

CS221 Assembly Language

Lab 2

ADAPTED FROM PROF. MOHAMED BEN OTHMAN LAB 1

Objectives

- Defining bytes, words, and double words.
- Using the 16- and 8-bit register parts.
- Moving data between registers and memory locations.
- Defining and printing character strings.

Practice

Data declaration:

Use the given program template shown in Figure 1 to declare the variety of data declaration we studied in the Intro to Assembly slides.

```
TITLE Flat Memory Program Template    (Template.asm)

; Program Description:
; Author:                      Creation Date:
; Modified by:                 Modification Date:

.686
.MODEL FLAT, STDCALL
.STACK

INCLUDE Irvine32.inc
.DATA
    ; (insert variables here)
.CODE
main PROC
    ; (insert executable instructions here)
    exit
main ENDP
    ; (insert additional procedures here)
END main
```

Figure 1

Use your slides to:

- A- Declare a **byte** with different forms. Use slide 22.
- B- Declare a **word** in different forms. Use slide 27.
- C- Declare a **dword** variable. Use slide 27.
- D- Declare a string (remember strings must use **"byte"**). Use the code on the slides 24-25.

Exercises

E- Fix the warnings.

32-bit	16-bit	8-bit (high)	8-bit (low)
EAX	AX	AH	AL
EBX	BX	BH	BL
ECX	CX	CH	CL
EDX	DX	DH	DL

32-bit	16-bit
ESI	SI
EDI	DI
EBP	BP
ESP	SP

Figure 2

- F- Move the values declared in A, B, and C to registers of a suitable size. See Figure 2 for the registers. Use the debugger to compare the memory and register values.
- G- Try to swap some of the values defined in A, B, and C. Can you `mov` memory to memory? What about operands of different sizes?
- H- Printing a string:

To print a string, you should declare this string (buffer) as byte, For example:

```
buffer byte "This is a string!", 0ah, 0dh, 0
```

Note: "0ah, 0dh" is used to print a new line.

Add in the code the following two lines:

Then, put the address of the string in the register `edx`

```
mov  edx, OFFSET buffer
```

Finally, call the procedure `WriteString`:

```
call WriteString
```

- I- What is the value of `edx`?
- J- Print the registers by calling the procedure `DumpRegs`.