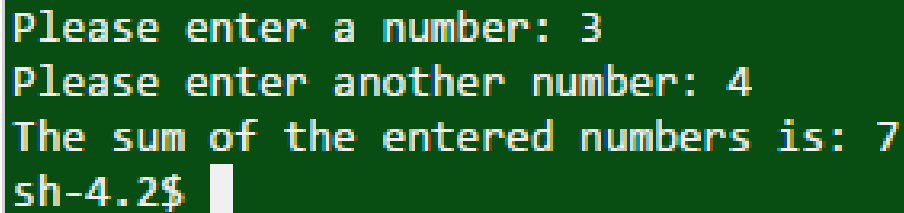


CIS 231 PROGRAMMING ASSIGNMENT 4: MACROS AND ASCII PROCESSING

This assignment has 2 experiments.

1. In the first experiment you will learn how to enter two single digit decimal Ascii characters through standard input of the tutorialspoint assembly online development environment and then print the sum back to the console.
2. In the second experiment you will modify the program from experiment 1 to add three numbers

EXPERIMENT 1: Read two single digit characters then add and show sum



```
Please enter a number: 3
Please enter another number: 4
The sum of the entered numbers is: 7
sh-4.2$
```

OBJECTIVE: Learn how to read and add two single digit numerical Ascii characters from standard input.

PROCEDURE: The first step is to understand how to properly input single characters through the console standard input on tutorialspoint. Experiment with the program discussed in lecture:

1. Find the source code named **AsciiToDecimalMacro.asm** provided in the modules section
2. Copy the content of **AsciiToDecimalMacro.asm** into the main.asm provided on tutorialspoint's NASM development environment.
3. If the program compiles without any errors click Execute (otherwise fix bugs and repeat step 3)
4. Once the program is running, a prompt will be displayed in the console stating *"Please enter a number: "*
5. Click anywhere within the console window and enter a single digit number.
6. Next hold the Control button and press D. This will enter an EOF (End of File character) to inform the program that a character has been entered.
7. Another prompt will be displayed in the console stating *"Please enter another number: "*
8. Click anywhere within the console window and enter a single digit number.
9. Hold the Control button and press D.
10. Finally a message will be displayed stating *"The sum of the entered numbers is: "* along with the sum

The sequence outlined in steps 1 through 10 go along with what is displayed in the image above.

NOTE1: If the sum of the numbers entered is greater than 9 then Ascii symbols will be shown.

NOTE2: The program will malfunction if more than one numeric digit is entered at a time or the Enter key is pressed after a numeric digit is entered.

Once you understand the source code of **AsciiToDecimalMacro.asm** and you understand how to use the **AsciiToDecimalMacro** program, then proceed to Experiment 2.

CIS 231 PROGRAMMING ASSIGNMENT 4: MACROS AND ASCII PROCESSING

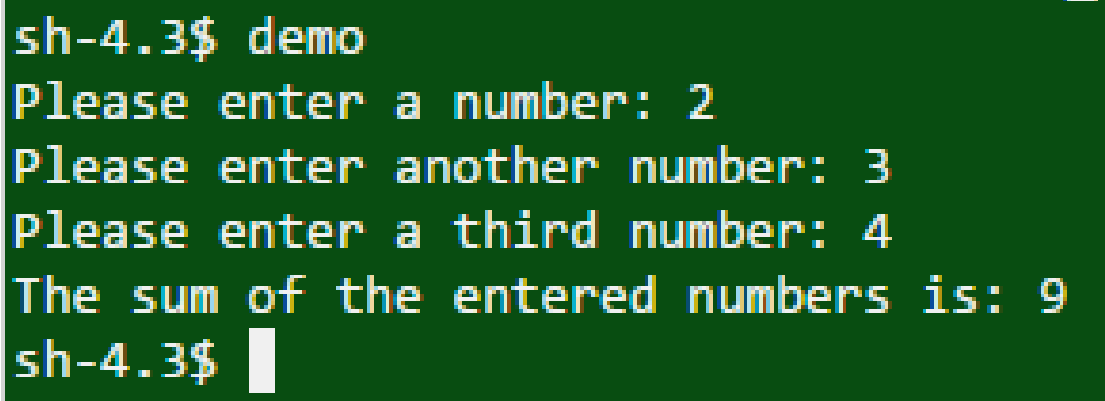
EXPERIMENT 2: Read three single digit characters then add and show sum

OBJECTIVE: Modify the AsciiToDecimalMacro.asm from Experiment 1 to read and add 3 numbers.

PROCEDURE: Create the modifications to AsciiToDecimalMacro.asm according to the following:

1. Create a message named **Prompt3** which will display *"Please enter a third number: "*
2. Create another variable named **num3** that is initialized to **0xff**
3. Display **Prompt3** after a number is entered into **num2** variable
4. Read a number through standard input into **num3** variable
5. In the section of the program after $\text{num1} + \text{num2}$ is calculated
 - a. Put **num3** into a register
 - b. Remove the Ascii encoding from **num3** and add to the sum of $\text{num1} + \text{num2}$
 - c. Put the Ascii encoding onto the register which holds the sum of $\text{num1} + \text{num2} + \text{num3}$
 - d. Put the Ascii encoded sum of $\text{num1} + \text{num2} + \text{num3}$ into the variable named **sum**
6. Display the sum of the entered numbers

An example of how the program should work appears below:



```
sh-4.3$ demo
Please enter a number: 2
Please enter another number: 3
Please enter a third number: 4
The sum of the entered numbers is: 9
sh-4.3$
```

If your program works correctly according to what appears in the image above, experiment 2 is completed.

CIS 231 PROGRAMMING ASSIGNMENT 4: MACROS AND ASCII PROCESSING

WHAT TO TURN IN:

After correct operation of your program in Experiment 2 has been verified:

1. Save your assembly source file
2. Upload your assembly source file to Programming Assignment 4 submission box on Canvas
3. Have a great day!