

# Assembly Language

## Assignment 5

- Group task (max. 3 students).
- **Due:** Next section. (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:

$$x! = x * (x-1) * (x-2) * \dots * 1 \quad (\text{e.g. } 3! = 3 * 2 * 1)$$

**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

```

- What does this program do? And what is the expected output?
- Run this program using MASM and compare the output with your answer.
- What is the purpose of the “temp” variable?
- 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.
- What is the purpose of “ESI” and “EDI” in this program?
- What is the purpose of decrementing ESI at line 15?
- 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.