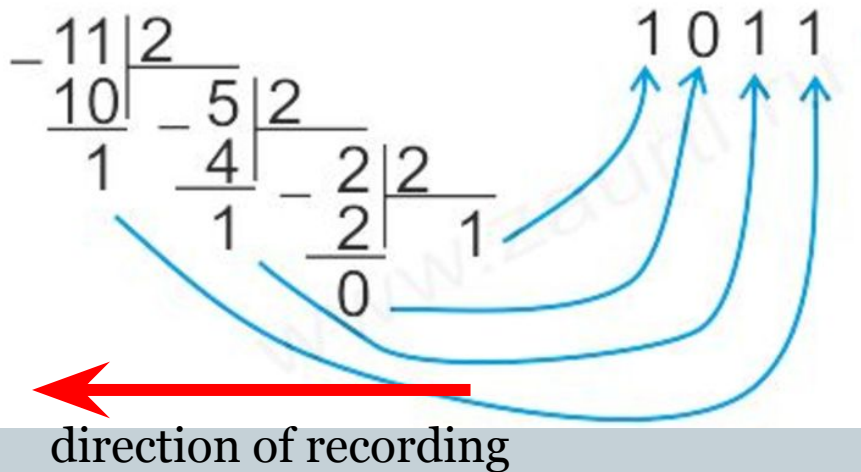




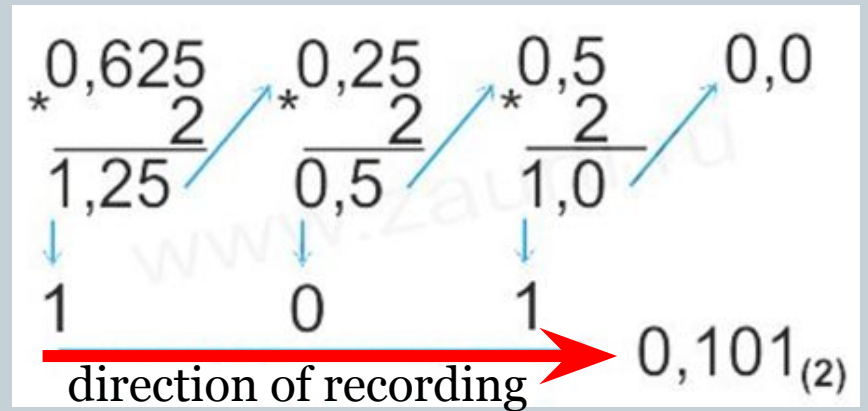
Data representation in computer systems and its architecture and components

$$11,625_{(10)} = \dots\dots\dots(2)$$

First step:



Second step:



Answer: $11,625_{(10)} = 1011,101_{(2)}$

Rules of conversion from binary to decimal number system

Example 1

$$\begin{array}{cccc}
 1 & 0 & 1 & 1_2 \\
 \downarrow & \downarrow & \downarrow & \downarrow \\
 2^3 & 2^2 & 2^1 & 2^0
 \end{array}
 = 1 \cdot 2^3 + 0 \cdot 2^2 + 1 \cdot 2^1 + 1 \cdot 2^0 = 8 + 2 + 1 = 11_{10}$$

Example 2

$$\begin{array}{cccccccc}
 1 & 1 & 0 & 1 & 1 & , & 1 & 0 & 1_2 \\
 \downarrow & \downarrow & \downarrow & \downarrow & \downarrow & & \downarrow & \downarrow & \downarrow \\
 2^4 & 2^3 & 2^2 & 2^1 & 2^0 & & 2^{-1} & 2^{-2} & 2^{-3}
 \end{array}
 = (1 \cdot 2^4 + 1 \cdot 2^3 + 0 \cdot 2^2 + 1 \cdot 2^1 + 1 \cdot 2^0 +$$

$$+ 1 \cdot 2^{-1} + 0 \cdot 2^{-2} + 1 \cdot 2^{-3})_{10} = 27,625_{10}.$$

Rules of conversion from ⁴ decimal to binary number system

conversion 345 to binary number system:

$345:2=172,5$	1
$172:2=86$	0
$86:2=43$	0
$43:2=21,5$	1
$21:2=10,5$	1
$10:2=5$	0
$5:2=2,5$	1
$2:2=1$	0
	1

$$345_{10} = 101011001_2$$

Find 110011+1101

5

Logical addition of numbers:

$$0+0=0$$

$$1+0=1$$

$$0+1=1$$

$$1+1=1\ 0$$

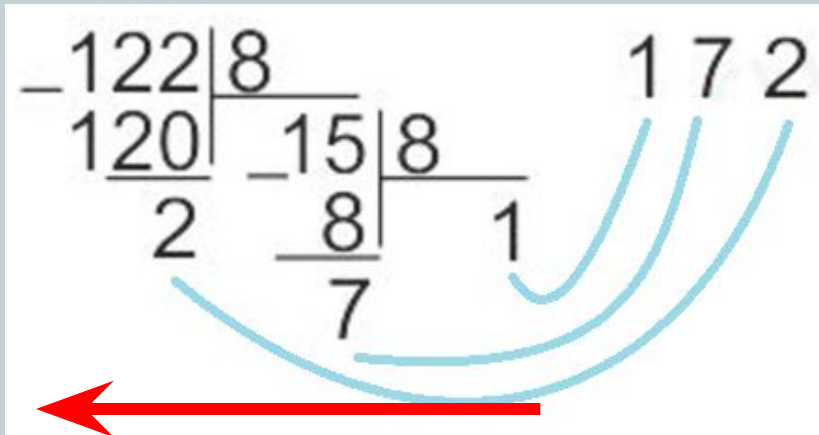
$$1+1+1=1\ 1$$

$$\begin{array}{r} \\ 110011 \\ + 1101 \\ \hline 1000000 \end{array}$$

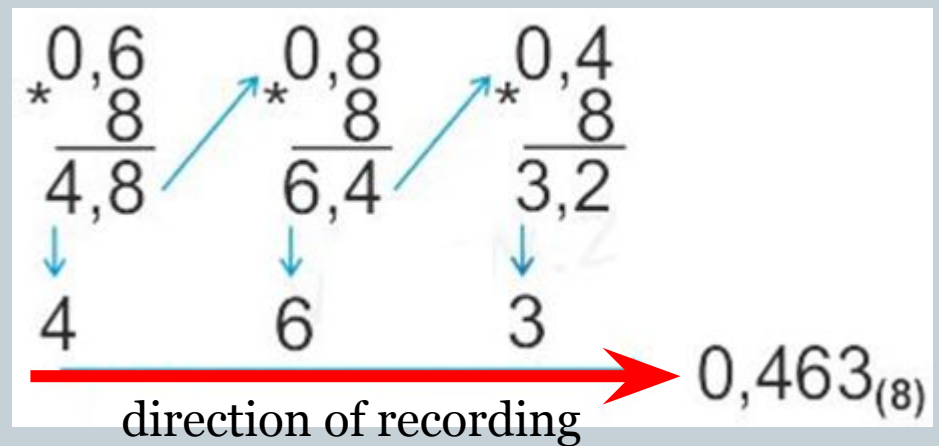
$$122,6_{(10)} = \dots\dots\dots(8)$$



First step:



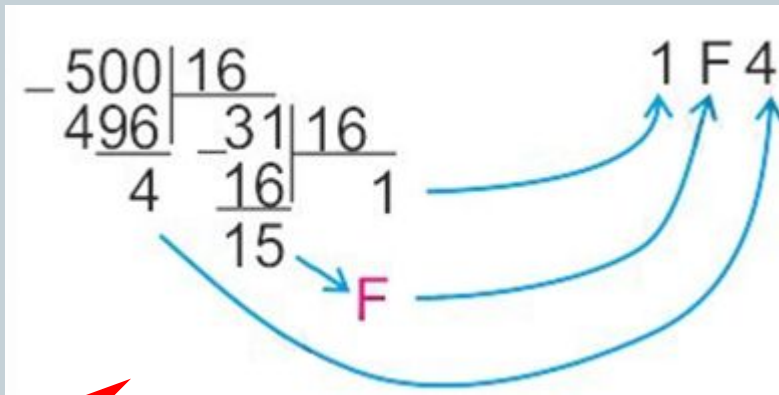
Second step:



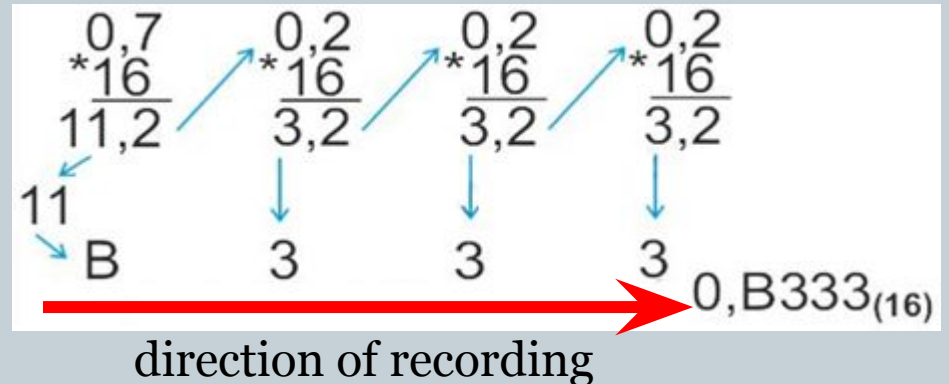
Answer: $122,6_{(10)} = 172,463\dots(8)$

$$500,7_{(10)} = \dots\dots\dots(16)$$

First step:



Second step:



Answer: $500,7_{(10)} = 1F4,B333\dots_{(16)}$

1. Converting binary to decimal

$$\overset{2}{1} \overset{1}{0} \overset{0}{1}, \overset{-1}{1} \overset{-2}{1} \text{ (2)} \rightarrow \text{(10)} = 1 \cdot 2^2 + 0 \cdot 2^1 + 1 \cdot 2^0 + 1 \cdot 2^{-1} + 1 \cdot 2^{-2} = 5,75_{(10)}$$

Answer: $101,11_{(2)} = 5,75_{(10)}$

2. Converting octal to decimal

$$\overset{1}{5} \overset{0}{7}, \overset{-1}{2} \overset{-2}{4} \text{ (8)} \rightarrow \text{(10)} = 5 \cdot 8^1 + 7 \cdot 8^0 + 2 \cdot 8^{-1} + 4 \cdot 8^{-2} = 47,3125_{(10)}$$

Answer: $57,24_{(8)} = 47,3125_{(10)}$

3. Converting hexadecimal to decimal

$$\overset{1}{7} \overset{0}{A}, \overset{-1}{8} \overset{-2}{4} \text{ (16)} \rightarrow \text{(10)} = 7 \cdot 16^1 + 10 \cdot 16^0 + 8 \cdot 16^{-1} + 4 \cdot 16^{-2} = 122,515625_{(10)}$$

Answer: $7A,84_{(16)} = 122,515625_{(10)}$

Addition of two numbers in octal

$$\begin{array}{r}
 \overset{1}{} \overset{1}{} _8 \\
 + _8 \\
 \hline
 7 _8 \\
 \hline
 \end{array}$$

$4+5=9=1*8+1$
 $5+0+1=6$
 $3+7=10=1*8+2$
 $6+1=7$

$$\begin{array}{r}
 , \\
 + , \\
 \hline
 3 , \\
 \hline
 \end{array}$$

$4+6=10=8+2$
 $5+3+1=9=8+1$
 $1+7+1=9=8+1$
 $2+1=3$

Answer: $6354_{(8)} + 705_{(8)} = 7261_{(8)}$ Answer: $215,4_{(8)} + 73,6_{(8)} = 311,2_{(8)}$

Addition of two numbers in hexadecimal

$$\begin{array}{r}
 1 \\
 1C52_{16} \\
 + 891_{16} \\
 \hline
 24E3_{16}
 \end{array}$$

$1+2=3$
 $5+9=14=E_{16}$
 $C_{16}+8=12+8=20=1*16+4$
 $1+1=2$

Answer: $1C52_{(16)} + 891_{(16)} = 24E3_{(16)}$

$$\begin{array}{r}
 11 \\
 8D,8 \\
 + 3B,C \\
 \hline
 C9,4
 \end{array}$$

$8+12=20=16+4$
 $13+11+1=25=16+9$
 $8+3+1=12=C_{16}$

Answer: $8D,8_{(16)} + 3B,C_{(16)} = C9,4_{(16)}$