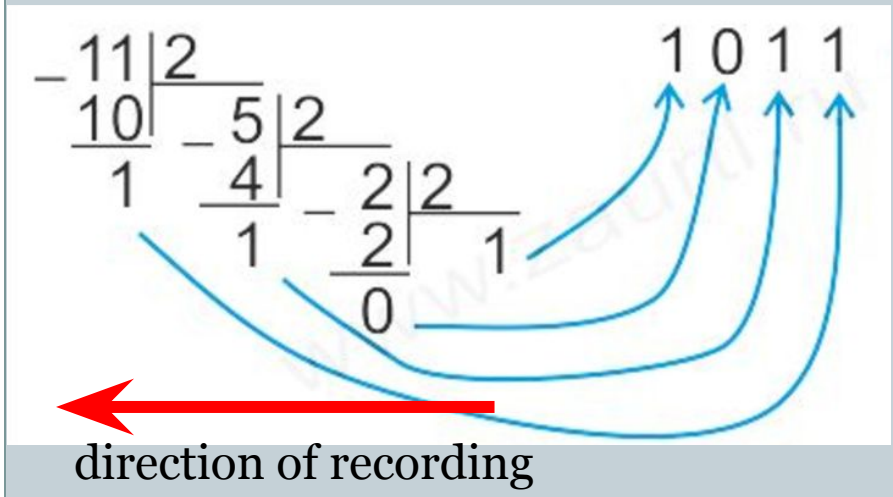
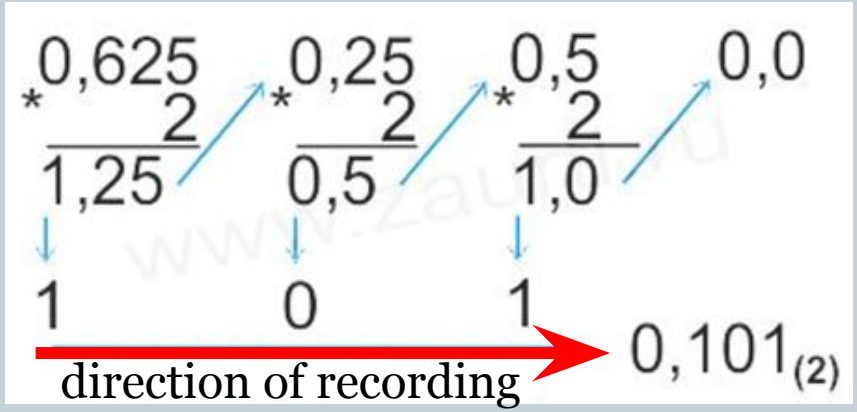
Data representation in computer systems and its architecture and components

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

First step:



Second step:



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

Rules of conversion from binary to decimal number system

Example 1

$$1\ 0\ 1\ 1_2 = 1\cdot 2^3+0\cdot 2^2+1\cdot 2^1+1\cdot 2^0=8+2+1=11_{10}$$

$2^3\ 2^2\ 2^1 2^0$

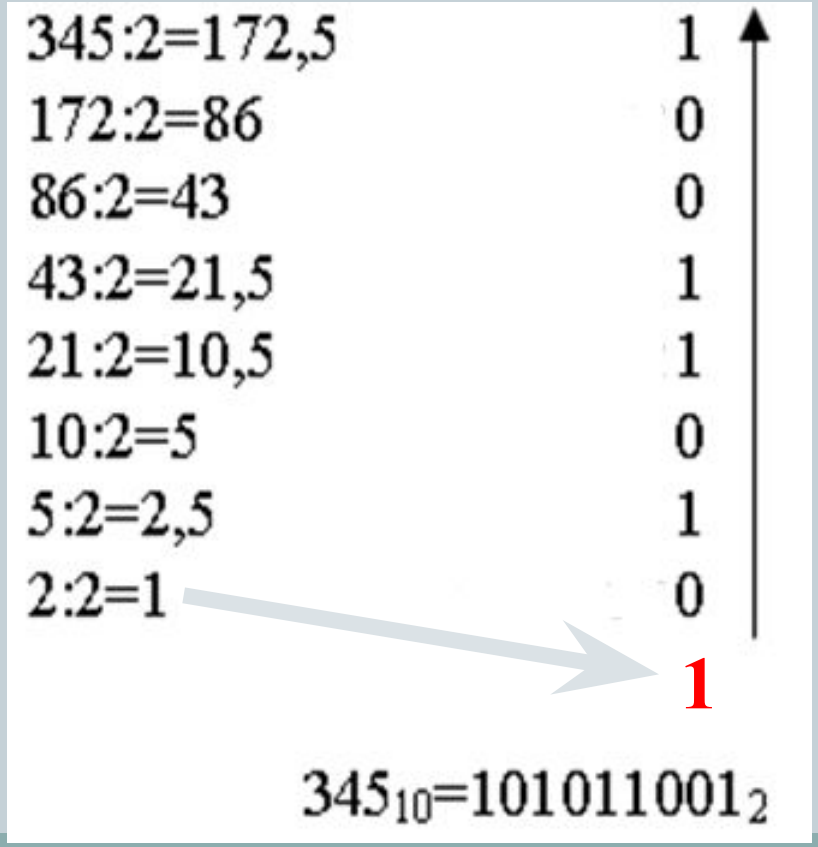
Example 2

$$1\ 1\ 0\ 1\ 1\ ,\ 1\ 0\ 1_2 = (1\cdot 2^4 + 1\cdot 2^3 + 0\cdot 2^2 + 1\cdot 2^1 + 1\cdot 2^0 + + 1\cdot 2^{-1} + 0\cdot 2^{-2} + 1\cdot 2^{-3})_{10} = 27,625_{10}.$$

$2^4\ 2^3\ 2^2\ 2^1\ 2^0\ 2^{-1}\ 2^{-2}\ 2^{-3}$

Rules of conversion from decimal to binary number system

conversion 345 to binary number system:



Find 110011+1101

Logical addition of numbers:

0+0=0

1+0=1

0+1=1

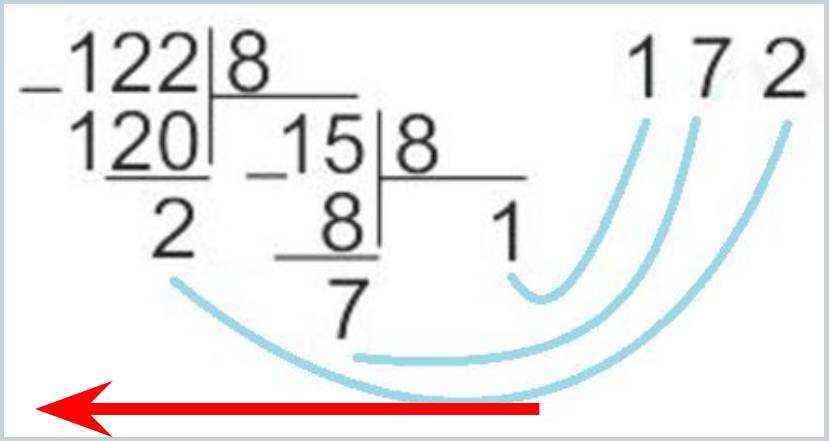
1+1=1 0

1+1+1=1 1

$$\begin{array}{r} {\scriptstyle 1\ 1\ 1\ 1\ 1\ 1} \\ 110011 \\ + \quad 1101 \\ \hline 1000000 \end{array}$$

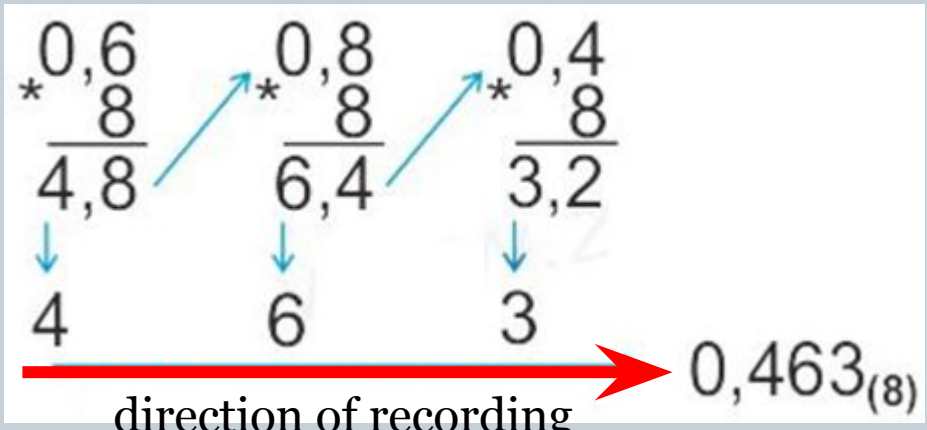
$122,6_{(10)}$=……$_{(8)}$

First step:



direction of recording

Second step:

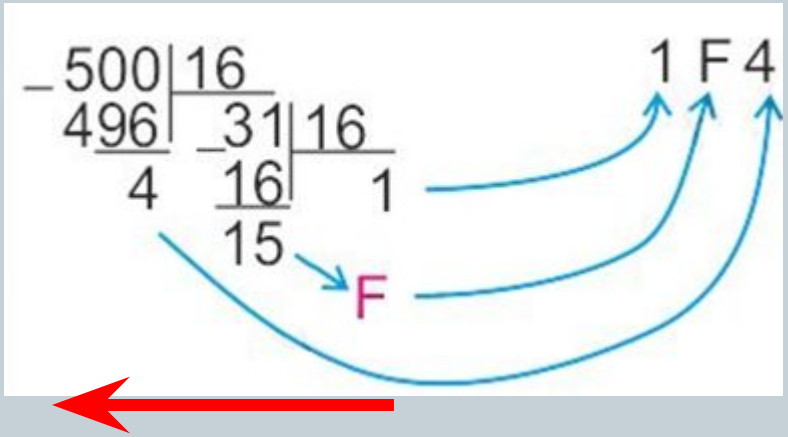


direction of recording

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

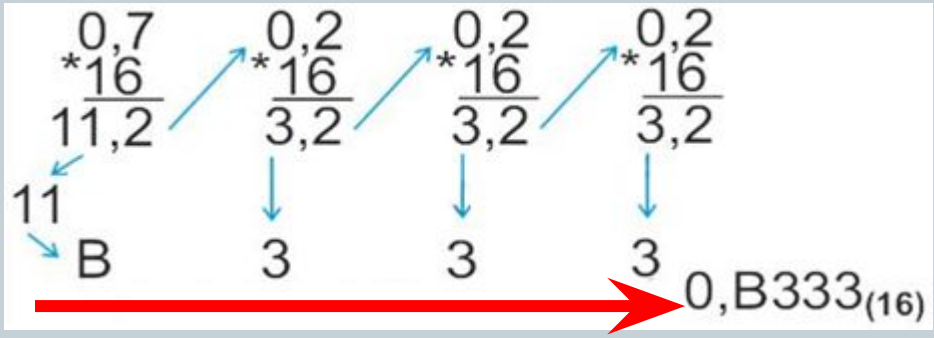
$500,7_{(10)}$=……$_{(16)}$

First step:



direction of recording

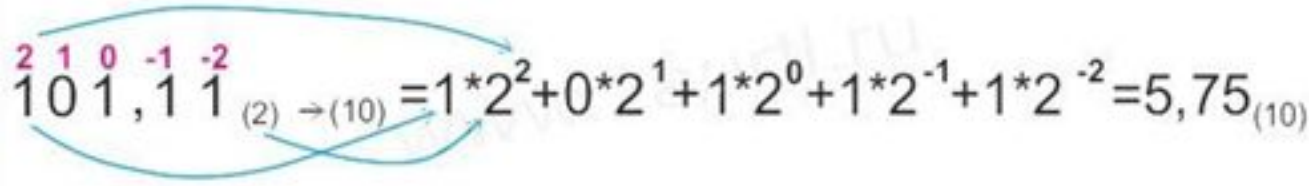
Second step:



direction of recording

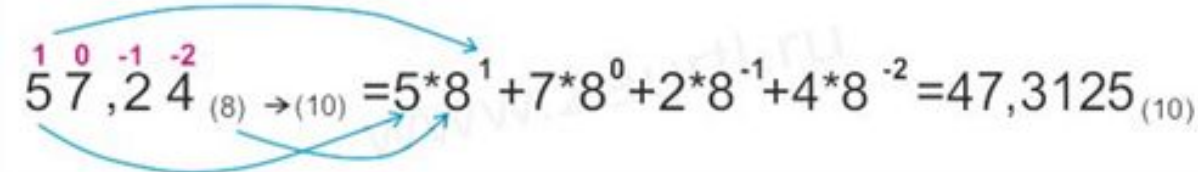
Answer: $500,7_{(10)}$= 1F4,B333…$_{(16)}$

1. Converting binary to decimal



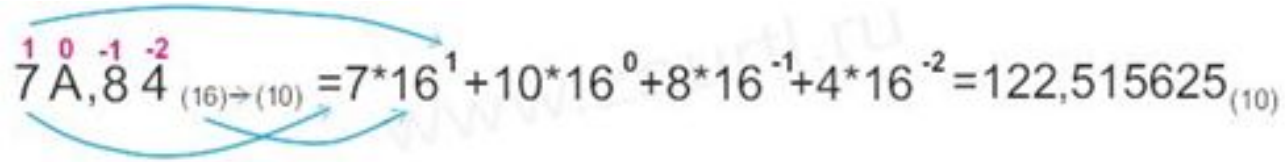
Answer: $101,11_{(2)} = 5,75_{(10)}$

2. Converting octal to decimal



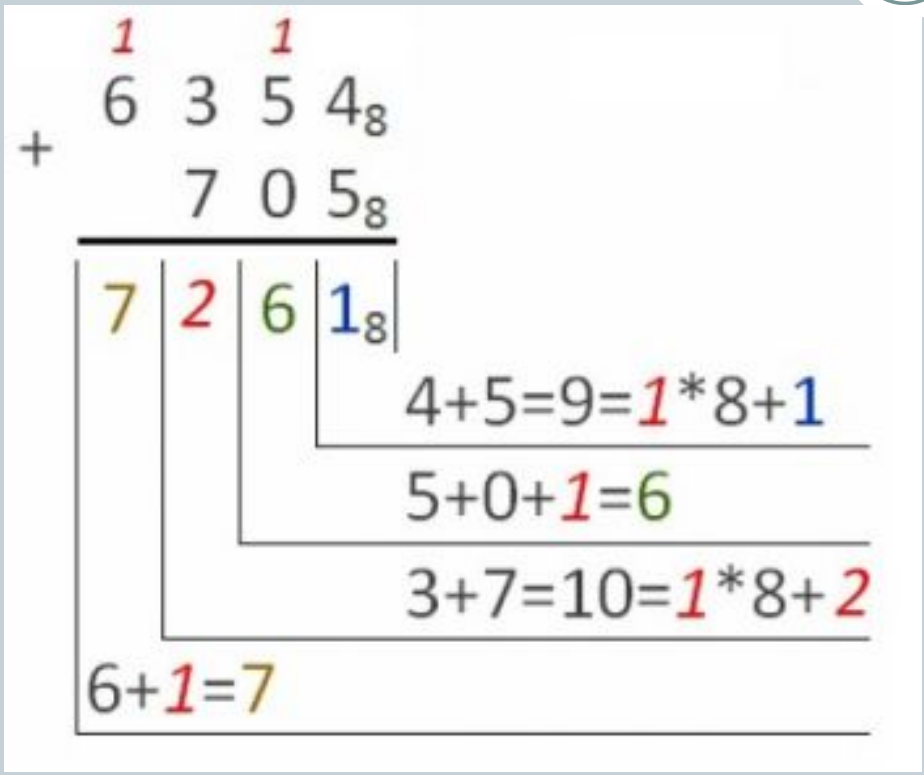
Answer: $57,24_{(8)} = 47,3125_{(10)}$

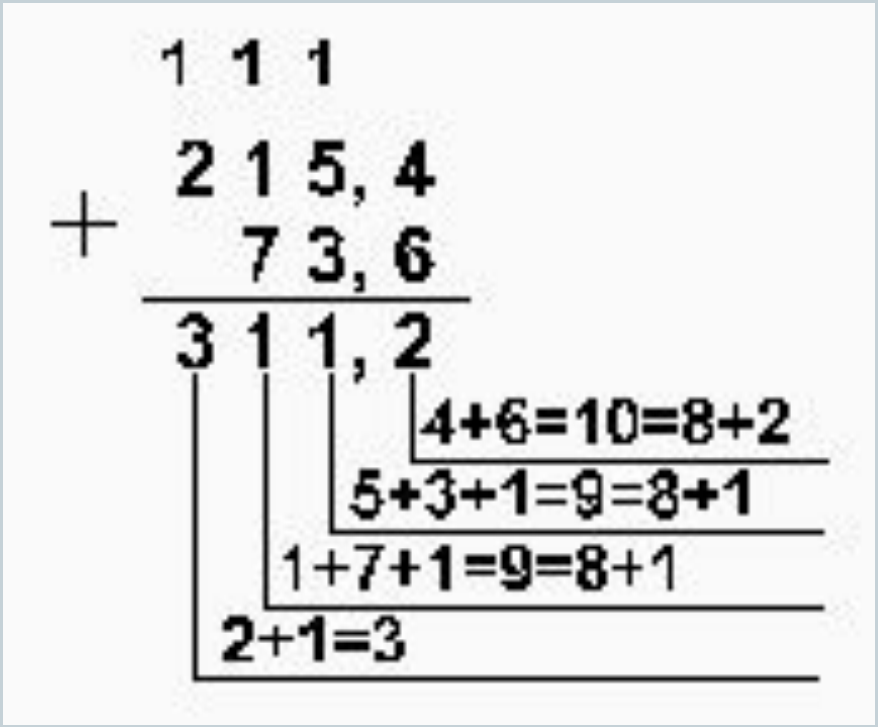
3. Converting hexadecimal to decimal



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

Addition of two numbers in octal

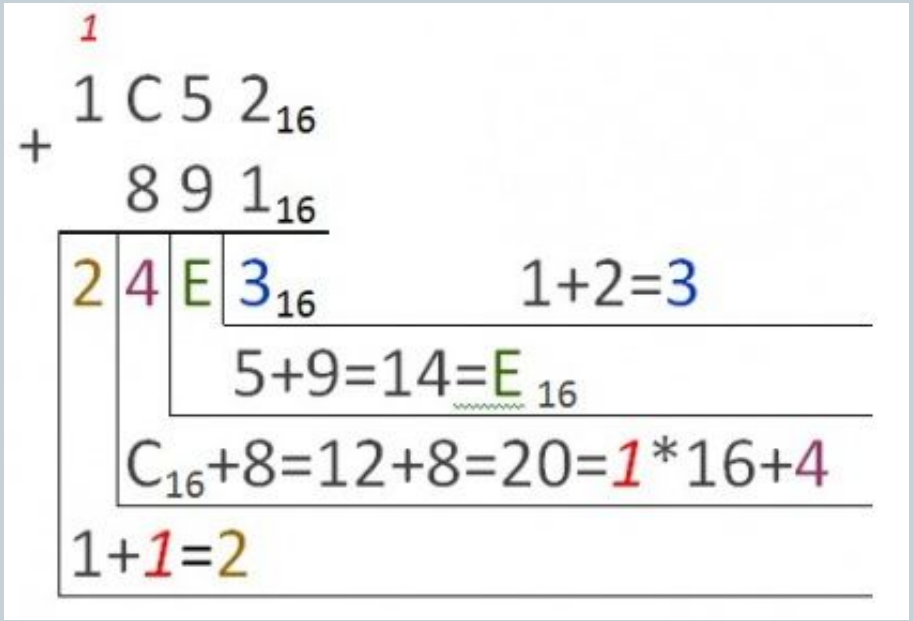




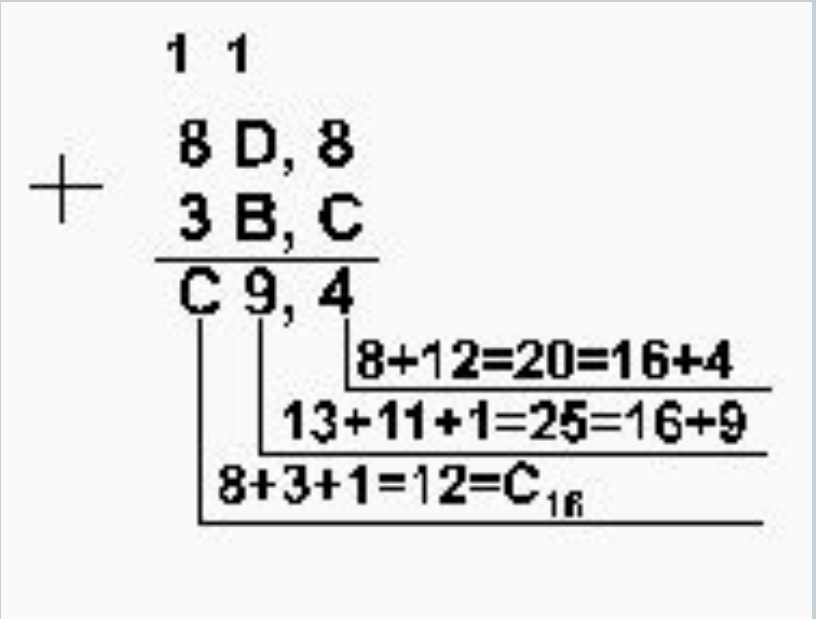
Answer: $6354_{(8)} + 705_{(8)} = 7261_{(8)}$

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

Addition of two numbers in hexadecimal



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



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