

1.

a.

i.

$$17 = 16 + 1 \Rightarrow (17)_{10} = (10001)_2 = (11)_{16}$$

$$(10001)_2$$

$$(21)_8$$

$$17 = 8 \cdot 2 + 1 \Rightarrow (17)_{10} = (21)_8$$

$$(11)_{16}$$

$$420 = 256 + 128 + 32 + 4 \Rightarrow (420)_{10} = (110100100)_2$$

$$(110100100)_2$$

$$\begin{array}{ccc} 0001 & 1010 & 0100 \\ \hline 1 & A & 4 \end{array} \Rightarrow (420)_{10} = (1A4)_{16}$$

$$(644)_8$$

$$(1A4)_{16}$$

$$\begin{array}{ccc} 1101 & 0011 & 00 \\ \hline 6 & 4 & 4 \end{array} \Rightarrow (420)_{10} = (644)_8$$

$$1337 = 1024 + 256 + 32 + 16 + 8 + 1 \Rightarrow (1337)_{10} = (10100111001)_2$$

$$\begin{array}{ccc} 0101 & 0011 & 1001 \\ \hline 5 & 3 & 9 \end{array} \Rightarrow (1337)_{10} = (539)_{16}$$

$$(2471)_8$$

$$\begin{array}{ccc} 0101 & 0011 & 1001 \\ \hline 2 & 4 & 7 & 1 \end{array} \Rightarrow (1337)_{10} = (2471)_8$$

$$(539)_{16}$$

b. i. $\begin{array}{ccc} 0010 & 1101 & 0101 \\ \hline 2 & D & 5 \end{array} \Rightarrow (1011010101)_2 = (2D5)_{16}$

ii. $\begin{array}{ccc} 1101 & 0010 & 1010 \\ \hline D & 2 & A \end{array} \Rightarrow (110100101010)_2 = (D2A)_{16}$

c. i. $(8 \ B \ A \ D \ F \ 0 \ 0 \ 0)_{16} = (100010110101011111000000001101)_2$

$\downarrow \quad \downarrow \quad \downarrow \quad \downarrow \quad \downarrow \quad \downarrow \quad \downarrow \quad \downarrow$
 1000 1011 1010 1101 1111 1101 1111 1101

ii. $(D \ E \ A \ D \ B \ E \ E \ F)_{16} = (1101111010101101101111011111)_2$

$\downarrow \quad \downarrow \quad \downarrow \quad \downarrow \quad \downarrow \quad \downarrow \quad \downarrow \quad \downarrow$
 1101 1110 1010 1101 1011 1110 1110 1111

2.

a.

$$i. (264)_{10} = (0010 \ 0110 \ 0100)_{BCD}$$

$$ii. (361)_{10} = (0011 \ 0110 \ 0001)_{BCD}$$

$$iii. (452)_{10} = (0100 \ 0101 \ 0010)_{BCD}$$

$$iv. (35)_{10} = (0011 \ 0101)_{BCD}$$

$$v. (481)_{10} = (0100 \ 1000 \ 0001)_{BCD}$$

3.

a.

i (6-bit)

$$17 = 16 + 1 = (10001)_2 \xrightarrow{\text{(işaret biti ekleyelim)}} (010001)_2$$

$$\Rightarrow -17 = \text{two's complement of } 17 = (101110)_2 + (000001)_2 \\ = (101111)_2$$

ii (3-bit)

$$3 = 2 + 1 = (11)_2 \xrightarrow{\text{(işaret biti ekleyelim)}} (011)_2$$

iii (8-bit)

$$101 = 64 + 32 + 4 + 1 = (1100101) \xrightarrow{\text{(işaret biti ekleyelim)}} (01100101)_2$$

iv (8-bit)

$$89 = 64 + 16 + 8 + 1 = (1011001) \xrightarrow{\text{(işaret biti ekleyelim)}} (01011001)_2$$

$$\Rightarrow -89 = \text{two's complement of } 89 = (10100110)_2 + (00000001)_2 \\ = (10100111)_2$$

b. 1011010001

$$+ 0100111010$$

$$+ 0000000101$$

$$= (1011)_2 = (8 + 2 + 1)_{10} = (11)_{10}$$

10 bit sign bit 0 yani sayımız pozitif

tabana dönüş gösterir

toplama yapıldığından elde kalan

sayı gözemseden gelirin.

4.

a.

i.

$$\begin{aligned}
 0,256 \cdot 2 &= 0,512 \\
 0,512 \cdot 2 &= 1,024 \\
 0,024 \cdot 2 &= 0,048 \\
 0,048 \cdot 2 &= 0,096 \\
 0,096 \cdot 2 &= 0,192 \\
 0,192 \cdot 2 &= 0,384 \\
 0,384 \cdot 2 &= 0,768 \\
 0,768 \cdot 2 &= 1,536 \\
 0,536 \cdot 2 &= 1,072 \\
 0,072 \cdot 2 &= 0,144
 \end{aligned}$$

$$(12)_{10} = (8+4)_{10} = (1100)_2$$

$$\Rightarrow (12,256)_{10} = (1100,0100000110\dots)_2$$

ii.

$$\begin{aligned}
 0,25 \cdot 2 &= 0,5 \\
 0,5 \cdot 2 &= 1
 \end{aligned}$$

$$(12)_{10} = (8+4)_{10} = (1100)_2$$

$$\Rightarrow (12,25)_{10} = (1100,01)_2$$

iv.

$$0,625 \cdot 2 = 1,25$$

$$0,25 \cdot 2 = 0,5$$

$$0,5 \cdot 2 = 1$$

$$(9)_{10} = (8+1)_{10} = (1001)_2$$

$$\Rightarrow (9,625)_{10} = (1001,101)_2$$

iii.

$$0,17 \cdot 2 = 0,34$$

$$0,34 \cdot 2 = 0,68$$

$$0,68 \cdot 2 = 1,36$$

$$0,36 \cdot 2 = 0,72$$

$$0,72 \cdot 2 = 1,44$$

$$0,44 \cdot 2 = 0,88$$

$$0,88 \cdot 2 = 1,76$$

$$0,76 \cdot 2 = 1,52$$

$$0,52 \cdot 2 = 1,04$$

$$0,04 \cdot 2 = 0,08$$

$$\vdots$$

$$(17)_{10} = (16+1)_{10} = (10001)_2$$

$$\Rightarrow (17,17)_{10} = (10001,001010110\dots)_2$$

$$b. 0,75 \cdot 2 = 1,5$$

$$0,5 \cdot 2 = 1$$

$$(2)_{10} = (10)_2$$

$$\Rightarrow (2,75)_{10} = (10,11)_2$$

virgülden sonra 2 bit yerine 3 bit ile gösterilirse

bu sayının değerinde bir değişiklik olmaz.

$$0,875 \cdot 2 = 1,75$$

$$0,75 \cdot 2 = 1,5$$

$$0,5 \cdot 2 = 1$$

$$(2)_{10} = (10)_2$$

$$\Rightarrow (2,875)_{10} = (10,11)_2$$

virgülden sonra 2 bit yerine 3 bit ile gösterilirse

bu sayı gerçekte değerine ulaşır ve değer $(10,111)_2$ olur.

Eğer virgülden sonra 3 bit kullanmazsak yukarıdaki örnekte belirli bir miktarda hatamız olur.