Lab # 3.

$7^4\ 7^3\ 7^2\ 7^1\ 7^0$

#1. a → 12345_7

$= (7^4 \times 1) + (7^3 \times 2) + (7^3 \times 3) + (7^2 \times 4) + (7^1 \times 5)$

$= 2401 + 686 + 147 + 28 + 5$

$= 3267_{10}$

b → $16^3\ 16^2\ 16^1\ 16^0$

$2\ A\ A\ 3_{16}$

$= (16^3 \times 2) + (16^2 \times A) + (16^1 \times A) + (16^0 \times 3)$

$= (16^3 \times 2) + (16^2 \times 10) + (16^1 \times 10) + (16^0 \times 3)$

$= 8192 + 2560 + 160 + 3$

$= 10915_{10}$

$16^1\ 16^0$

c → i) $4B_{16}$ → base 10

$= (16^1 \times 4) + (16^0 \times B)$

$= (16^1 \times 4) + (16^0 \times 11)$

$= 64 + 11$

$= 75_{10}$

ii) $4B_{16}$ → base 2

4 B

$= 0100\ 1011_2$

iii) $4B_{16}$ → base 2 → base 8

1 1 3 $= 113_8$

$001\ 001\ 011_2$

#1.d → 1011_{10} → base 16

1011 ÷ 16 = 63 (.1875 x 16) = 3
63 ÷ 16 = 3 (.9375 x 16) = 15
3 ÷ 16 = 0 (.1875 x 16) = 3

$= 3F3_{16}$
$= 0011\,1111\,0011_2$

e → 0xEE $= 1110\,1110_2$

$= (16^1 \times 14_{10}) + (16^0 \times 14_{10})$
$= 224 + 14$
$= 238_{10}$

#2 → 17_{10} sur 5 bits.

$2^4 + 2^0 \rightarrow 10001_2$

#3. a → 0110_2 a à . z sur 5 bits.

$= 2^3 + 2^2 + 2^0$
$= 8 + 4 + 1$
$= 13_{10}$

b → 10011_2

$= (-2^4) + (2^1) + (2^0)$
$= -16 + 2 + 1$
$= -13_{10}$

#4. a → $3,15_{10}$ → base 2

i) $3_{10} = 2^1 + 2^0 = 11_2$

ii) $0,15_{10}$ = base 2 = $0,00100110011100\ldots_2$

$0,15 \times 2$
$= 0,3 \times 2$
$= 0,6 \times 2$
$= 1,2 \times 2)$
$= 0,4 \times 2$
$= 0,8 \times 2$
$= 1,(6 \times 2)$
$= 1,(2 \times 2)$
$= 0,4 \times 2$
$= 0,8 \times 2$
$= 1,(6 \times 2)$
$= 1,(2 \times 2)$
$= 0,4 \times 2$
$= 0,8 \ldots$

$3,15_{10} = 11,00100110011100\ldots_2$
$= 1,10010011001100\ldots \times 2^1$

$e = 1 + 1023 = 1024 = 2^{10} = 10000000000$

$\underbrace{0}_{s}\ \underbrace{10000000000}_{e}\ \underbrace{10010011001100\ldots}_{f}$