Assembly Language

Assignment 9

- **You don't have to submit this assignment**

Q1) Trace the following program manually then answer the questions:

```
1   INCLUDE Irvine32.inc
2
3   .data
4   string BYTE "ABCDEFGHIJKLMNOPQRSTUVWXYZ",0
5   stringSize = ($ - string) - 1
6
7   .code
8   main PROC
9
10          mov    ecx,stringSize
11          mov    esi,0
12
13  L1:     movzx ax,string[esi]
14          push   ax
15          inc    esi
16          loop L1
17
18          mov esi,esp
19          mov ecx,stringSize
20          mov ebx,2
21          call dumpmem
22          call crlf
23
24          mov    ecx,stringSize
25          mov    esi,0
26  L2:     pop ax
27          mov    string[esi],al
28          inc    esi
29          loop L2
30
31          mov  edx,OFFSET string
32          call Writestring
33          call Crlf
34
35          exit
36  main ENDP
37  END main
```

A. What does this program do? And what is the expected output?
B. Run this program using MASM and compare the output with your answer.
C. Why the memory dump contains numbers?
D. Explain the new order of the output string.
E. Change line 13 into "mov ax, string[esi]", run the program and explain the result.
F. Change line 14 into "push al", run the program and explain the result.
G. Change line 20 into "mov ebx,1", run the program and explain the output.

Q2) Using Irvine 32.lib, write a complete assembly language program with a procedure to print the Factorial of integer number entered by the user. Consider that the factorial (!) of number (x) is:

x!= x*(x-1)*(x-2)* … * 1 (e.g. 3!= 3*2*1)

Q3) Indicate whether the following statements are syntactically correct or incorrect in MASM. If incorrect, indicate what is wrong with the statement:

a)
```
.if (number = 0)
        add number,2
.endif
```

b)
```
.if count >= 0 then
        sub count,2
.else
        add count,3
.endif
```

c)
```
.if x-1
        dec x
.endif
```

d)
```
if01: cmp x,y   ;try to find first what is the purpose of cmp, and jle
endif01: nop
jle endif01
then01: inc x
```

Wish you all a GOOD LUCK ☺