EE213 Computer Organization and Assembly Language
Quiz II (Section F) – Fall 2018
October 29th, 2018
Solution Paper-B

1. The `DATE` field of a file directory entry uses bits `0` to `3` for the `DAY`, bits `4` to `7` for the `MONTH`, and bits `8` to `15` for the `YEAR`. Write instructions to copy the DAY to a byte variable `bDay`. **(4 Points)**

```
MOV     AX, DATE
MOV     DX, 0
SHRD    DX, AX, 4
SHR     DH, 4
MOV     bDay, DH
```

2. In the following instruction sequence, show the resulting value of **AL** where indicated, in hexadecimal: **(4 Points)**

```
mov al,10h
not al                  ; a.0EFh
mov al,31h
and al,74h              ; b.30h
mov al,9Bh
or al,53h               ; c.0DBh
mov al,18h
test al,81h             ; d.18h
mov al,7Ah
xor al,0CDh             ; e.0B7h
```

3. Given that EAX = 01h, EBX=02h, ECX=03h, EDX = 00h, ESP = 0FFFh. Fill in the following table. Provide only the hex-decimal values **(8 Points)**

```
      main PROC
0001  SAL AL, 2
0002  PUSH EAX
0003  PUSH EBX
0004  CALL f1
0005  DIV CL
      main ENDP
```

```
      f1 PROC
000C  STC   ;CF = 1
000D  TEST AX,00h
000E  RCL AL,2
000F  CALL f2
0010  ret
      f1 ENDP
```

```
      f2 PROC
0017  MUL BL
0018  INC EDX
0019  PUSH EDX
001A  PUSH EBX
001B  POP EDX
001C  POP EBX
001D  ret
      f2 ENDP
```

```
      main PROC
0001  SAL AL, 2
      ;EAX=4
0002  PUSH EAX
      ;ESP:FFB
0003  PUSH EBX
      ;ESP:FF7
0004  CALL f1
      ;ESP:FF3
```

```
      f1 PROC
000C  STC
      ;CF=1
000D  TEST AX,00h
      ;EAX=4,CF=0
000E  RCL AL,2
      ;EAX=16d,10h
000F  CALL f2
      ;ESP:FEFh
```

```
      f2 PROC
0017  MUL BL
      ;AX:32
0018  INC EDX
      ;EDX = 01
0019  PUSH EDX
      ;ESP:FEBh
001A  PUSH EBX
      ;ESP:FE7h
```

```
0005  DIV CL
      ;AH=2,AL=0Ah
      main ENDP
```

```
0010  ret
      ;ESP:FF7
      f1 ENDP
```

```
001B  POP EDX
      ;ESP:FEBh,DX=02
001C  POP EBX
      ;ESP:FEFh,BX=01
001D  ret
      ;ESP:FF3
      f2 ENDP
```

	EIP	ESP	EAX	EDX
After f2 completes execution	**0010h**	**0FEFh**	**0020h**	**0002h**
After main completes execution	**---**	**0FF7h**	**020Ah**	**0002h**

4. Write a valid assembly language *prototype* and an *Invoke* for the following C++ function:
`void compare(short *result_ptr, char *ptr1, int word2, char ch)`

(2 Points)

```
compare PROTO, result_ptr: PTR WORD, ptr1:PTR BYTE, word2:DWORD, ch: BYTE

INVOKE compare, ADDR mem16, ADDR mem8, mem16, mem8
```

5. Write some ASM code to replace the contents of Accumulator with its mathematical cube (x^3)

(2 Points)

```
MOVZX BX, AL
MUL AL
MUL BX
```