Conversion between different Numbering systems

① Decimal to Binary

Ex1: $(5)_{10} = (\quad)_2$

Ex2: $(13)_{10} = (\quad)_2$

Ex3: $(17)_{10} = (\quad)_2$

Ex4: $(111)_{10} = (\quad)_2$

Ex5: $(1105)_{10} = (\quad)_2$

Ex6: $(3701)_{10} = (\quad)_2$

Ex6: $(51, 25)_{10} = (\quad)_2$

Ex7: $(23, 6)_{10} = (\quad)_2$

Ex8: $(100, 15)_{10} = (\quad)_2$

Ex9: $(0, 8)_{10} = (\quad)_2$

② Binary to Decimal

Ex1: $(1101)_2 = (\quad)_{10}$

Ex2: $(001111)_2 = (\quad)_{10}$

Ex3: $(11101011)_2 = (\quad)_{10}$

Ex4: $(1111111111000111100)_2 = (\quad)_{10}$

Ex5: $(111001, 111001)_2 = (\quad)_{10}$

Ex6: $(001001110111, 1111111)_2 = (\quad)_{10}$

Ex7: $(0000000000\ 001\ 00000, 1110)_2 = (\quad)_{10}$

Ex8: $(0, 000000\ 1\ 0000)_2 = (\quad)_{10}$

Ex9: $(0, 111111111111)_2 = (\quad)_{10}$

③ Decimal to Hexadecimal

Ex1: $(73)_{10} = (\quad)_{16}$

Ex2: $(2)_{10} = (\quad)_{16}$

Ex3: $(0002)_{10} = (\quad)_{16}$

Ex4: $(513)_{10} = (\quad)_{16}$

Ex5: $(999)_{10} = (\quad)_{16}$

Ex6: $(137)_{10} = (\quad)_{16}$

~~Ex7: (illegible)~~ Ex7: $(98)_{10} = (\quad)_{16}$

Ex8: $(98,5)_{10} = (\quad)_{16}$

Ex9: $(110,9)_{10} = (\quad)_{16}$

Ex10: $(371,89)_{10} = (\quad)_{16}$

Ex11: $(521,3)_{10} = (\quad)_{16}$

(4) Hex to Decimal

Ex1: $(13A)_{16} = (\quad)_{10}$

Ex2 $(AB)_{16} = (\quad)_{10}$

Ex3: $(ABCDEF)_{16} = (\quad)_{10}$

Ex4: $(BCDFEA)_{16} = (\quad)_{10}$

Ex5: $(17D)_{16} = (\quad)_{10}$

Ex6: $(10)_{16} = (\quad)_{10}$

Ex6 $(12)_{16} = (\quad)_{10}$

Ex7: $(AB,CD)_{16} = (\quad)_{10}$

Ex8) $(CD,EF)_{16} = (\quad)_{10}$

(4) Binary to Hex

Ex1: $(1110111111111)_2 = (\quad)_{16}$

Ex2: $(0011111110001)_2 = (\quad)_{16}$

Ex3 = $(1111, 1110)_2 = (\quad)_{16}$

Ex4 = $(011101, 0001)_2 = (\quad)_{16}$

Ex5: $(1110101)_2 = (\quad)_{16}$

Ex6: $(11111111111111111111)_2 = (\quad)_{16}$

Ex7: $(000111110001111100011111, 111111)_2 = (\quad)_{16}$

Ex8: $(1110111011111, 00111011101111)_2 = (\quad)_{16}$

Ex9: $(0001, 0001)_2 = (\quad)_{16}$

Ex10 = $(1101, 1101)_2 = (\quad)_{16}$

(5) octal to Decimal, Binary and Hex

Ex1: $(73)_8 = (\quad)_{10} = (\quad)_2 = (\quad)_{16}$

Ex2: $(17710)_8 = (\quad)_2 = (\quad)_{10} = (\quad)_{16}$

Ex3: $(631,05)_8 = (\quad)_2 = (\quad)_{10} = (\quad)_{16}$

Ex4 = $(5217,771)_8 = (\quad)_2 = (\quad)_{10} = (\quad)_{16}$

Ex5 = $(3210,5678)_8 = (\quad)_2 = (\quad)_{10} = (\quad)_{16}$

Random

Ex1: $(21)_3 = (\quad)_2 = (\quad)_{16} = (\quad)_{10}$

Ex2: $(55)_6 = (\quad)_7 = (\quad)_8 = (\quad)_9$

Ex3: $(587)_9 = (\quad)_3 = (\quad)_2 = (\quad)_6$

Ex4: $(6531,565)_7 = (\quad)_9 = (\quad)_2 = (\quad)_{16}$

Arithmetic operations

① Addition

Ex1 = $(5)_{10} + (3)_{10} = (\quad)_{10}$

Ex2: $(79)_{10} + (03)_{10} = (\quad)_{10}$

Ex3 = $(1111)_2 + (11)_2 = (\quad)_2$

Ex4: $(00111)_3 + (1111)_2 = (\quad)_2$

Ex5 = $(111111)_2 + (2)_{10} = (\quad)_{16}$

Ex6: $(2371)_8 + (14)_{10} = (\quad)_2$

Ex7: $(1111, 1111)_2 + (3, 5)_{10} = (\quad)_2$

Ex8: $(111111, 111001)_2 + (000700\,1, 0001)_2$ $(\quad)_2$

Ex9: $(98, AB)_{16} + (111, 11)_2 = (\quad)_2$

Ex10: $(73)_9 + (31)_7 = (\quad)_2$

2- subtraction :2.1 using one's complement

Ex1 : $(7)_{10} - (2)_{10} = (\quad)_{10}$

Ex2: $(14)_{10} - (100011)_2 = (\quad)_2$

Ex3: $(98)_{16} - (15)_{16} = (\quad)_2$

Ex4: $(1111,11)_2 - (111,111)_2 = (\quad)_2$

Ex5: $(-213,5)_{10} - (12,25)_{10} = (\quad)_{10}$

2.2 using two's complement

Ex6: $(111,111)_2 - (1111,111)_2 = (\quad)_2$

Ex7: $(31)_8 - (10)_{16} = (\quad)_2$

Ex8: $-(21)_{10} - (15)_{10} = (\quad)_{10}$

Data Representation

1- Text Representation

How is the following represented in memory?

using even Parity.

Ex1: (A)

Ex2: (ABCDe)

Ex3: (BiRzEiT)

Ex4: (HELLo 7X WORLd)

Ex5: (ComPuTeR 7315)

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using odd Parity

Ex6: (MeMoREEE)

Ex7: (odd PaRITy)

E8: (StArt)

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using no Parity

Ex 9: (CoMp 131)

Ex10): (dAtA)

Ex11: (CLIcK)

Numbers Representations

1- Fractional numbers

How the following number is represented in memory?

① $(34,25)_{10}$ ② $(-63,125)_{10}$ ③ $(45,1)_{10}$

④ $(1111,1111)_2$ ⑤ $-(112,625)_{10}$

2- Integer Representation

using ones complement or twos complement using 16-bit

① $(24)_{10}$

② $(413)_{10}$

③ $(512)_{10}$

④ $(-63)_{10}$

⑤ $(-71)_{10}$

⑦ $(-50)_{10}$

⑧ $(320)_{10}$

⑨ [illegible] $(312)_{10}$

1) Counting up to 8 numbers in Hexadecimal starting form

(a) 38 (b) 6F8 (c) 66FF (D) FFFF

Counting up to 10 numbers in the following numbers starting from :

(a) $(381)_9$ (b) $(1110)_2$ (c) $(21)_{10}$

(D) $(21212)_3$ (e) $(161)_7$

~~Co.~~ Given a binary number consist of 9 digits

(a) How many number can you represent

(b) what is the minimum number and the maximum number can you represent in binary?

Given a base 7 number consist of 5 digits

(A) Same as the Previous question

(B) = = = = =