İzmir Katip Çelebi University

Department of Electrical and Electronics Engineering

EEE316 Microprocessors

Spring 2020

Experiment I

Assembler and Simulator

Pre-Lab Report

- o Please study related topics in reference notes.
- o Answer the questions under the lab activities. Prepare report in the specified format. Reports must be completed before coming to lab.
- o Submit your report to CANVAS until February 26, 23:59.

Experimental Work

- o Please explain your code step by step to instructors during lab hours.

Lab Objectives

- o To examine and use MPLAB assembler and simulator
- o To examine and use the simple instructions for programming in assembly
- o To examine the flag bits of status register

References

- o Lecture notes
- o Mazidi, McKinlay, Causey "PIC Microcontroller and Embedded Systems," Chapter 2
- o Youtube page of the course:
  https://www.youtube.com/channel/UCLTMwkstUd4a7r8U1h_caaw/videos?view_as=subscriber

Lab Activities

1. Write and assemble a program to load value 25H to the WREG register. Then, move it from the WREG to the FileReg location 20H. Next, move the largest hex value that can be moved into an 8-bit register to 21H location. Then subtract the value at 20H location from the value at 21H location (you can use WREG). Store the result to any random FileReg location.
   Use the MPLAB simulator to single-step the program and examine the FileRegs.

2. Write and assemble a program to add these numbers: 15H, b'11011001' and D'16'. Write the summation result in FileReg 0x35 location. Next, increment the summation result and save it in FileReg 0x36 location. Then, decrement the summation result and save it FileReg 0x37 location.

Use the MPLAB simulator to single-step the program and examine the FileRegs.

3. Consider your date of birth in a day, month and year format (--/--/----) with 8 digits. Assume that all numbers in your date of birth are in hex format. Separate all numbers in 2 digits (e.g. date is 02/02/2020 and two groups are 02, 02, 20, 20). Save these four numbers in FileReg between 0x10 and 0x13. Sum these numbers one by one and keep the result in WREG. Examine the status of the C, DC, Z, OV and N flags after the execution of each addition and note the status of the flags (C, DC, Z, OV and N flag values) to your pre-lab report.

4. Write and assemble a program to load the smallest and the largest two-digit decimal prime numbers into 15H-16H FileReg locations (after hexadecimal conversion). Then, complement each value in these locations and overwrite the results in the same location. Then, sum each result with 01H value and overwrite the result in the same location again. Observe the relationship between the numbers before complementing and numbers after complementing and adding 01H. Write your comment on your pre-lab report.