KING FAHD UNIVERSITY OF PETROLEUM AND MINERALS
COLLEGE OF COMPUTER SCIENCE AND ENGINEERING
COMPUTER ENGINEERING DEPARTMENT

COE 205 - Term 061
Assignment #2

Problem 1 (40 points: Each question 5 points)

Q.1

Consider the following:

```
Var1  BYTE  15 DUP(2, 3, 5 DUP(11, 12))
```

This statement will:

A. Allocate 150 bytes in memory
B. Allocate 180 bytes in memory
C. Allocate 75 bytes in memory

Q2, 3 and 4

Consider the following:

```
.data
      Var1  BYTE  12h, 13h, 14h, 15h, 16h, 17h, 18h, 19h
      Var2  LABEL       WORD
      Var3  LABEL       DWORD
      Num   EQU   5
      Var4  BYTE  22h, 23h, 24h, 25h, 26h, 27h, 28h, 29h
```

Q.2

What is the value contained in AX after the execution of the following statement:

```
MOV   AX, OFFSET Var3
```

A. 0008h
B. 000Ah
C. 0001h

Q.3

What is the value of register BX after the execution of the following instruction:

```
MOV   BX, Var2+6
```

A. 2726h
B. 2827h
C. 2928h

Q.4

What is the value of register EBX after the execution of the following instruction?

```
MOV   EBX, Var3
```

A. 29282726h
B. 25242322h
C. 27262524h

Q5, 6, 7 and 8

Consider the following:

```
.data
     Var1  BYTE  0Ch, 0Dh, 0Eh, 0Fh
     Var2  WORD  0Ch, 0Dh, 0Eh, 0Fh
     Var3  DWORD 0Ch, 0Dh, 0Eh, 0Fh
     Msg   BYTE  'Virtually'
```

Q.5

Compute the address that should be used to access the letter 'V' in the word 'Virtually'

The address is 4 bytes + 4 word + 4 double words = 4 + 8 +16 = 28d = 001Ch

Q.6

Compute The address that should be used to access the second 'l' of the word 'Virtually'.

The address is Address of letter 'V' + 7 = 28 +7 = 35d = 0023h

Q.7

What is the value of the register AX after the execution of the following instruction:

```
MOV   AX,   Var2+2
```

A. 000Ch
B. 0C0Dh
C. 000Dh

Q.8

What is the value of the register EAX after the execution of the following instruction:

```
MOV   AX,   TYPE  Var3
```

A. 2
B. 4
C. 8

Problem 2 (40 points)

Consider the following:

```
.data
      Table1      BYTE  8, 10h, 9, 20h, 10, 23h, F6h, 22h, 16h
      NumE        EQU   LENGTHOF Table1
      Array       DWORD 01h, 02h, 03h, 04h
```

1. Consider the following statement: (10 points)

   ```
   MOV   EAX, NumE
   ```

   The addressing mode of operand NumE is:

   A. Direct
   B. Immediate
   C. Register

   Justify your answer:
   The NumE label is defined as an EQU statement which is used to define constants and do not have any representation in memory. So NumE is a value and not a memory location. Therefore, any reference to it is made as a reference to a constant.

2. Consider the following statement: (10 points)

   ```
   MOV   NumE, EBX
   ```

   Is this a correct statement?

   A. Yes.
   B. No.

   Justify your answer.
   It is impossible and not consistent to have a constant as a destination for a MOV operation.

3. Consider the following statement: (10 points)

   ```
   MOV   EAX,  Table1 + LENGTHOF Table1
   ```
   is equivalent to:
   ```
   MOV   EAX   Array
   ```

   Is this correct?

   A. Yes.
   B. No.

   Justify your answer:
   Because Table1 is defined before Array, so the location pointed to by Table1 + LENGTHOF Table1 is actually the same as Array1. This is also possible because the statement that defines NumE does not generate any reservation in memory.

4. We want to move the second word in the double word “Array” to the register BX. Write the statement that will achieve that. (10 points)

```
MOV   BX    WORD PTR Array+2
```

Problem 4 (30 points)

Consider the following data allocation statements:

```
.data
      Var1        BYTE  0Ch, 0Dh, 0Eh, 0Fh
      Var2        WORD  0Dh, 0Eh, 0Fh, 0Ah
      Var3        DWORD 0Eh, 0Fh, 0Ah, 0Bh
      Var4        LABEL  WORD
      Var5        LABEL  DWORD
      Msg         BYTE  'Virtually'
      Table1      BYTE  5 DUP(27,35h)
```

Please fill the content of the following table to show the effect of the statements above.

Label	Address	Data	Label	Address	Data
Var1	0000	**0Ch**		0018	**0Bh**
	0001	**0Dh**		0019	**00h**
	0002	**0Eh**		001A	**00h**
	0003	**0Fh**		001B	**00h**
Var2	0004	**0Dh**	**Var4; Var5; Msg**	001C	**'V'**
	0005	**00h**		001D	**'i'**
	0006	**0Eh**		001E	**'r'**
	0007	**00h**		001F	**'t'**
	0008	**0Fh**		0020	**'u'**
	0009	**00h**		0021	**'a'**
	000A	**0Ah**		0022	**'l'**
	000B	**00h**		0023	**'l'**
Var3	000C	**0Eh**		0024	**'y'**
	000D	**00h**	**Table1**	0025	**1Bh (= 27d)**
	000E	**00h**		0026	**35h**
	000F	**00h**		0027	**1Bh**
	0010	**0Fh**		0028	**35h**
	0011	**00h**		0029	**1Bh**
	0012	**00h**		002A	**35h**
	0013	**00h**		002B	**1Bh**
	0014	**0Ah**		002C	**35h**
	0015	**00h**		002D	**?**
	0016	**00h**		002E	**?**
	0017	**00h**		002F	**?**