**CSCI 360-1 More Midterm Exam Study Questions Spring 2019**

**X**

**Decimal, Binary, and Hexadecimal Number Systems**

**Convert the following UNSIGNED numbers:**

Decimal Binary Hexadecimal

1236 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 10 0001 1010 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 3058

**Do the following UNSIGNED integer arithmetic:**

BINARY: 1 1 0 1 1 1 0 0 0 0 1

+ 1 1 1 0 - 1 1 1 0 1

HEXADECIMAL 2 A F 9 4 9 C 3 E

+ 4 1 8 D - 3 B 8 7 0

**Do the following two's complement arithmetic and determine if overflow occurred:**

3 2 8 A C 1 0 5 7 8 E E B C 0 5

+ 7 F 8 4 6 9 5 1 - 2 0 0 9 8 7 0 1

**Dump Reading**

Answer the following questions using the given PSW and memory contents. Be sure to give the address answers in hexadecimal.

PSW AT ABEND FFC50006 A0000018

REGS 0-3 F4F4F4F4 F4F4F4F4 F4F4F4F4 000009A1

REGS 4-7 F4F4F4F4 F4F4F4F4 F4F4F4F4 F4F4F4F4

REGS 8-11 F4F4F4F4 F4F4F4F4 F4F4F4F4 F4F4F4F4

REGS 12-15 F4F4F4F4 00000078 FFFE7960 00000000

Address Storage

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000000 5830F048 5A30F04C 5A30F050 5A30F054 5B30F058 5A30F05E 5B30F074 5030F060

000020 5830F06C 5A30F070 5030F068 5830F060 5B30F068 5030F064 E1600000 0000E060

000040 F0480030 07FEF5F5 00000695 00000156 000001BD 00000069 00000070 0000012C

000060 F5F5F5F5 F5F5F5F5 F5F5F5F5 00000447 00000159 000000F7 F5F5F5F5 00000000

000080 F5F5F5F5 F5F5F5F5 F5F5F5F5 F5F5F5F5 F5F5F5F5 F5F5F5F5 F5F5F5F5 F5F5F5F5

What is the address of the instruction that would have been executed next had the program not abended

on the current instruction? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

What is the length (in bytes) of the instruction that caused the abend? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

What is the condition code (in decimal)? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

What is the address of the instruction that caused the abend? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

What type of program interrupt occurred?

Number \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Write the instruction that caused the abend in EXPLICIT assembler language.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Explain, in detail, why the program abended.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Encoding / Decoding**

**Fill in the blanks in the assembly listing below, using IMPLICIT addressing where possible:**

LOCATION

COUNTER MACHINE SOURCE

VALUE (HEX) LANGUAGE LANGUAGE

000000 TEST CSECT

000000 USING TEST,15

\*

000000 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ L 3,NUM1

\*

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 5C20 F02C \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\*

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ D 2,FOURFIVE

\*

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ LR 4,2

\*

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 1A44 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\*

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 5940 F030 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\*

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ BC B'0100',AROUND

\*

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ LA 3,1(,3)

\*

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 5030 F038 AROUND \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ LNR 5,3

\*

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ ST 5,NQ

\*

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 07FE \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\*

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ NUM1 DC F'1685'

\*

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 00000001 ONE DC F'1'

\*

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ FOURFIVE DC F'45'

\*

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ TWOFIVE DC 2C'5'

\*

000038 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Q DS F

\*

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ NQ DS F

\*

END TEST

**Execution of instruction**

Using the provided register and storage contents, show the complete contents (n hexadecimal) after execution of the instruction. Results are NOT cumulative.

REGS 0-3 00000004 000000F9 00000000 000000A1

REGS 4-7 FFFFFFFF FFFFFFED 00000010 FF00014A

REGS 8-11 07007007 00000000 FFFFFFFF 00000060

REGS 12-15 F4F4F4F4 00000078 FFFE7960 00000000

USER STORAGE

000000 5830F048 5A30F04C 5A30F050 5A30F054 5B30F058 5A30F05E 5B30F074 5030F060

000020 5830F06C 5A30F070 5030F068 5830F060 5B30F068 5030F064 E1600000 0000E060

000040 F0480030 07FEF5F5 00000695 00000156 000001BD 00000069 00000070 0000012C

000060 F5F5F5F5 F5F5F5F5 F5F5F5F5 00000447 00000159 000000F7 F5F5F5F5 00000000

000080 F1F1F1F1 F2F2F2F2 F3F3F3F3 F4F4F4F4 F5F5F5F5 F6F6F6F6 F7F7F7F7 F8F8F8F8

AR 6,1 Reg 6 = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

M 2,=F'3' Reg 2 = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Reg 3 = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

LA 11,52(,11) Reg 11 = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

LPR 8,5 Reg 8 = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

DR 4,0 Reg 4 = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Reg 5 = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

L 1,12(6,0) Reg 1 = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Short Answer**

**For questions 1 - 6, write the assembly instructions to perform the following tasks. (Be sure to define any extra storage that you may need). Use literals only where necessary.**

1. Show two ways to initialize register 4 to the value 9.
2. Put the four bytes starting at address 12 (in decimal) into register 5.
3. Put the contents of register 9 into storage starting at address 88 (in hexadecimal).
4. Branch to the label HERE if the condition code is 1 or 3.
5. Put the value 146 into register 6 without using a literal.
6. Compare the contents of registers 4 and 8.

**For questions 7 - 10, answer the following questions.**

1. Assuming signed numbers, is 5FFFFFF7 positive or negative?

How can you tell? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2. Calculate the following D(X,B) address.

Register 0 = 00000005 Register 4 = 00000009

24(4,0) = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (provide answer in hex)

3. What registers will be multiplied using the following code? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

MR 8,5

Where will the answer be stored? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4. Where is the dividend located in the following divide instruction? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

DR 2,5

Where will the remainder be after execution of the instruction? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_