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| **Cairo University** | **CMPN201** | **Total: 20 Points** |
| **Faculty of Engineering** | **Microprocessor Systems** | **2015-2016** |
| **Computer Eng. Department** | **Midterm Exam** | **One Hour** |

**This is an open-book, open notes exam. All electronic devices - Except calculators - are forbidden.  
Make any reasonable assumptions (if necessary)  
Answer the following questions**

1. [2] Increasing the data bus width increases …………………………………………………………..
2. [4] What is the function of the following programs

|  |  |
| --- | --- |
| MOV AL, N  DEC N  LBL: MOV BL, N  MUL BL  DEC N  JNZ LBL | MOV AX, A  MOV BX, B  MUL BX |
| ……………………………………………….. | ……………………………………………….. |

1. [4] Allocate syntax errors of the following program

|  |  |
| --- | --- |
|  | Reason |
| MOV SI, offset VAR1 |  |
| MOV DI, offset VAR1+10 |  |
| REP LOADSB |  |
| MOV CL,[AX] |  |
| MOV BL,[2AD1H] |  |
| MOV AX,BL |  |
| MOV CL,[SI][DI]+10 |  |
| MOV CX, [BP] |  |

1. [4] Write a single instruction for each of the following operations. Note that no other changes should occur.
   1. Invert bits number 0, 5, 10, and 15 in AX:
   2. Divide the content of AX by 16:
2. [2] Identify the operand addressing mode used in each of these instructions.
   1. ADD DX,15
   2. CMP WORD PTR [BX+DI],10
3. [10] Compatibility between the later and the earlier microprocessors has been a successful strategy for the Intel family. Give two distinct examples of the modifications that demonstrate this compatibility.
4. [3] Suppose you had a different processor that was designed and operated similarly to the 8086/8088 architecture with the following differences: All of the registers are 8-bit registers, and the physical address (PA) is a 10-bit number.
   1. Given what you know about the 8086/8088 architecture, what would be the size of the total addressing space on this new device?
   2. Given what you know about 8086/8088 addressing, what would be the size of the “offset window” at each segment location through which you could address memory?
5. [4] What is the content of AX after executing each of the following codes?

|  |  |
| --- | --- |
| MOV AL,00000011B  MOV BL,10000000B  MUL BL | MOV AL,00000011B  MOV BL,10000000B  IMUL BL |

1. [2] 10101101 = ……….. [as an unsigned number] and 10101101 = ……….. [as a signed number]
2. [4] Write a program that draws a red filled square on a white background starting at 100,100. Each side is 50px length.
3. [4] Write a program that merges two sorted lists into a new list.
4. [3] A computer manufacturer announced for a machine with 16 KB video memory and supports 800\*600 resolution. How many different colors does it support?

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