CONVERSION BETWEEN NUMBER SYSTEMS. PART 2: FROM ANY TO DECIMAL...

Lecture 7

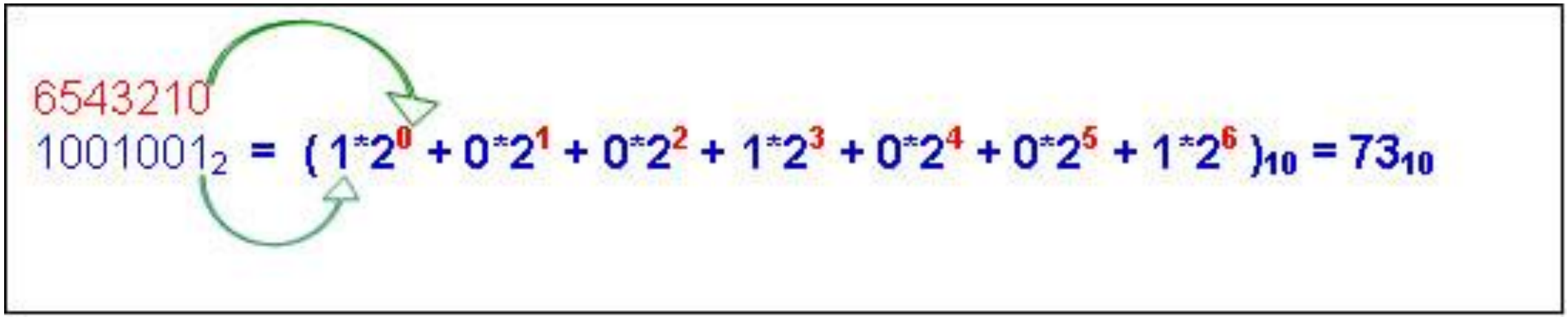
QUESTIONS

What is the algorithm of conversion from decimal number to new number system?

A number in decimal system	New base (new radix)
14	2
16	8
68	16
6	2
12	8
7	2

OTHER BASE SYSTEM TO DECIMAL SYSTEM

$1001001_2 =_{10}$



ALGORITHM

- **Step 1 -** Determine the column (positional) value of each digit (this depends on the position of the digit and the base of the number system).
- **Step 2 -** Multiply the obtained column values (in Step 1) by the digits in the corresponding columns.
- **Step 3 -** Sum the products calculated in Step 2. The total is the equivalent value in decimal.

EXAMPLE

Example

Binary Number : 11101_2

Calculating Decimal Equivalent:

Step	Binary Number	Decimal Number
Step 1	11101_2	$((1 \times 2^4) + (1 \times 2^3) + (1 \times 2^2) + (0 \times 2^1) + (1 \times 2^0))_{10}$
Step 2	11101_2	$(16 + 8 + 4 + 0 + 1)_{10}$
Step 3	11101_2	29_{10}

Binary Number : 11101_2 = Decimal Number : 29_{10}

TASKS TO DO (CONVERT TO DECIMAL SYSTEM)

NUMBER IN A SYSTEM (with radix R)	RADIX (R)
1100100	2
10	16
A2	16
9	16
82	16
1101,01	2
11	4

HOME TASKS

- convert numbers from a number system with radix R to decimal number system:

NUMBER IN A SYSTEM (with radix R)	RADIX (R)
1101	2
12	16
100	16
BB	16
31	16
0101,1	2
14	4