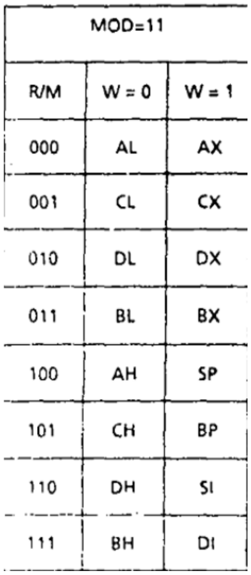
EE213 Computer Organization and Assembly Language
Quiz III (GR1) Solution – Spring 2018
April 30, 2018
Paper: **A**

1. Encode the given instructions, provide hex-decimal values only (8 Points):



MOD=11		
R/M	W = 0	W = 1
000	AL	AX
001	CL	CX
010	DL	DX
011	BL	BX
100	AH	SP
101	CH	BP
110	DH	SI
111	BH	DI

Instruction	Opcode
MOV	1000 10dw
ADD	0000 00dw
SUB	0010 10dw
OR	0000 10dw
XOR	0011 00dw
AND	0010 01dw
PUSH (16 bits)	50h
POP(16 bits)	58h

```
XOR AL, AH
```

0011 0000 11 100 000

=30 E0 h

```
PUSH BP
```

50h + 05

= 55 h

```
ADD AL, 0BAh
```

0000 0010 + 00

02 + 00 ← BA

= 02 BA h

```
POP DI
```

58 h + 07 h

= 5F h

2. Elaborate the following parameters of .model directive: (4 Points)
-Stack Distance -Memory Model

Answer:
Stack distance specify whether or not stack is maintained on Data Segment.
Memory Model specify the physical storage considerations of a program; in how many physical segments a program will be stored.

3. Elaborate through an example, how does `LODSB` differ from `STOSB`? (4 Points)

Answer: **LODSB** instruction loads a BYTE from memory at ESI into AL whereas **STOSB** instruction store the contents of AL in memory at the offset pointed to by EDI
e.g. **FREE RESPONSE**

4. Using string primitive instructions, replace each element of given array by its mathematical square, assume any valid type for array1. (4 Points)

array1 =

11	12	13	14	15	16	17	18	19	20

Solution:

```
.data
    array BYTE 11,12,13,14,15,16,17,18,19,20
.code
    main PROC
    cld
    mov esi,OFFSET array
    mov edi,esi
    mov ecx,LENGTHOF array
    L1: lodsb                   ; load [ESI] into AL
    mul AL                      ; AL^2
    stosb                       ; store AL into [EDI]
    loop L1
```