COSC 2329

Dr. Tim McGuire

**EXAM #1**

*Sample*

1. Name the advantages of programming in assembly language.

Extremely difficult to write

Efficiency of language

1. Name the disadvantages of programming in assembly language.

Extremely difficult to write

1. What is another name for the register ax?
2. What is another name for the register cx?

Extremely difficult to write

For the next 4 problems, assume that A, B, and C are 16-bit signed integers stored in memory

1. Translate the assignment statement **C = A + B** into assembly language.
2. Translate the assignment statement **A = – (A + 1)** into assembly language.
3. Translate the assignment statement **A = A - B** into assembly language.
4. Translate the assignment statement **C = A + B + B - 42** into assembly language.
5. Perform the indicated operations using 8-bit two's complement arithmetic and indicate the sum and the state of **CF**, **OF**, **SF**, and **ZF**.

**a) 01010101 b) 01111111 c) 11111111 d) 10101010**

**+10101011 +01111111 +11111111 +10110001  
  
 CF = \_\_\_\_ CF = \_\_\_\_ CF = \_\_\_\_ CF = \_\_\_\_**

**OF = \_\_\_\_ OF = \_\_\_\_ OF = \_\_\_\_ OF = \_\_\_\_**

**SF = \_\_\_\_ SF = \_\_\_\_ SF = \_\_\_\_ SF = \_\_\_\_**

**ZF = \_\_\_\_ ZF = \_\_\_\_ ZF = \_\_\_\_ ZF = \_\_\_\_**

1. Convert C42B16 to binary:
2. Express 319 as a base 3 number.
3. Convert the signed 16-bit binary number 1111111111111101 2 to base 10.
4. Convert 0111 0100 1100 0010 from binary to hexadecimal.
5. Write the truth table for the XOR operation.
6. Convert **–2** to 8-bit binary using:
   1. sign-magnitude
   2. 1’s complement
   3. 2’s complement
7. Express **1000000100101010010011112**
   1. as an octal number
   2. as a hexadecimal number
8. Suppose a program contains the lines

**call proc1**

**mov ax,bx**

and: (a) instruction **mov ax,bx** is stored at **7300**h; (b) **proc1** is a procedure that begins at **address ABCh**; (c) **sp** = **00F2**h. What are the contents of **ip** and **sp** just after **call proc1** is executed? What word is on top of the stack?

1. Suppose **sp** = **01FA**h and the top of the stack = **2046**h. What are the contents of **ip** and **sp** after **ret** is executed?
2. Suppose **al** contains **11010010**b and **cf** = **0**. Give the new contents of **al** and **cf** after each of the following instructions is executed. Assume the preceding initial conditions for each part of this question.

**shl al, 1**  
 **shr al, 1**  
 **ror al,cl** if **cl** contains 2  
 **sar al, cl** if **cl** contains 2  
 **rcr al, 1**  
 **rcl al, cl** if **cl** contains 3

1. Give a logic instruction to do each of the following:
   1. Clear bits 0 and 7 of **al**, leaving the other bits unchanged.
   2. Set bits 0, 2, 4, 6, 8, 10, 12, and 14 bits of **bx**, leaving the other bits unchanged.
   3. Complement the least significant bit of **dl**, leaving the other bits unchanged.
   4. Replace the value of the byte variable BYTE1 by its one's complement.
2. Using shift instructions, multiply the **ax** register by 8. Assume unsigned arithmetic.
3. Using shift instructions, divide the **bx** by 4. Assume signed arithmetic.
4. Write assembly code for the following decision structure:

**while ax** > 1 **do**

divide**ax** by 2*using a signed shift instruction*

**endwhile**

1. Write a procedure which will accept a character as input in **al**. If it is a lowercase letter, convert it to uppercase; otherwise, leave it unchanged.
2. Write assembly code for the following loop structure:

**for** 100 times **do**

*increment* **ax** *by one*

**endfor**

1. Translate the following into Intel assembly language assuming that all variables are 16-bit signed integers in memory:
   1. **a = b \* c;**
   2. **d = e/f; g = e % f;**
   3. **h = i – j\*k/m;**