" ; if ($?) { g++ with_Library_functions.cpp -o with_Library
_functions } ; if ($?) { .\with_Library_functions }

***MENU FOR STRING OPERATIONS***

1. String Length
2. String Copy
3. String Concatenation
4. String Reverse
5. String Palindrome
6. String Compare
7. Substring

Select which operation you want to perform : 7

Enter a string : Fundamentals
Enter sub string : ment
The substring occurred 1 times in main string
PS C:\Users\DELL\OneDrive\Desktop\Labs\DSA LAB\LAB 3>
```

2)Question: (without Library functions)

Code:

```
#include<iostream>
using namespace std;

int stringLen(char a[]){
   int index = 0, len = 0;
   while(a[index] != '\0'){
      len = len +1;      //increment length count
      index = index + 1;
   }
   return len;
}

char *stringCopy(char a[], char b[]){
   int index = 0;
   while(a[index] != '\0'){
      b[index] = a[index];    //appends one String to other character wise
      index = index + 1;
   }
   b[index] = '\0';
   return b;
}

char *stringConcatenation(char a[], char b[]){
   int start = 0, end = 0;
   while(a[start] != '\0'){
      start = start+ 1;      //index count to end of string
   }
   while(b[end] != '\0'){
      a[start] = b[end];     //adds new string to the end of first string
      start =start +1;
      end = end + 1;
   }
   a[start] = '\0';
   return a;
}

char *stringReverse(char a[]){
```

```
    int start = 0, end = 0;
    while(a[end] != '\0'){
        end = end + 1;      //calculates length of string i.e. end value
    }
    end  = end - 1;
    while(start < end){
        swap(a[start], a[end]);     //swap alternate characters from start and end
        start = start + 1;
        end  = end - 1;
    }
    return a;
}

bool stringPalindrome(char a[]){
    int start = 0;
    while(a[start] != '\0'){
        start = start + 1;      //claculates length of string
    }
    int end  = start - 1; start = 0;
    while(start < end){
        if(a[start] == a[end]){    //checks alternate terms from start and end
            start = start + 1;
            end = end - 1;
        }
        else{
            goto jump;
        }
    }
    jump:
    if(start < end){
        return 0;   //returns false(0) if not a palindrome
    }
    else{
        return 1;   //returns true(1) if palindrome
    }
}

int stringCompare(char a[], char  b[]){
    int index = 0;
    while(a[index] != '\0' || b[index] != '\0'){
        if(a[index] == b[index]){      //compares each charater of both string
            index = index + 1;
        }
        else{
            break;
        }
    }
    int diff = a[index] - b[index];
    return diff;
}

int Substring(char a[], char b[]){
    int len_str = 0, len_sub = 0;
    while(a[len_str] != '\0'){
        len_str++;            //calculate length of string
    }
```

```
    while(b[len_sub] != '\0'){
        len_sub++;              //calculate length of substring
    }
    if(len_sub > len_str) return 0;     //not a substring (0 occurences)
    int count = 0;
    for(int i = 0; i <= len_str - len_sub; i++){
        int j;
        for(j = 0; j <= len_sub - 1; j++){
            if(a[i+j] != b[j]){
                break;
            }
        }
        if(j == len_sub){
            count++;        //increment substring count
        }
    }
    return count;
}

int main(){
    cout << "\n***MENU FOR STRING OPERATIONS***\n" << endl;
    cout << "1. String Length\n2. String Copy\n3. String Concatenation\n4. String Reverse\n";
    cout << "5. String Palindrome\n6. String Compare\n7. Substring\n" << endl;
    cout << "Select which operation you want to perform : ";
    int choice;
    cin >> choice;
    char str1[50], str2[50];
    cout << "\nEnter a string : ";
    cin >> str1;
    switch (choice)
    {
    case 1:
        cout << "The length of String : " << stringLen(str1);    //Calculates string length
        break;
    case 2:
        cout << "Copied String(str2) : " <<stringCopy(str1,str2);      //Copies String to another variable
        break;
    case 3:
        cout << "Enter another string : ";cin >> str2;
        cout << "Concatenated string : " << stringConcatenation(str1, str2);    //Concntenates two strings
        break;
    case 4:
        cout << "The reverse of string : " << stringReverse(str1);    //Reverses the String
        break;
    case 5:
        if(stringPalindrome(str1)) cout << "The string entered is a Palindrome.";    //Checks a string is palindrome or not
        else cout << "The string entered is not a Palindrome.";
        break;
    case 6:
        cout << "Enter another string : ";cin >> str2;
        cout << "The differnece of strings is : " << stringCompare(str1, str2) << endl;             //Compares two strings
        if(stringCompare(str1,str2) == 0) cout << "Strings are equal";
        if(stringCompare(str1,str2) < 0) cout << "String 1 is greater than String 2";
        if(stringCompare(str1,str2) > 0) cout << "String 1 is less than String 2";
        break;
    case 7:
```

```
        cout << "Enter sub string : ";cin >> str2;
        cout << "The substring occurred " <<Substring(str1, str2);              //Counts occurence of Substring
        cout << " times in main string";
        break;
    default:
        cout << "Enter a valid choice";
        break;
    }
    return 0;
}
```

Input & Output:

```
PS C:\Users\DELL\OneDrive\Desktop\Labs> cd "c:\Users\DELL\OneDrive\Desktop\Labs\DSA LAB\LAB 3\" ; if ($?) { g++ without_Library_functions.cpp -o without_Library_functions } ; if ($?
) { .\without_Library_functions }

***MENU FOR STRING OPERATIONS***

1. String Length
2. String Copy
3. String Concatenation
4. String Reverse
5. String Palindrome
6. String Compare
7. Substring

Select which operation you want to perform : 6

Enter a string : Fundamentals
Enter another string : ment
The differnece of strings is : -39
String 1 is greater than String 2
PS C:\Users\DELL\OneDrive\Desktop\Labs\DSA LAB\LAB 3>
```