

Computer Science 03-60-266 Midterm Examination

Wednesday February 23rd 2005

Dr. Alioune Ngom

Last Name:

First Name:

Student Number:

INSTRUCTIONS

- EXAM DURATION IS 80 MINUTES.
- OPEN NOTES EXAM: **lecture notes, textbook, lab notes and 266 former exams only.** Nothing else allowed.
- READ ALL QUESTIONS CAREFULLY BEFORE ANSWERING.
- Write **all** answers and scrap works in the space provided. Use **no** other paper.
- There are 5 questions (15 minutes/question). Answer **all** of them.
- There are 10 pages. Count them before you start.
- Calculators are allowed.
- If you need to make any assumptions, state them clearly with your answers.
- Write your answer neatly. Messy work is very hard to read and may cause you to lose marks.

#1	#2	#3	#4	#5	Total
10	10	10	20	10	60

Question #1. (10 marks) Using **Shift** and/or **Rotation** instructions, write an ASM program that transforms the content of register **BX** as follows. The content of register **BH** becomes a mirror-image of the content of register **BL**; for example, if **BX** = 01101001 00000111, then the program will return **BX** = 11100000 00000111.

Question #2. (10 marks) Write an ASM program that transforms an array `Vec`, of word elements, as follows. The second half of `Vec` becomes a mirror-image of its first half; for example, if `Vec = "11112223 12345678"`, then the program will return `Vec = "11112223 32221111"`. Assume the array has an even length N . Also, `Vec` should be the only array in the program.

Question #3. (10 marks) For each of the following instructions below, give the hexadecimal content of the destination operand as well as the values of the status flags **CF** and **OF**, after execution of the instruction.

1. SUB AL, BL, when AL = 5Eh and BL = E5h
2. SUB AH, BH, when AH = F6h and BH = 6Fh
3. ADD AL, BL, when AL = 78h and BL = 89h
4. ADD AH, BH, when AH = 98h and BH = 87h

Question #4. (20 marks) Assuming the data segment starts at address 00000000h, fill in the memory map (table below) for the following data definitions:

```
.data
X LABEL WORD
A DD    FEDCBA98h
Y LABEL BYTE
B EQU   -3
C DW    -7, 89ABh
Z LABEL DWORD
D DB    "-7", 'Ch'
```

	----- 0 -----	----- 1 -----	----- 2 -----	----- 3 -----
-- 0000 --				
-- 0004 --				
-- 0008 --				
⋮				

What is the offset address of

X

A

Y

and C?

(if any)

For each of the following instructions, give the value of the final destination operand, if possible:

1. MOV AX, WORD PTR D+1
XOR AH, BYTE PTR Z-1

2. MOV AX, [X]
SAR AL, 1

3. LEA EAX, Y
MOV BH, [EAX+B]

4. XCHG [A+3], DWORD PTR C

Question #5. (10 marks) Translate the following pseudo-code into ASM code

```
AX = 0;
While Not (AX = 999) Do
  AX = AX + 1;
  If [(29 * (AX+1)) % 16] == 0 Then
    AX = (AX+1) / 16;
    Exit loop;
  Else
    AX = 16 * (AX+1);
EndWhile;
Print(AX);
```

Space for Scrap Work

Space for Scrap Work

Space for Scrap Work

Space for Scrap Work

Space for Scrap Work

Space for Scrap Work