NAME WASEEM KHAN

ID NO 14306

SUBJECT ASSEMBLY LAN

SUBMit Mr. AMIN

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Q1 what will be the value of the destion opesand after each of the following instructim execute in sequence?

```
data
Val1    WORD  1000h
Val2    WORD  2000h
```

Solutim:-

(a) CX = 009Bh
(b) CX = 009Bh
(C) Val2 = 1000h
(d) Al = 20h
(e) AX = 200h
(f) EAX = 20000h

Q2 write down the values of destination oprands and flags after the execution of each instruction:

Code:

```
mov  CX, 1
Sub  CX, 1
```

Solution:-

(a) CX = 0, ZF = 1
(b) CX = -1, SF = 1
(c) AL = 00, CF = 1
(d) AL = FF, CF = 1
(e) AL = 80h, OF = 1
(f) CF = 0, OF = 1

Q3 What will be the value of EAX after each of the following instruction execute?

```
data
myBytes   BYTE 10h, 20h, 30h, 40h
myWords   WORD 3 DUP(?), 2000h
myString  BYTE "ABCDE"
```

Solution:-

```
mov eax, TYPE myBytes;  a. 1
mov eax, LENGTHOF myBytes;  b. 4
mov eax, SIZEOF myBytes;  c. 4
mov eax, TYPE myWord;  d. 2
mov eax, LENGTHOF myWord;  e. 4
mov eax, SIZEOF myWord;  f. 8
mov eax, SIZEOF myString;  g. 5
```

Q4 write down the value of each destination operand:

Solution:-

```
.data
val32 LABEL DWORD
varB BYTE 78h, 56h, 34h, 12h
val8 LABEL BYTE
varD DWORD 12345678h
.Code
move bl, BYTE PTR varD; (a) BL=78h
mov al, val8 ; (c) AL=78h
mov eax, DWORD PTR varB; (b) EAX=
78563412h
mov eax, val32; (d) EAX = 12345678h
```

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Q5 what will be the value of the destination operand after each of the following instruction execute in sequence?

```
data
myBytes     BYTE 10h, 20h, 30h, 40h
mywords     WORD 8Ah, 3Bh, 72h, 44h, 66h
myDoubles   DWORD 1,2,3,4,5
```

Solution.

```
mov al, [esi+3] ; b. AL = 40h
mov esi, OFFSET myword+2 ; C. AX=003Bh
mov edi, 8
mov edx, [myDoubles+edi] ; d. EDX=3
mov edx, myDoubles[edi] ; e. EDX=3
```

Q6 Part a:-

Convert the Character in Al to upper Case.

Solution:-

Use the AND instruction to Clear

```
mov al,'a'      ; Al = 01100001b
al , 11011111b  ; Al = 01000001b
```

Q6 Part b:-

Convert the binary decimal byte into its equivalent ASCII decimal digit.

Solution:-

Use the OR instruction:-

```
mov al,6        ; Al = 00000110b
OR
al,00110000b    ; Al = 00110110b
```

The ASCII '6' = 00110110b.

Q6 Part C:-

Jump to label L1 if bits 0, 1, and 3 in assembly language and explain:

Solution:-

Clear all bits except bits 0, 1 and 3
Then Compare the result with 00001011
and a1, 00001011b ; Clear unwanted bits
Cmp a1, 00001011b ; Check remaining bits
je L1, ; all Set? jump to L1

Try to

* write code that jumps to label L1 if either bit 4, 5, or 6 is Set in the BL register.
* write code that jump to label L1 if bit 4, 5 and 6 are all Set in the BL register.
* write code that jump to label L2 if AL has even Parity.

* write code that jump to label L3 if EAX is negative.
* write code that jump to label L4 if the expression (EBX-ECX) is greater than Zero

Q7 write each of the following Pseudocode in assembly language and explain:

a) if (var1 <= var2)
    var3 = 128;
else
{
    var3 = 110;
    var4 = 90;
}

```
cmp var1, ecx
jna else
cmp ecx, edx
jna else
mov x:0,1
jmp next
else: mov x:2
next.
```

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Q7 Part b:-

if (val1 > ecx) or (ecx > edx then

X = 30

else

X = 40;

Solution:-

```
cmp  ebu, ecx
 ja  L1
cmp  ebx , val1
 ja  L1
mov X,2
jump next
L1 ; mov X,1
next
```

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Q7 Past C:-

```
while (eax < ebx)
    eax = eax+1;
```

Solution:-

```
top : Cmp eax , ebx ; Check loop Condition
jae next            ; false? exit loop
inc eax             ; body of loop
jmp top             ; Repeat the loop
next:
```

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Q8 Part a:-

write a Sequence of Statments that use only PUSH and POP instruction to exchange the values in the EAX and EBX registers?

write a Sequence of Statment that use only PUSH and POP instructions to exchange the value in the EAX and EBX registers	PUSh ebX PUSh eax POP ebX POP eax

Q8 b) write a program with a loop and indirect addressing that copies a string from Source to target, reversing the character order in the process. use the following variable:
Source BYTE "This is the source string",0
target BYTE SIZEOF Sourse DUP('#')

- Solution:-

```
.386
.model flat StdCall
.stack 4096
ExitProcess PROTO, dwExitCode.
.data
Source BYTE "This is the Source
String",0
target BYTE SizEOF Source
.Code
main PROC
mov esi,0
mov edi, LENGTHOF Source 1
```

```
mov ecx, SIZEOF Source

L1:
    mov eax,0
    mov edial ,Source [esi]
    mov target [edi],al
   inc esi
   dec edi
  loop L1

INVOKE Exit Process,0
main ENDP
END main
```

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Q8 Part C:-

write a program that displays a String in all .... also use a delay of 1s in each foreground colour change?

Solution:-

```
INCLUDE Irvine32.inc
.data
loopcount DWORD?
foreground DWORD?
background DWORD?
.code
main PROC
mov ecx, 16 ; outer loop count
L1:
mov loopcount, ecx
mov foreground, ecx
```

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dec forceground ; forceground initial value = 15 decrements by 1 each time repeats

mov ecx 16 Inner loop Count

L2

mov forceground ecx

dec background . Background initial value = 15 decrements 1 each loop repeats

mov eax background . Set EAX = back ground

Shif eax. 4 . shift equivelent to multiplying EAX by 16

add eax foreground : Add forceground to EAX

Call Sellectcolor

mov al 'A' : Set Al to Charactest So written to Screen.

```
Call writechar: write The Character in
Al to Screen
loop L2
Call Crif. Advance cursor to
begining of next line
mov ecx loopcount
loop L1
Exit
 main ENDP
 END main
```