MIDTERM EXAM

For full credit show all work and justify all answers.

You are allowed 4 pages (=2 sheets) of 8.5"x11" set of prepared notes.

1. **(5+5 POINTS)**

   Give one sentence explanations of these terms:

   (a) BIOS

   (b) Register indirect mode

2. **(5+5 POINTS)**

   What are the physical addresses of the first and last byte in the segment whose number is 1234h?

3. **(5+5 POINTS)**

   Give the decimal interpretation of the 12-bit number 8FEh:

   (a) As an unsigned number.

   (b) As a signed number.

4. **(15 POINTS)**

   Assume a program has the following declarations at the beginning of the data segment, i.e. at offset 0000h.

   ```
   var1  DB  -1
   var2  DB 'ABCD'
   var3  DW 0ABCDh
   ```

   Draw a picture of memory at the beginning of the data segment, labeling the memory locations, the locations of the variables, and the contents of each byte.

5. **(5+5+5 POINTS)**

   For each of the following registers, name one instruction that *implicitly* uses the register. Also say how the instruction uses the register.

   (a) CX

   (b) SP

   (c) AX

6. **(10 POINTS)**

Consider the code fragment:

```
.DATA
Values DB    5, 0FFh, 6, 7
...
.CODE
...
MOV AX, WORD PTR Values
MOV CL, 8
SAR AX, CL              ; shift arithmetic right
Contd:
...
```

What is the contents of AX when the execution reaches Contd? Assume there is no jump into Contd.

7. **(15 POINTS)**

Upon execution of the instruction `ADD AX,BX` the following status flags have the values

`CF=1, OF=1, ZF=1, SF=0.`

What can you say about the contents of registers AX and BX just before the execution? Are the values in AX and BX uniquely determined? Are the flag conditions redundant?

8. **(20 POINTS)**

Write the assembly language statements corresponding to the following pseudo-Pascal code:

```
if ( ax < 0)
  then  if (ax > -10)
           then cx :=  0
           else cx := -1
        end_if
  else cx := 1
end_if
```