Lab 3 - Memory

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CS311 - Computer Architecture 1

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The third laboratory exercise continues on the second exercise which requires you to assign and transcribe different data types in **yasm** assembly language.

Please create a file named `memory.asm` in ebe (or in any text editor of your choice).

Using the codes from Chapter 2 and 3, create two segments as `.data` and `.bss` in your file.

Question 1 - `.data` section.

The first exercise requires you to code different numbers in the `.data` segment. There are generally four different types:

- `db` - byte (1 byte)
- `dw` - word (2 bytes)
- `dd` - double word (4 bytes)
- `dq` - quad word (8 bytes)

The task is the following:

1. Choose a number within this range $(2^5 - (2^7 - 1))$. Allocate this number using the four different types of `db`, `dw`, `dd` and `dq`. Use labels `a`, `b`,`c` and `d`.
2. Assign the string "This is CS311 course" using `dw`. Use label `e`.
3. Choose a floating point number within this range $(2^4 - 2^6)$. Use at least three decimal points (non-zero values). Allocate this number using the `dd` type. Use label `f`.
4. Assign an array of 30 words, initialized to 5. Use label `g`.
5. Given the number 673456_D, assign it using the minimum data type in base-16. Use label `h`.

Question 2 - `.bss` section.

The second exercise requires you to reserve different numbers in the `.bss` segment.

1. Reserve an array of 25 double words. Use label `i`.
2. Reserve an array of 100 bytes. Use label `j`.
3. Reserve 20 words. Use label `k`.

Computation

Use either the **ebe** interface or command line (makefile) to generate the machine code as `memory.lst`. In this file, you will have three fields (columns). The first columns is the memory locations, the second columns is the values translated into base-16, however reversed. The third columns is the instructions itself.

For all instructions in Question 1 and 2, compute the memory displacement and verify it with column 1. Save this computation in the file `computation.doc`. Show all working.

Submission

The student must submit the following separate files to canvas:

1. `memory.asm`
2. `memory.lst`
3. `computation.doc`

The three files must be submitted through Canvas by 5pm October 14, 2016. The penalty for late submission is 10% for 1 day, 20% for 2 day, after which it will be zero. The grading rubric is given in Table 1.

Table 1: Grading rubric

File	Aspects	Points
`memory.asm`	Compiles	5
	Correct values used	25
	Documentation	10
`memory.lst`	Submission	5
`computation.doc`	Correct translation of memory	35
	Detailed explanation	20