

# Assembly Language

## Assignment 2

### **Part 1: Chapter 2 Review Questions (10 Points)**

- Individual task, every student should submit to the section Instructor.
- **Due:** Next Section (one night before if you submit by email)

**Section 2.1.5:** All (Book, page 35)

**Section 2.2.5:** 1, 3, 4, 5, 6, 15, 16 (Book, page 42)

**Section 2.3.3:** 1, 2, 3, 5, 12 (Book, page 47)

### **Part 2: Lab (10 Points)**

**In this part you will figure out a simple Assembly language environment, common registers, and memory organization. First, apply the environment configuration to install an assembly utility called “Debug”. Then perform the exercise after.**

- Group Task (Max 3 students), The instructor should review the task within the lab.
- **Due:** Next Section.

#### **Environment configuration:**

- For 32bit “x86” Windows (mostly winxp)
  - Start the command prompt [run utility>cmd]
  - Run the following command “debug”.
- For 64 bit windows
  - Download DosBox ( [download](#) )
  - Download debug.rar ( [download](#) )
  - Extract debug.rar to specific drive for example D:\
  - Install and start DosBox and mount drive D as following [ mount d d:\ ↵ ] *hint: note that C drive is mounted by default*
  - Change directory to drive D as following [ d: ↵ ]
  - Run the command “debug”

#### **Exercise: Write a report with snapshots for the following procedure**

1. Run the command [ ? ↵ ] to list all the available commands with “debug” program
2. Run the command [ r ↵ ] to list all the available registers
3. Record the contents of the following registers (CS, DS, IP, Flags: over flow, zero, carry) *Check hint 1*
4. Run the command [ a 100 ↵ ] then write the following assembly instructions:

```
mov ax, 0001 ↵  
sub ax, 0001 ↵  
add ax, 0002 ↵  
sub ax, 0003 ↵  
add ax, 7fff ↵  
add ax, 7fff ↵
```

5. Press Enter again after the last instruction to end the " a " command
6. Record the address in front of each instruction in the previous program
7. Run the command [ p =100 ↵ ] to execute the first instruction at address 100
8. Record the contents of the following registers (AX, CS, DS, IP, and Flag: over flow- sign-zero- carry).
9. Run the command [ p ↵ ] 5 times to execute all the program instructions. In each time, record the contents of the following registers (AX, CS, DS, IP, and Flag: over flow – sign- zero- carry).
10. Run the command [ d 100 ↵ ] to dump (display) part of the memory contains the previous program.
11. From the first line in the dump, what is the machine code of the instruction (sub ax, 0003 ) ?

*Hint 1: The following figure show the default values of the flags register*

```

-r
AX=0000 BX=0000 CX=0000 DX=0000 SP=00FD BP=0000 SI=0000 DI=0000
DS=073F ES=073F SS=073F CS=073F IP=0100  NU UP EI PL NZ NA PO NC
073F:0100 B80100      MOV     AX,0001

```

Over flow	Sign	Zero	Carry
-----------	------	------	-------

*Hint 2: for further help use the following tutorial*  
[http://kipirvine.com/asm/debug/Debug\\_Tutorial.pdf](http://kipirvine.com/asm/debug/Debug_Tutorial.pdf)