EE2003: Computer Organization

Assignment - 2 : Subroutines, Delays, Loops,Stacks

Due date: Aug 18th 2017, 11:55pm IST

Note:

1. Please use moodle dicussion threads for posting your doubts after checking if the same question has been asked earlier.
2. Submit a single zip file in the moodle named as A2_Rollno.zip containing the .ASM file with proper comments along with .pdf file explaining formula used to generate the correct time delay from code.
3. Read the problem to fully to understand the whole procedure.

PROBLEM

The goal of this assignment is to implement delay subroutine and understand the importance of stack. You need to change the parameters in the subroutine to arrive at the required time delay. Each student has to refer to the attached excel sheet to know the clock frequency, method and required time delay to generate.

Clock Frequency Three clock frequencies 1MHz, 3MHz and 5MHz are provided in the excel sheet. Each student need to select only one among the three corresponding to your roll number in the excel sheet for calculation of delay

Delay Methods There are four methods for generating delay, each of them is briefly explained below.You need to implement only one of these methods for this assignment. Kindly refer to the excel sheet and select the method corresponding to your roll number.

1. **Register Pair** You need to create a delay subroutine that can be called from main program. Within the subroutine you need to create a loop. Use any one of the (HL/BC/DE) register pair only. Assign values to registers in that pair to create the required delay. Refer text book for more details.

2. **Nested Loop** You need to create a delay subroutine that can be called from the main program. Within the subroutine you need to create a nested loop. Use only 8 bit register for both inner and outer loop. Again do not use the same register for both inner and outer loop. Assign values to the 8 bit registers of both inner and outer loop to obtain the required delay based on the clock frequency selected.

3. **Nested Subroutine** You need to create a subroutine that can be called from the main program. Within this subroutine create loop using only 8 bit register. Within this loop you have to make call to second delay subroutine. Use only 8 bit register for the second subroutine. Again do not use the same register for both subroutines. Assign values to the two 8 bit registers such as to obtain the required delay based on the clock frequency selected.

4. **Loop with NOP** You need to create a delay subroutine that can be called from the main program. Within the subroutine you need to create a loop with only 8bit register. Within this loop introduce 2 to 4 NOP statements. By changing the value of 8bit register and varying the number of NOP statements, try to obtain the required delay, based on the clock frequency selected.

Time Delay You need to generate the required time delay as close as possible to the value given in the excel sheet corresponding to your roll number. Use the clock frequency and the method corresponding to your roll number in the excel sheet. The formula used to calculate should be clearly mentioned in your one page report (.pdf file).

Main PROGRAM

1. Initialize stack pointer and all registers before calling the delay routine.
2. IN order to initialize the accumalator and flag registers do the following. Add two numbers 0xFE and 0x01. Then call thedelay routine. Report the output of the Flag and Accumulatorin your one pagereprt file.
3. Now call the subroutine for the required time delay using one of the four methods. Call this subroutine immediately after the addition operation. Report the values of the Flag and Accumulator registers after returning from the subroutine.

LINKS TO SOFTWARE

You can use any one of the assemblers for writting 8085 assembly language program. Some are listed below. But make sure to submit properly commented .ASM file for this assignment.

1. **GNUSim8085 :** Works in both Windows as well as Linux. Check the link below. Ubuntu users can download from repository itself.
   https://gnusim8085.github.io/download
2. **Sim8085 :** Works inly in windows. Check the link below.
   http://www.homesoft.gen.tr/sim8085
3. **Jubin's 8085 Simulator :** Works only in windows. Requires Java to be installed. Has minor bugs too. Check the link below.
   https://8085simulator.codeplex.com/
4. **MASM32 :** Works only in windows. This is a command line software without any gui. Check this blog for more details.
   https://imabhishekgarg.wordpress.com/category/assembly-language-masm-programming/

–end–