Assembly Language

Assignment 5.**A**

- Group task.
- **Due:** Thursday, 18 Dec. **(**one night before if you submit by email**)**

Q1) (5 points) Convert the following program into assembly program:

```
#include <stdio.h>
int main()
{
        int volts, ohms, amperes;
        printf("\n%s", "Enter the number of volts: ");
        scanf("%d", &volts);
        printf("%s", "Enter the number of ohms: ");
        scanf("%d", &ohms);
        amperes = volts / ohms;
        printf("\n%s%d\n\n", "The number of amperes is: ", amperes);
        return 0;
}
```

Q2) (5 points) Using Irvine 32.lib, write a complete assembly language program 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)

Find Q3 in the next Page.

Q3) (10 points) Trace the following program manually then answer the questions:

```
1   INCLUDE Irvine32.inc
2
3   .data
4   list byte 76h,5h,50h,14h,2h
5   temp dword 0;
6
7   .code
8   main PROC
9          call Clrscr
10
11         mov ecx, lengthof list
12         l1:
13                mov temp,ecx
14                mov esi,ecx
15                dec esi
16
17                .if ecx>1
18                       jmp print
19                .endif
20
21                dec ecx
22                l2:
23                       mov edi,ecx
24                       dec edi
25
26                       mov al, list[esi]
27                       .if al<list[edi]
28                              xchg al,list[edi]
29                              mov list[esi],al
30                       .endif
31                loop l2
32
33                mov ecx,temp
34         loop l1
35
36         print:
37         mov esi, offset list
38         mov ecx, lengthof list
39         mov ebx, 1
40         call dumpmem
41
42         exit
43  main ENDP
44  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. What is the purpose of the “temp” variable?
D. What is the purpose of the “If condition” start at line 17?, Remove lines 17,18, and 19. Then test the program with MASM to help you find the answer.
E. What is the purpose of “ESI” and “EDI” in this program?
F. What is the purpose of decrementing ESI at line 15?
G. Is it possible to dispense “AL” and change the instruction at line 28 to “xchg list[esi],list[edi]”. Try it with MASM and report what will happen.