

COE 205 Computer Organization & Assembly Language

Assignment 2 Solution

Data Definition and Data Related Operators

Q1. (3 pts) Declare a 32-bit signed integer variable and initialize it with the smallest possible negative decimal value.

Solution:

```
dval    SDWORD    -2147483648
```

Declare an uninitialized array of 100 16-bit unsigned integers.

Solution:

```
warray  WORD      100 DUP(?)
```

Declare a string variable containing the word "COE205" repeated 20 times, and terminated with the null char.

Solution:

```
mystr   BYTE      20 DUP("COE205"),0
```

Q2. (7 pts) Show the content of the individual bytes allocated in memory (in hexadecimal) for the following declarations. Assuming that the address of *I* is **404000h**, what are the addresses of *J*, *K*, and *L*? What is the total number of allocated bytes?

```
.DATA
I    SBYTE    1, -1
J    SWORD    10FFh, -256
K    DWORD    23456h
L    BYTE     'COE205'
```

Solution:

	I		J		K				L							
404000h	01h	FF	FF	10	00	FF	56	34	02	00	43	4F	45	32	30	35

Address of J = 404002h

Address of K = 404006h

Address of L = 40400Ah

Total allocated bytes = 16

Q3. (10 pts) Given the following definitions:

```
.DATA
wval      LABEL    WORD
barray    BYTE     10h, 20h, 30h, 6 DUP (0Ah)
ALIGN 4
warray    WORD     5 DUP(1000h)
pressKey  EQU      <"Press any key to continue ...",0>
darray    DWORD    5 DUP(56789ABh),
                7 DUP(12345678h)
dval      LABEL    DWORD
prompt    BYTE     pressKey
```

What will be the value of EAX, AX, and AL after executing each of the following instructions? Assume that the address of *barray* is **404000h**.

- a) `mov eax, TYPE warray`
Answer: `eax = 2`
- b) `mov eax, LENGTHOF barray`
Answer: `eax = 9`
- c) `mov eax, SIZEOF darray`
Answer: `eax = 48`
- d) `mov eax, OFFSET warray`
Answer: `eax = 40400Ch`
- e) `mov eax, OFFSET darray`
Answer: `eax = 404016h`
- f) `mov eax, OFFSET prompt`
Answer: `eax = 404046h`
- g) `mov eax, DWORD PTR barray`
Answer: `eax = 0A302010h`
- h) `mov al, BYTE PTR darray`
Answer: `al = ABh`
- i) `mov ax, wval`
Answer: `ax = 2010h`
- j) `mov eax, dval`
Answer: `eax = 73657250h = 'Pres'`