

Assembly Language

Assignment 2

Part 1: Chapter 2 Review Questions

- 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

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 (3-5 students), The instructor should review the task within the lab.
- **Due:** Thursday, 30 Oct.

Environment configuration:

- a. For 32bit “x86” Windows (mostly winxp)
 - i. Start the command prompt [run utility>cmd]
 - ii. Run the following command “debug”.
- b. For 64 bit windows
 - iii. Download DosBox ([download](#))
 - iv. Download debug.rar ([download](#))
 - v. Extract debug.rar to specific drive for example D:\
 - vi. Install and start DosBox and mount drive D as following [mount d d:\ ↵] *hint: note that C drive is mounted by default*
 - vii. Change directory to drive D as following [d: ↵]
 - viii. 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
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Hint 2: for further help use the following tutorial
http://kipirvine.com/asm/debug/Debug_Tutorial.pdf