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Different ways to perform actions in different number systems and switch from one number system to another number system

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Annotation; in this article, scientific research has been carried out in the fields of implementation of actions in various number systems and various methods of transition from one number system to another number system, as well as the result of reforms carried out in our country today.

Keywords; binary number system, divisor, decimal number, technique-technology

As a result of the reforms carried out in our country today, drastic changes are taking place in all spheres, including socio - economic, cultural and educational, as well as in the educational system. The tremendous reforms carried out in our education system have laid the foundation for the organization of an excellent educational process, taking into account the latest achievements of Science, Technology and technology in education of the younger generation.

The decree of the president of the Republic of Uzbekistan"on measures to train qualified pedagogical personnel and further improve the system of such personnel provision of secondary special, vocational educational institutions " and, on this basis, aimed at training qualified personnel for the educational system today and their organization of their specialty subjects using modern educational technologies, the latest information and communication methods.

The fact that future mathematics teachers have in-depth knowledge of their subject of study serves as an important basis for their future activities. To this end, it is necessary to expand the knowledge of students and familiarize them with the practical issues of mathematics. One such issue is number systems. Let's look at the most basic number systems and the steps to follow on them.

Binary number system. The number system, which consists of only two characters, is a binary number system, and the numbers in this system are formed using only 0 and 1. 101011101_2, 101001_2 numbers are an example of numbers in the binary number system.

Triple number system. The numbers that are formed using only the numbers 0,1,2 are the numbers written in the Triple number system. Example: 210211_3, 200121_3, 12112001_3.

Such a conclusion can be drawn from the above systems, what number system is told to the system of numbers that are formed using numbers that are smaller than that number. That is, the numbers in the four number system are from 0.1.2.3 numbers, the numbers in the five number system are from 0.1.2.3.4 numbers, the numbers in the six number system are from 0.1.2.3.4.5 numbers, the numbers in the Seven Number system are from 0.1.2.3.4.5.6 numbers, the numbers in the from numbers 0,1,2,3,4,5,6,7,8 and finally the numbers in the decimal number system, familiar to us and widely used in mathematics, are formed from numbers 0,1,2,3,4,5,6,7,8,9.

We explain the transfer of numbers given in another number system to the decimal number system by solving the following examples.

Example 1: 101_2 convert the number to the decimal number system.

Solution: $101_2=1\times2^2+0\times2^1+1\times2^0=5$

Example 2: 132_4 what is the number equal to in the decimal number system?

Solution: $132_4=1\times4^2+3\times4^1+2\times4^0=16+12+2=30$.

When transferring a given number to another system in the decimal number system, the following methods are used.

Example 3: Convert the number 73 to the number five system.

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1-:

73	5
5	14 | 5
23	10 | 2
20	④
③	

$73=(243)_5$

2-:

73	25 | 5 | 1
50	2 | 4 | 3
23	
20	
3	
3	
0	

$73=(243)_5$

2	14	73
0	10	70
2	4	3

Method 3*:* From 73, the most kata number is selected, which is divisible by non-kata 5, and we subtract and divide it from 73. We perform the steps as follows.

Example 4: Convert the number 73 to the binary number system.

Solution: We will solve this example by Method 3.

1	2	4	9	18	36	73
0	2	4	8	18	36	72
1	0	0	1	0	0	1

Answer:$73=(1001001)_2$

There are two ways to switch from one number system to another number system:

1) transition through the decimal number system.

2) direct passage.

The number given in the first method is first transferred to the decimal number sisitema and then transferred to the other number system using the methods described above.

To use the second method, it is necessary to first know the operations of division and multiplication in different number systems. Each number system has its own special addition and multiplication tables, with the help of which actions are performed. Below we list the addition and multiplication tables for several counting systems.

Addition and multiplication tables for the binary number system:

×	0	1
0	0	0
1	0	1

+	0	1
0	0	1
1	1	10

Addition and multiplication tables for the Triple number system:

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×	0	1	2
0	0	0	0
1	0	1	2
2	0	2	11

+	0	1	2
0	0	1	2
1	1	2	10
2	2	10	11

Addition and multiplication tables for the quadratic number system:

+	0	1	2	3
0	0	1	2	3
1	1	2	3	10
2	2	3	10	11
3	3	10	11	12

×	0	1	2	3
0	0	0	0	0
1	0	1	2	3
2	0	2	10	12
3	3	10	11	12

From the tables presented, one can draw such a conclusion: in order to multiply or add in different number systems, this action is performed in the decimal number system, and then the given number is transferred to the system.

Based on the above tables, the actions of multiplication, division, addition and subtraction are performed.

$$\begin{array}{r} 3142_5 \\ \times\ 23_5 \\ \hline 20031_5 \\ +\ 11334_5 \\ \hline 133421_5 \end{array}$$

$3142_5 \times 23_5 = 133421_5$

$$\begin{array}{r|l} 121204_6 & 14_6 \\ \hline -\ 104_6 & 4534_6 \\ \hline 132_6 & \\ -\ 122_6 & \\ \hline 100_6 & \\ -\ 50_6 & \\ \hline 104_6 & \\ -\ 104_6 & \\ \hline 0 & \end{array}$$

$121204_6 : 14_6 = 4534_6$

Suppose something g written in relation to the basis m let the number is given. Directly desired this number from us h require transfer to the basis. First of all h number g we write in the basis, then we perform the following steps: a) m number h mold and residue b_0 we find the number $m=hq_1+b_0$ And b_0 balance h we transfer to the basis. This number h the last digit of the base number will be;b) q_1 number h is the remainder as the number b_1 we find the number and transfer it to the basis h; c) this process q_i we continue until the number is smaller than h.

Example 5. 372_8 express the number in the hexadecimal number system.

Yechish:

$$\begin{array}{r|l} 372_8 & 6_8 \\ \hline -\ 36_8 & 51_8 \\ \hline 12_8 & \\ -\ 6_8 & 5_8 = 5_6 \\ \hline 4_8 = 4_6 & \end{array} \qquad \begin{array}{r|l} 51_8 & 6_8 \\ \hline -\ 44_8 & 6_8 \\ \hline 6_8 & 1_8 = 1_6 \\ -\ 6_8 & \\ \hline 0_8 = 0_6 & \end{array}$$

Answer: $372_8 = 1051_6$

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