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CS 130

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Assignment #2

3.1 [5] <COD §3.2> What is $5ED4 - 07A4$ when these values represent unsigned 16-bit hexadecimal numbers? The result should be written in hexadecimal. Show your work.

3.2 [5] <COD §3.2> What is $5ED4 - 07A4$ when these values represent signed 16-bit hexadecimal numbers stored in sign-magnitude format? The result should be written in hexadecimal. Show your work.

3.3 [10] <COD §3.2> Convert $5ED4$ into a binary number. What makes base 16 (hexadecimal) an attractive numbering system for representing values in computers?

3.4 [5] <COD §3.2> What is $4365 - 3412$ when these values represent unsigned 12-bit octal numbers? The result should be written in octal. Show your work.

3.5 [5] <COD §3.2> What is $4365 - 3412$ when these values represent signed 12-bit octal numbers stored in sign-magnitude format? The result should be written in octal. Show your work.

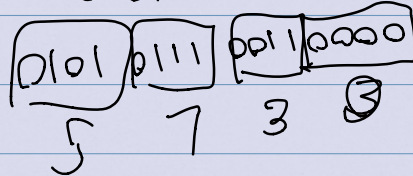
3.6 [5] <COD §3.2> Assume 185 and 122 are unsigned 8-bit decimal integers. Calculate $185 - 122$. Is there overflow, underflow, or neither?

3.7 [5] <COD §3.2> Assume 185 and 122 are signed 8-bit decimal integers stored in sign-magnitude format. Calculate $185 + 122$. Is there overflow, underflow, or neither?

3.8 [5] <COD §3.2> Assume 185 and 122 are signed 8-bit decimal integers stored in sign-magnitude format. Calculate $185 - 122$. Is there overflow, underflow, or neither?

$$3-1 \quad 5ED4 = 0101 \overset{5}{1110} \overset{E}{1101} 0100$$

$$07A4 = 0000 0111 1010 0100$$



in hexadecimal is equal 5730

3.1)

$$5ED4 \text{ base } 16 \rightarrow 0101 \text{ } 0111 \text{ } 1010 \text{ } 0100$$

07A4 base 16 to binary

$$5730 \text{ base } 16 \rightarrow$$

A - 10
F - 15

1
0000 represent base 2 in
base 16

because the maximum will get
to 1111 = D in base 16

33 converting SED4 into binary number to represent values in computer

$$\begin{array}{c} \text{SED4}_{16} \\ \downarrow \\ \text{13} \end{array}$$

$$(0101\ 1111\ 1101\ 0100)_2$$

Modern computer is operating at base 16
as computer are made from 32 bit & 64 bit

16×2 16×4

Hexadecimal represent large number compared to other system like decimal and binary

3.4) Octal = 8 required 000

3 813

4365

3912

$$(0753)_8 \rightarrow (000\ 111\ 101\ 011)_2$$

$$(0\ 7\ 5\ 3)_8$$

3.5 Signed 12 bit octal number

negative sign

base 7 24365 ①00 011 110 101

base 8 - 3412 (9) 11 100 001 010

positive
sign

↓ result is same
as 3.4

Negative number converted to 2's complement

result 000 111 101 011

0 7 5 2

2.6 Decimal integer

hoer 10 125 1011 1091

base 10 $\begin{array}{r} 122 \\ 263 \end{array}$ $\begin{array}{r} 0111 \\ 0011 \end{array}$ $\begin{array}{r} 1010 \\ 1111 \end{array}$

the range is $0 - 255$ the numbers are
in range so neither overflow nor
underflow happen.

3.7

hence $185 - 1100\ 0111$ in 4 bit signed (-71)

It is actually $-71 + 122 = 51$

$185 (-71) \rightarrow 1011\ 1001$

$+122 \quad 1000\ 0110$

$051 \quad 0011\ 0011$

by limiting using 4 bit storage
and the fact of the result in this case

$$3.8 \quad 145_{10} = 10111001_{\text{two}}$$

Since the first bit is 1 it is negative number
the magnitude is the remainder bit

$$57_{\text{ten}} = 0111001_2$$

$$\text{the second number is } 122_{\text{ten}} = 01111010_{\text{two}}$$

$$-57 + 122 = 65$$

65 neither

||| -ten's complement

A. 72 B. 5 C. 999 E. 6234

10's complement

A 0099 B 0095 C 0001 D 10000 - 6234

3766