FEU Institute of Technology
COLLEGE OF ENGINEERING • COLLEGE OF COMPUTER STUDIES

CCS0007
Computer Programming 2 for IT

s
EXERCISE
2

Character and String Manipulation

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I. OBJECTIVES

At the end of this Laboratory exercise, the students must be able to:

- Create a program that applies different C-String functions.
- Create a program process C-String values using user-defined functions

II. BACKGROUND INFORMATION

A string stored as an array of characters terminated with '\0'.

Table 1: Some Predefined C-String Functions in <cstring>

FUNCTION	DESCRIPTION
strcpy(Target_String_Var,Src_String)	**Copies the C-string value Src_String into the C-string variable Target_String_Var**
strcpy(Target_String_Var,Src_String,limit)	The same as the two argument strcpy except that at most Limit characters are copied
strcat(Target_String_Var,Src_String)	**Concatenates the C-String value Src_String onto the end of C-string in the C-string variable Target_String_Var**
strcat(Target_String_Var,Src_String, Limit)	The same as the two argument strcat except that at most Limit characters are appended.
strlen(Src_String)	**Returns an integer equal to the length of Src_String. (The null character, '\0', is not counted in the length.**
strcmp(String_1, String_2)	**Returns 0 if String_1 and String_2 are the same. Returns a value < 0 if String_1 is less than String_2. Returns a value > 0 if String_1 is greater than String_2 (that is, returns a nonzero value if String_1 and String_2 are different). The order is lexicographic.**
strcmp(String_1, String_2, Limit)	The same as the two-argument strcmp except that at most Limit characters are compared.

Table 2 : Some Predefined character manipulating functions in <cctype>

FUNCTION	DESCRIPTION
toupper(Char_Exp)	Returns the uppercase version of Char_Exp (as value of type int).
tolower(Char_Exp)	Returns the lowercase version of Char_Exp (as value of type int).
isupper(Char_Exp)	Returns true provided Char_Exp is an uppercase letter; otherwise, returns false.
islower(Char_Exp)	Returns true provided Char_Exp is an lowercase letter; otherwise, returns false.
isalpha(Char_Exp)	Returns true provided Char_Exp is a letter of the alphabet; otherwise return false.
isdigit(Char_Exp)	Returns true provided Char_Exp is one of the digits '0' through '9'; otherwise, returns false.
isalnum(Char_Exp)	Returns true provided Char_Exp is either a letter or a digit; otherwise, returns false.
isspace(Char_Exp)	Returns true provided Char_Exp is a whitespace character, such as the blank or newline character, otherwise, return false.
ispunct(Char_Exp)	Returns true provided Char_Exp is a printing character other than whitespace, a digit, or a letter; otherwise return false.
isprint(Char_Exp)	Returns true provided Char_Exp is a printing characters includes blank space; otherwise returns false.
isgraph(Char_Exp)	Returns true provided Char_Exp is a printing characters; otherwise returns false.
isctrl(Char_Exp)	Returns true provided Char_Exp is a control character; otherwise, return false.

III. EXPERIMENTAL PROCEDURE

INSTRUCTIONS:

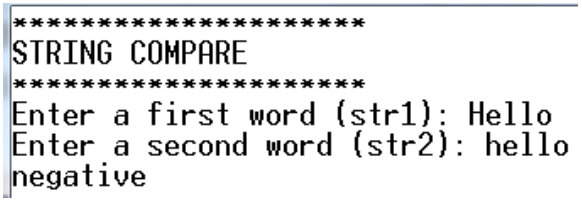
Copy your source codes to be pasted in this document as well as a screen shot of your running output.

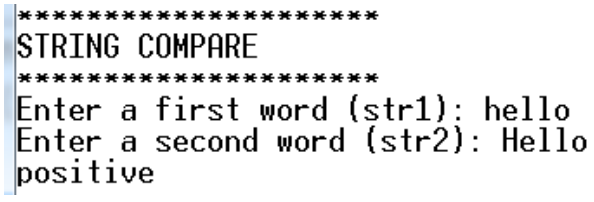
Upload your document using the link provided in your canvas.

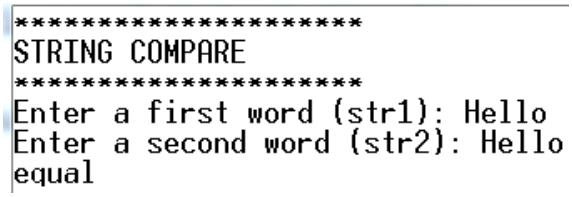
ACTIVITY2.1: Compare two strings

Create a program that will compare two input strings using strcmp( ).

EXAMPLE PROGRAM OUTPUT:





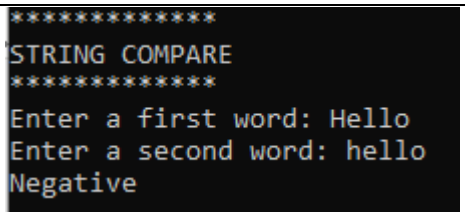


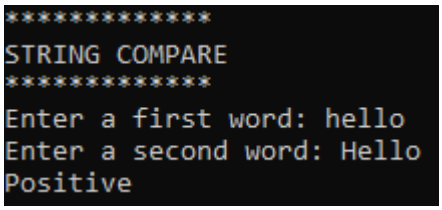
SOURCE CODE:

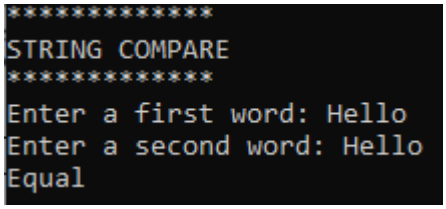
```
#INCLUDE <IOSTREAM>
#INCLUDE <CSTRING>
USING NAMESPACE STD;

INT MAIN() {
    //FOR UI
    CHAR STR1[256];
    CHAR STR2[256];
    COUT << "**************" << ENDL;
    COUT << "STRING COMPARE \N";
    COUT << "**************" << ENDL;
    COUT << "ENTER A FIRST WORD: ";
    CIN.GETLINE(STR1,256);
    COUT << "ENTER A SECOND WORD: ";
    CIN.GETLINE(STR2,256);
    // ALGO FOR DETERMINING THE RESULT
    IF(STRCMP(STR1,STR2) == 0) {
        COUT << "EQUAL";
    } ELSE IF (STRCMP(STR1,STR2) == -1) {
        COUT << "NEGATIVE";
    } ELSE IF (STRCMP(STR1,STR2) == 1) {
        COUT << "POSITIVE";
    }
    RETURN 0;
}
```

SAMPLE OUTPUTS:







ACTIVITY 2.2: Copying strings

Create a program that will copy a string from one variable to another using the strcpy( ) function.

EXAMPLE PROGRAM OUTPUT:

```
**********************
STRING COPY
**********************
Enter a first word (str1): abc
Enter a second word (str2): def
new string value for str1: def
```

```
**********************
STRING COPY
**********************
Enter a first word (str1): abc
Enter a second word (str2): abc def ghi jkl
new string value for str1: abc def ghi jkl
```

SOURCE CODE:

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

int main() {
   //For UI
   char str1[256];
   char str2[256];
   cout << "*************" << endl;
   cout << "STRING COPY \n";
   cout << "*************" << endl;
   cout << "Enter a first word: ";
   cin.getline(str1,256);
   cout << "Enter a second word: ";
   cin.getline(str2,256);
   strcpy (str1,str2);
   //outputing the new value of str1
   cout << "The New String Value for
str1: " << str1;
   return 0;
}
```

SAMPLE OUTPUTS:

```
*************
STRING COPY
*************
Enter a first word: abc
Enter a second word: def
The New String Value for str1: def
```

ACTIVITY 2.3: Concatenating strings

Create a program that will concatenate two strings.

```
**********************
STRING CONCATENATION
**********************
Enter a first word (str1): Hello
Enter a second word (str2):  World
new string value for str1: Hello World
```

```
**********************
STRING CONCATENATION
**********************
Enter a first word (str1): Welcome
Enter a second word (str2):  to FEU
new string value for str1: Welcome to FEU
```

SOURCE CODE:

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

int main() {
   //For UI
   char str1[256];
   char str2[256];
   cout << "*************" << endl;
   cout << "STRING CONCATENATION \n";
   cout << "*************" << endl;
   cout << "Enter a first word: ";
   cin.getline(str1,256);
   cout << "Enter a second word: ";
   cin.getline(str2,256);
   strcat(str1,str2);
   //outputing the new value of str1
   cout << "The New String Value for
str1: " << str1;
   return 0;
}
```

SAMPLE OUTPUTS:

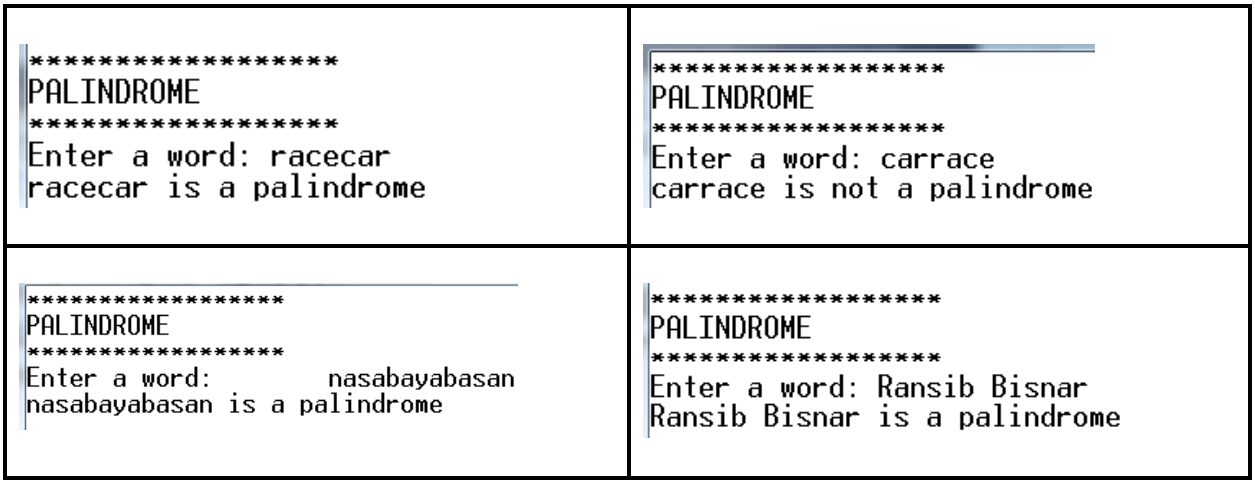
```
*************
STRING CONCATENATION
*************
Enter a first word: Hello
Enter a second word:  World
The New String Value for str1: Hello World
```

ACTIVITY 2.4: Palindrome

Convert a program that will determine if the given word input is a palindrome using C-String functions.

NOTE: Palindromes are words that are read the same way either left to right or right to left.

EXAMPLE PROGRAM OUTPUT:



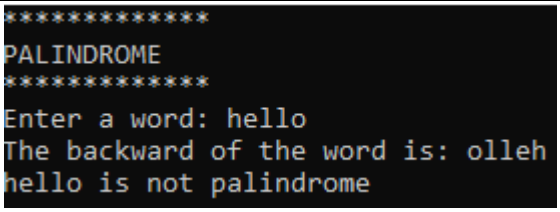
SOURCE CODE:

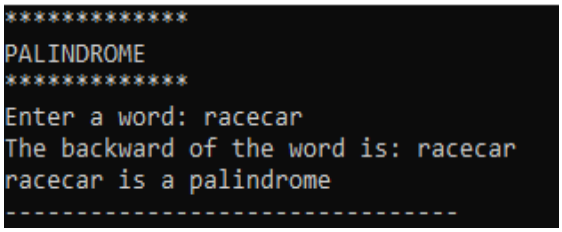
```
#INCLUDE <IOSTREAM>
#INCLUDE <CSTRING>
USING NAMESPACE STD;

INT MAIN() {
    //FOR UI
    INT LEN,TEMP;
    CHAR STR1[20];
    CHAR STR2[20];
    BOOL ISPAL;
    COUT << "**************" << ENDL;
    COUT << "PALINDROME\N";
    COUT << "**************" << ENDL;
    COUT << "ENTER A WORD: ";
    CIN.GETLINE(STR1,20);
    LEN = STRLEN(STR1);
    //OUTPUTTING THE WORD BACKWARDS
    COUT << "THE BACKWARD OF THE WORD IS: ";
    FOR (INT I = 0; I < LEN ;I++){
        TEMP = LEN - I - 1;
        COUT << STR1[TEMP];
    }

    //DETERMINING IF THE WORD IS PALINDROME
    FOR(INT I=0 ;I < LEN ;I++){
         IF(STR1[I] != STR1[LEN-I-1]){
             ISPAL = 1;
             BREAK;
        }
   }
    COUT << ENDL;
    IF (ISPAL) {
        COUT << STR1 << " IS NOT PALINDROME";
    } ELSE {
        COUT << STR1 << " IS A PALINDROME";
    }
    RETURN 0;
}
```

SAMPLE OUTPUTS:





ACTIVITY 2.5: Uppercase

Create a program that will accept an input string. Display the same string in all capital form.

EXAMPLE PROGRAM OUTPUT:

```
Enter some string: all friend story
All Friend Story
```

```
Enter some string: ALL FRIEND STORY
All Friend Story
```

```
Enter some string: aLL FRIEND StOrY
All Friend Story
```

SOURCE CODE:

```
#include <iostream>
#include <cstring>
using namespace std;
int main()
{
   // making the ui
   int len;
   char str1[256];
   cout << "**************" << endl;
   cout << "CAPITALIZING EACH WORD"
<<endl;
   cout << "**************" << endl;
   cout << "Please enter a sentence:
";
   cin.getline(str1, 256);
   //gettting the length
   len = strlen(str1);
   str1[0] = toupper(str1[0]);

   // making the letter uppercase
before space
   for (int i = 1; i < len; i++)
   {
      if ( str1[i - 1] == ' ' )
         str1[i] = toupper( str1[i]
);
      else
      // to lower the rest of the
word
      str1[i] = tolower(str1[i]);
   }
   //outputing the results
   cout << str1 << endl;
   return 0;
}
```

SAMPLE OUTPUTS:

```
**************
CAPITALIZING EACH WORD
**************
Please enter a sentence: bus light year
Bus Light Year
```

```
**************
CAPITALIZING EACH WORD
**************
Please enter a sentence: ALL FRIEND STORY
All Friend Story
```

```
**************
CAPITALIZING EACH WORD
**************
Please enter a sentence: aLL FRIEND stOrY
All Friend Story
```

ACTIVITY 2.6: Strings to words

Create a program that will ask the user to enter some string. The program will split the string in to word and display in reverse vertical order.

EXAMPLE PROGRAM OUTPUT:

```
Enter a string: one two three four
four
three
two
one
```

```
Enter a string: the man with a dog
dog
a
with
man
the
```

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

int main()
{
    //making the ui
    string str;
    cout << "**************" << endl;
    cout << "STRINGS TO WORDS" <<endl;
    cout << "**************" << endl;
    cout << "Please enter a sentence: ";
    getline(cin,str);

    int i = str.length() - 1;
    int start, end = i + 1;
    string result = "";
    //string to words algo
    for(i; i >=0; i--) {
        if(str[i] == ' ')
        {
            start = i + 1;
            while(start != end){
                 result += str[start++];
             }
             //make every word go to new line
             result += " \n";
             end = i;
        }
    }
    start = 0;
    while(start != end){
        result += str[start++];
    }
    //outputing the result
    cout << result;

    return 0;
}
```

```
**************
STRINGS TO WORDS
**************
Please enter a sentence: mark angelo capili
capili
angelo
mark
```

```
**************
STRINGS TO WORDS
**************
Please enter a sentence: one two three
three
two
one
```

IV. ASSESSMENT

Department	Information Technology
Subject Code	CCS0007
Description	COMPUTER PROGRAMMING 2 FOR IT
Term/Academic Year	

Topic	Character and String Functions
Lab Activity No	2
Lab Activity	**Character and String Manipulation**
CLO	**3**

Note: The following rubrics/metrics will be used to grade students' output in the lab exercise.

Trait	**(Excellent)**	**(Good)**	**(Fair)**	**(Poor)**
Requirement Specification(30pts)	Able to identify correctly all input and output and provide alternative. **(28-20pts)**	Able to identify correctly all input and output **(25-17pts)**	Able to identify only one input or output **(22-14pts)**	Unable to identify any input and output **(20-11pts)**
Data type(20pts)	Able to apply required data type or data structure and produce correct results **(18-20pts)**	Able to apply required data type or data structure and produce partially correct results **(15-17pts)**	Able to identify required data type or data structure but does apply correctly **(12-14pts)**	Unable to identify required data type **(9-11pts)**
Input Validation(20pts)	The program works and meets all specifications. Does exception al checking for errors and out-of- range data **(18-20pts)**	The program works and meets all specifications. Does some checking for errors and out of range data **(15-17pts)**	The program produces correct results but does not display correctly Does not check for errors and out of range data **(12-14pts)**	The program produce s incorrect results **(9-11pts)**
Free from syntax, logic, and runtime errors (10pts)	Unable to run program **(10pts)**	Able to run program but have logic error **(8-9pts)**	Able to run program correctly without any logic error and display	Able to run program correctly without any logic error and display

			inappropriate output **(6-7pts)**	appropriate output **(5pts)**
Delivery (10pts)	The program was delivered on time **(10pts)**	The program was delivered after 5 minutes from the time required. **(8-9pts)**	The program was delivered after 10 minutes from the time required. **(6-7pts)**	The program was delivered after 15 (or more) minutes from the time required. **(5pts)**
Use of Comments (10pts)	Specific purpose is noted for each function, control structure, input requirements, and output results. **(10pts)**	Specific purpose is noted for each function and control structure. **(8-9pts)**	Purpose is noted for each function. **(6-7pts)**	No comments included. **(5pts)**

Topic	Character and String Manipulation
Lab Activity No	2.1
Lab Activity	Compare two strings
CLO	3
Requirement Specification (30pts)	
Data type (20pts)	
Input Validation (20pts)	
Free from syntax, logic, and runtime errors (10pts)	
Delivery (10pts)	
Use of Comments (10pts)	
TOTAL	

Topic	Character and String Manipulation
Lab Activity No	2.2
Lab Activity	Copying strings
CLO	3
Requirement Specification (30pts)	
Data type (20pts)	
Input Validation (20pts)	
Free from syntax, logic, and runtime errors (10pts)	
Delivery (10pts)	
Use of Comments (10pts)	
TOTAL	

Topic	Character and String Manipulation
Lab Activity No	2.3
Lab Activity	Concatenating strings
CLO	3
Requirement Specification (30pts)	
Data type (20pts)	
Input Validation (20pts)	
Free from syntax, logic, and runtime errors (10pts)	
Delivery (10pts)	
Use of Comments (10pts)	
TOTAL	

Topic	Character and String Manipulation
Lab Activity No	2.4
Lab Activity	Palindrome
CLO	3
Requirement Specification (30pts)	
Data type (20pts)	
Input Validation (20pts)	
Free from syntax, logic, and runtime errors (10pts)	
Delivery (10pts)	
Use of Comments (10pts)	
TOTAL	

Topic	Character and String Manipulation
Lab Activity No	2.5
Lab Activity	Uppercase
CLO	3
Requirement Specification (30pts)	
Data type (20pts)	
Input Validation (20pts)	
Free from syntax, logic, and runtime errors (10pts)	
Delivery (10pts)	
Use of Comments (10pts)	
TOTAL	

Topic	Character and String Manipulation
Lab Activity No	2.6
Lab Activity	Strings to words
CLO	3
Requirement Specification (30pts)	
Data type (20pts)	
Input Validation (20pts)	
Free from syntax, logic, and runtime errors (10pts)	
Delivery (10pts)	
Use of Comments (10pts)	
TOTAL	