MIPS ASSEMBLY MINI-PROJECT REPORT

Project 14

**Student’s Name: *Lê Anh Tuấn***

**Student’s ID: *20184322***

**I>Problem statement and solution:**

**Problem to solve: *Problem 14***

**Problem statement: *Given two strings, find the number of common characters between them.***

***Example: For s1 = “aabcc” and s2 = “adcaa”, the output should be commonCharacterCount(s1,s2) = 3. String have 3 common characters – 2 “a” ’s and 1 “c”.***

**Solution:**

**1)Input two strings from keyboard:**

-I use InputDialogString two times for have the two input strings for the problem.

Used Registers:

#$v0: syscall service

#$a0:Message

#$a1:Input string

#$a2: Max character accepted

**2)Handle ‘\n’ character at the end of input strings:**

**-**Since the input string if the user hasn’t entered the maximum number of characters so the string always end with ‘\n’ this character can make the result wrong and take a longer time to execute so I will remove this character first from both input string.

while(string[i] != ‘\0’){

if(string[i] == ‘\n’){

string[i] = ‘\0’;

break;

}else{

i++;

}

}

Used Registers:

#$t0: value of '\n'

#$a1:Input string

#$s0: = a1[0]

**3)Compare pair of characters that from two input strings:**

-Firstly, I will use nested loop include two for loops for compare each character of this string to another.

for(i=0;i<strlen(string1);i++){

for(j=0;j<strlen(string2);j++){

count\_function();

}

}

**4)Handle repeat character and count the common characters of two strings:**

-Since the string can have a lot of repeat character like double or triple “a” in the example so this can make the program count more than the expected result so I implement a procedure to solve this problem by have a store string and each character is read from the first string I will compare it to all character in this store string, If it haven’t read before so I will put it in the store string and continue the loop, otherwise, it will break the loop and continue with the next character.

-Fourthly,if the loop is continue now we can compare each element of the loop.In case there are two same characters on each string, I use another procedure to count the times this character appear in the first string and in the second string then compare the result. The smaller result will be added to the final result for common characters.

Used Registers:

\*duplicateCharacter function:

#$s0: need to check character

#$v0: the number of times this appear in string

#$a1:Input string

#$t1: = a1[0]

\* repeatChar function:

#$t5: = a3[0]

#$s0: need to check character

#$v0: boolean return

#$a3:Input string

**5)Output the result by MessageDiaglogInt:**

-Finally,use the syscall function to dialog out the result and terminate the program.

**II>Used data structures and algorithms:**

**Data structures**: strings,stack

**III>Descriptions for functions and used resgisters: In the source code**