ECE 3731 Experiment-2
(Memory Dump: Loops and memory access)

Lab Instructor: Azeem Hafeez

Email: azeemh@umich.edu

Contents

1 Goal

Learn to write basic programs with loops and memory access.

2 Outcome of the lab

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1. To learn about memory access
2. To learn about loops
3. To learn terminal I/O
4. To learn about flowcharts

3 Pre-Lab Question

Write a program to print all alphabets from A to Z.

4 Lab description

In this experiment, you have to develop a program as outlined below. It is recommended that you develop this program in progressive phases as is indicated below. Parts (a),(b),(c) represent progressively more difficult requirements.

4.1 Part (a)

Save the following numbers in memory starting from 0x1000.

$3A,$3B,$5F,$6F,$8E,$9D,$8B,$81,$1B,$1C,$1E,$16,$18,$19,$18,$18,$2A,$1,$3,$4

Write a program that will print the contents of 20 successive memory locations (data values) starting at 0x1000. The output (data values) should be in hexadecimal and there should be a space printed between the values.

Save this project folder as Lab2A.

4.2 Part (b)

Make a copy of Project folder Lab2A. The requirement is same as in part(a), except you should pause for the user to press the space bar between the outputs. Your program should print a value, wait for the user to press the space bar and then print the next value and so on. Note that your program should ignore all the keystrokes except the space bar.

Save this project folder as Lab2B.

4.3 Part (c)

Make a copy of Project folder Lab2B. Same requirement as above ((a) and (b)), except you should maintain a counter.The counter should be initially one, and incremented after each output. Your program should print the value of the counter in decimal and then print the value in memory (in hexadecimal) with the character : as separator.

e.g. Prints 01:3A 02:3B 03:6F 04: 8E 05:9D ....

Submit the code from your well commented .asm file from your project in your report. You must also have in your report a flowchart for your program. Please note that your report consists of a single document as.PDF.

Save this project folder as Lab2C.

5 Useful I/O Functions

The following functions are useful for I/O

5.1 TermInit

This function must be called near the beginning of the program before any other terminal I/O functions are called.

5.2 putchar

This function prints a single character to the terminal. The character to be printed must be placed in B register first.

5.3 getchar

This function waits for the user to press a key on the PC keyboard. (The keyboard is considered to be the input part of the terminal.) When a key is finally pressed its ASCII character code is placed in B register. e.g.

5.4 out2hex

This function prints two ASCII characters that correspond to the hex digits in register B.

5.5 printf

This is a function that prints a string to the terminal. (The use of format specifiers (e.g. It is assumed that D register has a pointer to the string to be printed before the function is called.
All characters in the string are printed until the zero termination is

6 Post Lab Questions

1. Briefly explain what the overall purpose of this program is and complete the memory table below which should show what is in memory after the program has been run.
(e.g. Purpose: finds largest of five numbers)

```
        ORG   $1000
TABLE   DC.B  $18, $39, $E1, $8B, $15

        ORG   $2000
        LDX   #TABLE
        LDAB  #5
LOOP    LDAA  0, X
        STAA  5, X
        INX
        DBNE  B, LOOP
        BRA   *
```

$1000	
$1001	
$1002	
$1003	
$1004	
$1005	
$1006	
$1007	
$1008	
$1009	

2. Assuming you have the same data section as in the above, write a program that adds 1 to each of the five numbers in memory. This must be done using a program loop.

3. What is the difference between "For", "While" and "Do While" loop?

7 Submission Deadline:

As announced on canvas