108 組合語言與系統程式
(Assembly Language and System Programming)
期中考 Midterm Exam

學號(Student ID)： 姓名(Name): 日期(Date)：09:10~12:00, 04/27/2020

1. **Please list four examples of system software. (10%)**
   Ans:

2. **(a) What is a compiler? (b) What is an assembler? (10%)**
   Ans:

3. **Please list the following units from fast to slow.**
   (RAM, Register, L2 Catch, L1 Catch, Hard Disk) (6%)
   Ans:

4. **What is the purpose of EIP? (4%)**
   Ans:

5. **Consider the double word DWORD 34125678h. If placed in memory at offset 0000, please show the memory layout. (Hint: The computer system uses little endian order.) (10%)**
   Ans:

6. In the following instruction sequence, show the values of the Carry, Zero, and Sign flags where indicated: (15%)

```
mov ax,00FFh
add ax,1       ; a) AX=      SF=  ZF=  CF=
sub ax,1       ; b) AX=      SF=  ZF=  CF=
add al,1       ; c) AL=      SF=  ZF=  CF=
mov bh,6Bh
add bh,45h     ; d) BH=      SF=  ZF=  CF=
mov al,5
sub al,6       ; e) AL=      SF=  ZF=  CF=
```

Ans:				
a)	AX =	SF =	ZF =	CF =
b)	AX =	SF =	ZF =	CF =
c)	AL =	SF =	ZF =	CF =
d)	BH =	SF =	ZF =	CF =
e)	AL =	SF =	ZF =	CF =

7. What will be the values of the given flags after each operation? (4%)

```
mov al,-128
neg al            ;a) CF =    OF =
mov ax,8000h
add ax,2          ;b) CF =    OF =
mov ax,4
sub ax,8          ;c) CF =    OF =
mov al,-10
sub al,+121       ;d) CF =    OF =
```

Ans.		
a)	CF =	OF =
b)	CF =	OF =
c)	CF =	OF =
d)	CF =	OF =

8. What will be the value in EAX after following lines execute? (6%)

```
mov eax,1002FEFAh
neg ax   ;  1) EAX=
```

Ans:

Ans.	
1)	EAX =

9. Write down the hexadecimal value of each destination operand: (10%)

```
.data
arrayB  BYTE   10h,20h,30h,40h
arrayW  WORD   2000h,3000h,5000h
arrayD  DWORD  5,6,3,8

myByte BYTE 0FFh, 0
.code
mov eax,0
mov al,arrayB+3          ; 1) AX  =
mov eax,[arrayD+8]       ; 2) EAX =
mov ax,[arrayW+4]        ; 3) AX =
mov al,myByte            ; 4) AX =
mov ah,[myByte+1]        ; 5) AX =
dec ah                   ; 6) AX =
inc al                   ; 7) AX =
dec ax                   ; 8) AX =
mov ax,00FFh
inc al                   ; 9) AX =
add ax,0FEBFh            ; 10) AX =
```

Ans:	
1)	AX =
2)	EAX =
3)	AX =
4)	AX =
5)	AX =
6)	AX =
7)	AX =
8)	AX =
9)	AX =
10)	AX =

10. Indicate the hexadecimal value of AL after each shift. (10%)

```
mov al,0D4h
shr al,1              ;1) AL=
mov al,0A8h
sar al,1              ;2) AL=
shl al,3              ;3) AL=
mov al,8Ch
sar al,3              ;4) AL=
sar al,1              ;5) AL=
```

Ans:	
1)	AL =
2)	AL =
3)	AL =
4)	AL =
5)	AL =

11. Translate the following expression into assembly language. (15%)

Rval = 35 * Wval + Xval - (-Yval + Zval) + 8

Ans:

```
.code
```