

**SINDH MADRESSATUL ISLAM UNIVERISTY, KARACHI**

**DEPARTMENT OF SOFTWARE ENGINEERING**

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**CSC103 - PROGRAMMING FUNDAMENTALS**

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**SECTION SE1A/SE1B/SE1C/CS1D<sup>e</sup>**

**LAB MANUAL 09**

**STRING AND MATH**

**FUNCTIONS IN C**

## STRING AND MATH FUNCTIONS IN C

### 1. String – Basic Operations (string.h)

- **strlen() (string length):** The strlen function returns the number of characters that precede the terminating NULL character.

#### Example 01:

```
# include <stdio.h>
int main()
{
    char str[20] = "Hello World!";
    int length; /* to store the return value of strlen */
    int size; /* to store the size of string */
    printf("Enter a string: ");
    gets(str);
    printf("str = %s\n", str);
    length = strlen(str);
    printf("length = %d\n", length);
    size = sizeof(str);
    printf("size = %d\n", size);
}
```

```
/*
Note: identify difference between
sizeof operator and strlen function
*/
```

- **strcpy()(string copy):** The strcpy functions copy the string from source to destination (including the terminating '\0' character.)

```
# include <stdio.h>
int main()
{
    char str1[20] = "Hello World!";
    char str2[15] = "Bye World!";
    printf("Before function call to strcpy\n");
    printf("Value of str1 = %s\n", str1);
    strcpy(str1, str2);
    printf("After function call to strcpy\n");
    printf("Value of str1 = %s", str1);
}
```

- **strcmp() (string comparison):** Compares the string string1 to the string2.
- This function starts comparing the first character of each string.
- If they are equal to each other, it continues with the following pairs until the characters differ or until a terminating null-character is reached.

```
# include <stdio.h>
int main()
{
    char str1[20] = "Hello World!";
    char str2[20] = "Hello World!";
    int result; /* to store the return value of strcmp */
    printf("Value of str1 = %s\n", str1);
    printf("Value of str2 = %s\n", str2);
    result = strcmp(str1, str2);
    printf("result = %d\n\n", result);
}
```

- **strcat (string concatenation):** This function will concatenate (join) the source string and the destination string.

```
# include <stdio.h>
int main()
{
    char str1[20] = "Hello";
    char str2[40] = " World!";
    printf("Value of str1 = %s\n", str1);
    printf("Value of str2 = %s\n", str2);
    strcat(str1, str2);
    printf("Value of str1 = %s\n\n\n", str1);
}
```

**Task 01: Program that prints the words separated by blank spaces**

```
# include <stdio.h>
int main()
{
    char sentence[50];
    printf("Enter Sentence");
    gets (sentence);
    for(i=0;i<sentence.length();i++)
    {
        /* write a code for to print each wordsseparetrly
        like senatnce is "This is a book"
        Ouptu:
        This
        is
        a
        book
        */
    }
}
```

**Task 02: Program that finds the frequency of characters**

```
# include <stdio.h>
int main()
{
    char sentence[50];
    printf("Enter Sentence");
    gets (sentence);
    for(i=0;i<sentence.length();i++)
    {
        /* write a code for Find the Frequency of Characters */
    }
}
```

## 2. Mathematics: <math.h>

- Mathematics is a relatively straightforward library to use again. You must #include <math.h> and must remember to link in the math library at compilation.

- **sqrt () :** Square root function
- **Prototype:** double sqrt(double x)

```
#include <stdio.h>
#include <math.h>
int main()
{
    double x;
    double sRoot;
    printf("Enter a number:\t");
    scanf("%lf", &x);
    sRoot = sqrt(x);
    printf("Square Root of %lf is %lf", x, sRoot);
    return 0;
}
```

- **floor() :** Round to largest integral value not greater than x
- **ceil() :** Round to smallest integral value greater than x
- **Prototype:** double floor (double x)
- double ceil (double x)

```
#include <stdio.h>
#include <math.h>
int main()
{
    double x;
    double floorX, ceilX;
    printf("Enter a number:\t");
    scanf("%lf", &x);
    floorX = floor(x);
    ceilX = ceil(x);
    printf("For %lf: Floor is %lf and Ceiling is %lf", x, floorX, ceilX);
    return 0;
}
```

- **exp() :** Exponential functions, calculates the value of  $e^x$
- **Prototype:** `double exp (double x)`

```
#include <stdio.h>
#include <math.h>
int main()
{
    double x, expX;
    printf("Enter a number:\t");
    scanf("%lf", &x);
    expX = exp(x);
    printf("Exponential value of %lf is %lf",x,expX);
    return 0;
}
```

- **pow() :** Power function, calculates  $x^y$
- **Prototype:** `double pow (double x, double y)`

```
#include <stdio.h>
#include <math.h>
int main()
{
    double x, y, powerValue;
    printf("Enter a number:\t");
    scanf("%lf", &x);
    printf("Enter a power:\t");
    scanf("%lf", &y);
    powerValue = pow(x, y);
    printf("%lf^%lf is %lf",x,y,powerValue);
    return 0;
}
```

## **Lab Task 09:**

1. Solve the following:
  - a. Without using the function strcmp(), find whether two strings, str1 and str2 are exactly equal or not.
  - b. Without using the function strcat(), concatenate two strings i.e. str1 and str2 are the two strings and after concatenation str1 will have str2 joined/concatenated after it.
  - c. Without using the function strcpy(), copy one string into another string.
2. Using pow (), write a C program to compute the surface area and volume of a cube.
3. Write a C Program to find roots of a quadratic equation when coefficients are entered by the user.

## **Submission Instructions:**

*Due Date: Jan 08, 2023*

1. For C files, name your C files as questionNumber\_yourRollNum\_yourSection\_LTNumber.c (e.g. Q1\_BSE-22F-123\_SE1A\_LT1.c).
2. Place all files in a folder and name the folder as yourRollNum\_yourSection\_LTNumber (e.g. BSE-22F-123\_SE1A\_LT1).
3. Compress the folder by using either Winrar or 7Zip with the same name.
4. Go to [tiny.cc/pffall2022smiu](https://tiny.cc/pffall2022smiu) and in the “Coordination Document Folder” open the “PF-Activity Submission Form”.
5. Fill out all the details with your correct password and submit the form by the due date.