CS 271Computer Architecture and Assembly Language

Self-Check for Lecture #3

Solutions

1. What's wrong with the following data segment?

```
.data
x_value     DWORD       5
7Eleven     BYTE        "My job",0
X_VALUE     DWORD       500
Age   ;user's age;      DWORD       ?
```

`x_value` and `X_VALUE` are the same variable, since MASM is not case-sensitive.
`7Eleven` is an invalid variable name (can't start with a digit)
`Age ;user's age; DWORD ?` The first semi-colon makes all of the rest of the line into a comment.

2. The following data segment starts at memory address 1400. What is the address of each variable?

```
.data
myName      BYTE        "Elmer Fudd",0   ;Address = 1400, size = 11
yourName    BYTE        30 DUP(0)        ;Address = 1400+11 = 1411, size = 30
myAge       DWORD       45               ;Address = 1411+30 = 1441, size = 4
yourAge     DWORD       ?                ;Address = 1441+4 = 1445, size = 4
myScore     DWORD       ?                ;Address = 1445+4 = 1449, size = 4
yourScore   DWORD       ?                ;Address = 1449+4 = 1453, size = 4
```

3. Why is it a good idea to implement a program's output first?

As soon as the output is displayed, you can check to see if it fulfills layout specifications. The greatest advantage, however, is that the rest of the program development will be much easier to debug, since results will be displayed as the program's processes are implemented.

4. What's the result of the following code fragment?I.E., what registers are changed?

```
mov   eax,100
cdq
mov   ebx,13
div   ebx
```

Registers changed:
eax contains 7 (integer quotient of 100 / 13)
ebx contains 13 (assigned, unchanged by division)
edx contains 9 (integer remainder of 100 / 13)

Given the following constant definition and data segment:

```
MY_CREDITS = 12
.data
x     DWORD       12
y     DWORD       13
z     WORD        25
```

5. What's wrong with the following code segment statements?

```
mov   ebx, z                  Size mismatch
mov   y, x                    Can't move memory to memory
mov   ebx, MY_CREDITS         nothing wrong here
mov   MY_CREDITS, ebx         Can't assign to a constant
```

Given the following data segment:

```
.data
intro_1          BYTE       "Welcome, "
username         BYTE       "Fred."
intro_2          BYTE       "What's up?"
count            DWORD      0
```

6.What is displayed by the following code segment statements?

```
mov         edx, OFFSET intro_1
CALL        WriteString
CALL        CrLf
mov         edx, OFFSET username
CALL        WriteString
CALL        CrLf
mov         edx, OFFSET intro_2
CALL        WriteString
CALL        CrLf
```

```
Welcome, Fred.What's up?
Fred.What's up?
What's up?
```

Each call to WriteString displays memory until a zero is encountered.