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ECE 427: Microcomputer Architecture Lab

Experiment #3

Chapter #3 Lab Supplement: For Loop and Compare Instruction

Performed: 10/1/2013

Submitted: 10/8/2013

Objective:

- Write a program to search a list of 20 unsigned numbers (positive) and find the maximum value and its location within the list.
- Also find the minimum value and its location within the list.

Word Description:

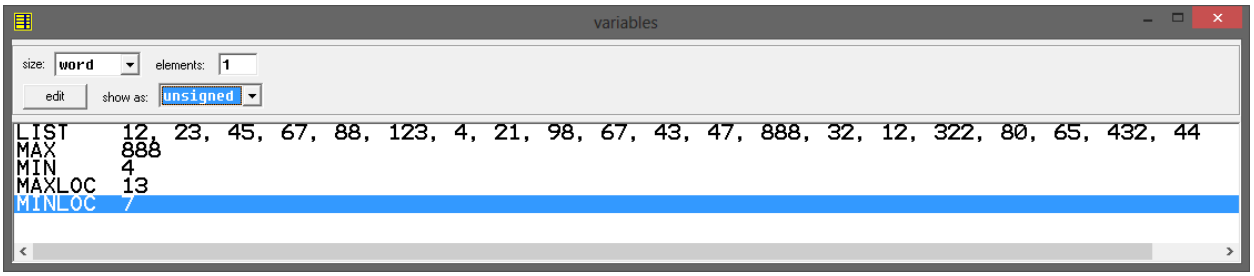
In this lab, gained practical experience with iterating through a list of information, and comparing the values within loops.

Code & Screenshots:

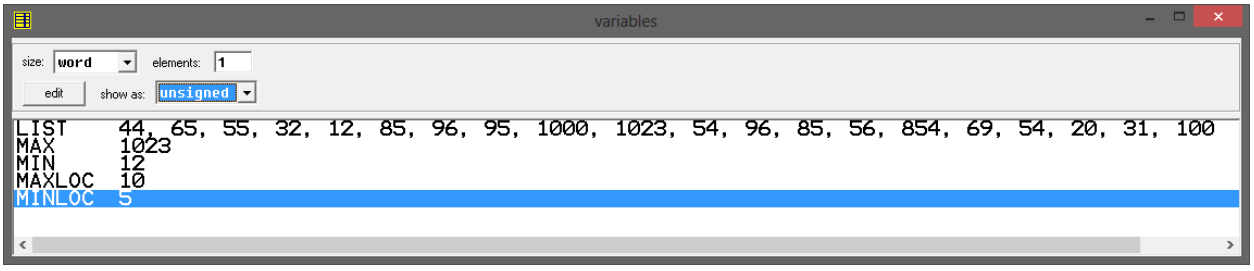
```
org 100h
.data
LIST DW 44,65,55,32,12,85,96,95,1000,1023,54,96,85,56,854,69,54,20,31,100
MAX DW 00
MIN DW 00
MAXLOC DW 0
MINLOC DW 0

.code
MAIN   PROC FAR
    MOV AX,@DATA
    MOV DS,AX
    MOV CX,20
    MOV BX,OFFSET LIST
    SUB AX,AX ;AL will hold the highest number
    SUB DX,DX ;AH will hold the location of the highest number
AGAIN1:CMP AX,[BX]
    JA NEXT1
    MOV AX,[BX]

    ;GET LOCATION
    MOV DX,21
    SUB DX,CX

NEXT1: INC BX
    INC BX
    LOOP AGAIN1
    MOV MAX,AX
    MOV MAXLOC,DX

 ;REPEAT FOR THE MIN
    MOV AX,@DATA
    MOV DS,AX
    MOV CX,20
    MOV BX,OFFSET LIST
    SUB AX,AX ;AL will hold the lowest number
    SUB DX,DX ;AH will hold the location of the lowest number
    MOV AX,[BX] ;SET the first list value as the minimum
    MOV DX,1 ;SET the location of the min to be the first value
AGAIN2:CMP AX,[BX]
    JB NEXT2
    MOV AX,[BX]
```

```
    ;GET LOCATION
    MOV DX,21 ;One more than the number of items in the list
    SUB DX,CX ;Subtract the Counter Value from 21 and store

NEXT2: INC BX
    INC BX
    LOOP AGAIN2
    MOV MIN,AX
    MOV MINLOC,DX

    MOV AH,4CH
    INT 21H
MAIN   ENDP

ret
```

Data Set 1:



Data Set 2:



Conclusion & Comments:

In this lab, we were able to iterate through a list, finding the minimum and maximum values (of unsigned ints) in the list. We also were able to find the location of those data elements within the list. We also were introduced to the compare statements, and also gained more experience with looping and use of the registers. This lab specifically gave us experience with looping over words rather than bytes, and the need to increment the pointer twice, rather than once when working with 16-bit words.