CONVERSION BETWEEN NUMBER SYSTEMS. PART 1: FROM DECIMAL TO ANY...

Lecture 6

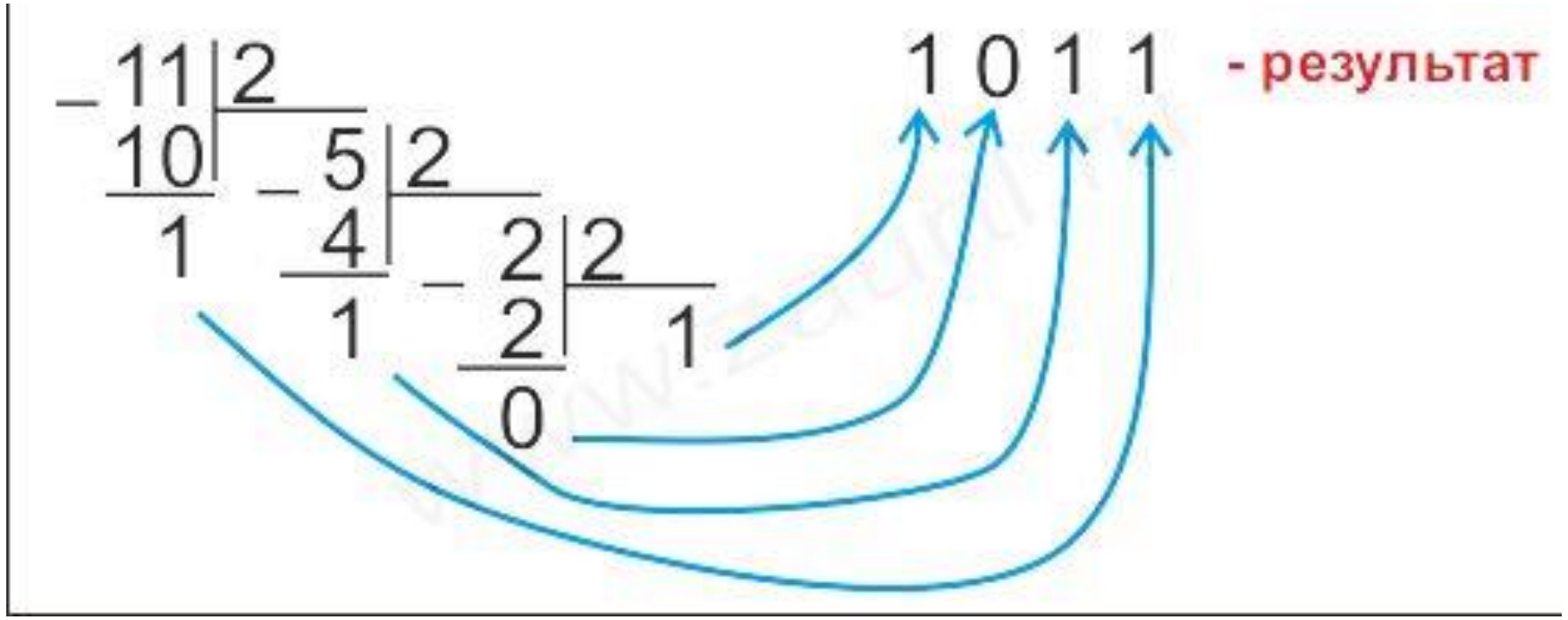
QUESTIONS

1. What is a number system?
2. Which number systems do you know?
3. What is a radix (base of number system)? What does it mean?
4. What is an alphabet (or set of symbols) of a number system? What's the alphabet of decimal number system?

HOW TO CONVERT FROM DEC TO ANY?

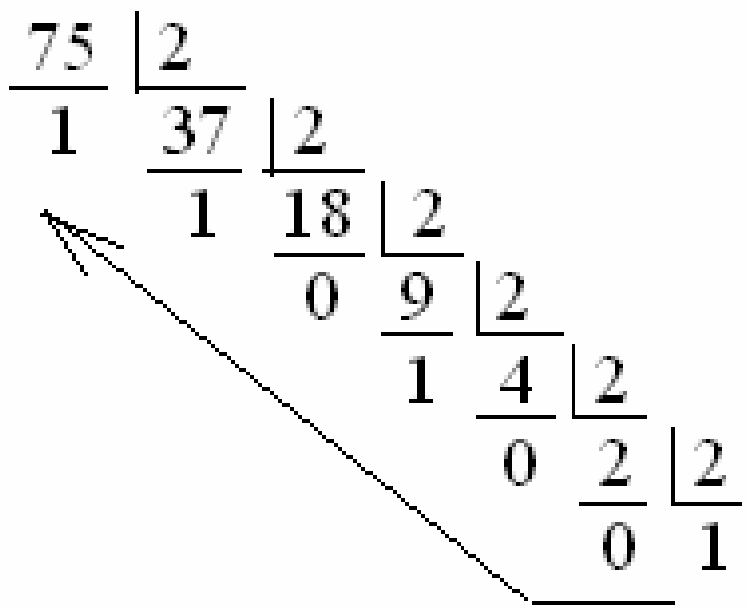
- There are many methods or techniques which can be used to convert numbers from one base to another.

AN EXAMPLE

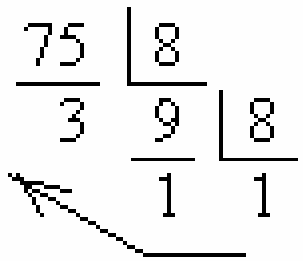


EXAMPLES

Перевод в двоичную с/сч.



Перевод в восьмеричную с/сч.



ALGORITHM

- **Step 1 -** Divide the decimal number to be converted by the value of the new base.
- **Step 2 -** Get the remainder from Step 1 as the rightmost digit (least significant digit) of new base number.
- **Step 3 -** Divide the quotient of the previous divide by the new base.
- **Step 4 -** Record the remainder from Step 3 as the next digit (to the left) of the new base number.

Repeat Steps 3 and 4, getting remainders from right to left, until the quotient becomes zero in Step 3.

FRACTION

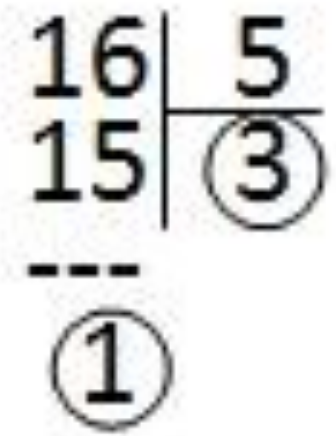
$0,375_{10}$

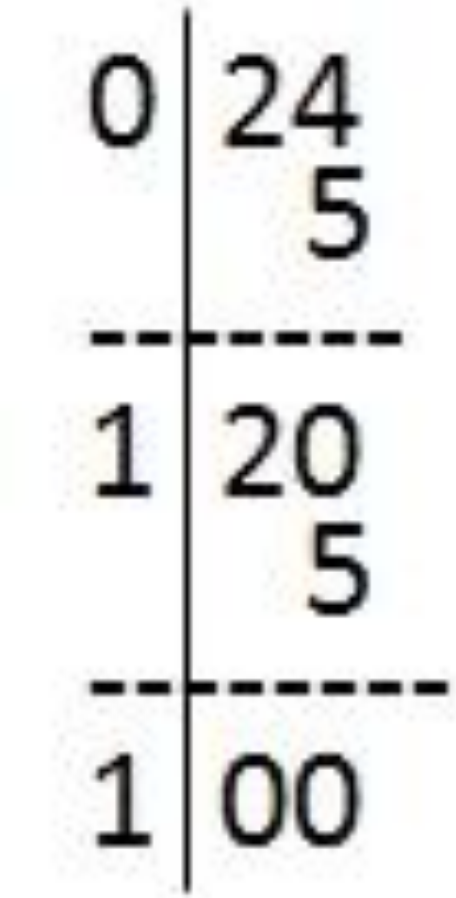
$$
\begin{array}{rcl}
0,375 & \rightarrow & 0 \\
\times\ 2 & & \\
\hline
0,750 & \rightarrow & 0 \\
\times\ 2 & & \\
\hline
1,50 & \rightarrow & 1 \\
\hline
0,50 & & \\
\times\ 2 & \rightarrow & 1 \\
\hline
1,00 & &
\end{array}
$$

$0,375_{10} = 0,011_2$

AN EXAMPLE

$16{,}24_{10} = ?_5$





$16{,}24_{10} = 31_5 + 0{,}11_5 = 31{,}11_5$

TASKS TO DO

convert decimal numbers to new system:

A number in decimal system	New base (new radix)
5	2
12	7
24	16
29	16
9,5	8
16	2

HOME TASKS

convert decimal numbers to new system:

A number in decimal system	New base (new radix)
23	2
29	8
62	16
8,25	2
8	8
2,5	2