Sitthiphol Yuwanaboon

John O'Neal

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 5ED4 = 0101 1110 1101 0100

07A4 = 000 0111 1010 0100

0101 0111 0011 0000

5 7 3 0

in hexidecimal is equal 5730

3.2)

5ED4 base

07A4 base 16 0101 0111 0011 0000

to binary

5730 base 16 →

A – F

10 – 15

0000 represent base 2 in base 16

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

33 converting 5ED4 into binary number to respresent values in computer

5ED4 16
13

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

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 1000

3 3+3
4 3 6 5
3 4 1 2

$(0753)_8 \rightarrow (000\ 111\ 101\ 011)_2$
$(0\ \ 7\ \ 5\ \ 3)_8$

3.5 signed 12 bit octal number

negative sign

base 8   2365   100 011 110 101

base 8   -3412   011 100 001 010

positive sign

result is same as 3.4

negative number converted to 2s complement

result   000 111 101 011

0 7 5 3

3.6 Decimal integer

base 10   185   1011 1001

base 10   -122   - 0111 1010

063

0011 1111

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

3.7

Hence 185 → 1100 0111 in a bit signed (−71)

It is actually −71+122 = 51

185 (−71) → 1011 1001

+122 1000 0110

051 0011 0011

by limiting using 8 bit storage and the fact of the result in this case.

3.8 $185_{ten} = 10111001_{two}$

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

$57_{ten} = 0111001_2$

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

$-57 + 122 = 65$

65 neither

III. ten's complement

A. 72 B. 5 C. 999 E 6234

10's complement

A 0024 B 0005 C 0001 D $10000 - 6234$

$\boxed{3766}$