Methodology Of Teaching Arithmetic Fundamentals of Information Storage in Computer Memory

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ABSTRACT

This article describes the operations of addition, subtraction, multiplication and division on number systems. Also, the representation of the numbers in the decimal number system in the binary number system and the ways to transfer the numbers from the binary number system to the decimal number system are presented.

Keywords: Number system, binary and decimal number systems, binary scheme, real number

The modern development of society, the integration and globalization of world systems in various fields of human professional activity, increasingly high demands are placed on the formation of professionals as mature specialists in their field. The emerging professional competition is causing a number of changes in the personal qualities of informatics teachers and society's demands for their professional activity. Accordingly, the need for a competitive teacher in the labor market, a person with a set of basic competencies in communication, information, technology and other fields is increasing. The educational process, first of all, is organized on the basis of the principle of training the young computer teacher at a professional level, as well as ensuring that the young generation will become a mature specialist in their profession in the future, developing the ability to make clear decisions in a short period of time, and in addition, acquiring a profession. The policy of the Republic of Uzbekistan in the field of education is distinguished by the fact that it has a national character and is aimed at training competitive personnel for various branches of the increasingly developing economy. Nowadays, it is a priority task for pedagogues to recognize and develop the abilities of young students to think freely.

For this reason, an important task is given to young computer science teachers, as one of the main tasks is to form a person who has the capacity to perceive little, is an independent thinker and has a new intellectual level. Such trained personnel have the ability to carry out creative activities based on theoretical knowledge, independently manage their behavior and activities, and have a great responsibility in teaching the next generation in their pedagogical activities. and he should be a skilled specialist in his profession. In this sense, the issue of improving the methodological training of young informatics teachers is urgent. Because the goal-oriented training of students studying in general secondary and professional educational institutions and the formation of their thinking ability, the process of forming computer

literacy in them requires a lot of perseverance and skill from computer science teachers.

When computers start to be produced, the problem of coding information related to their working principle in the binary number system and performing operations arises. Because, in order to learn how to perform an action on a computer, a person must first imagine how to perform this action. So, in order to learn the principle of operation of computers, it is appropriate to know how operations are performed in the binary number system.

In computers, each character is assigned 8 characters consisting of a sequence of 0's and 1's. Using different permutations of the 8 zeros and ones, we can encode different types of characters. If we divide them into 8 using numbers consisting of 0 and 1, the number of permutations will be equal to 2^8=256, which means that they can encode 256 numbers, letters and various other characters using computer representation of data. . If we take the numbers in the hexadecimal number system as column and row numbers, we create a new table. In this case, every number and alphabetic character in the world standards: ASCII (American Standard Code for Information Interchange) table is created. We can use three different colors to represent color on a computer. These are green, brown and red. This device is called an RGB module. A bit is accepted as the smallest unit of information. A bit is a symbol of 0 or 1 in the digital representation of information, which is derived from the words binary digit in English and means a binary number. For example, 11011011 has 8 bits because there are 8 digits (0 and 1) involved. A byte is accepted as a larger unit of measurement than a bit: 1 byte=8 bits. For example: 11110001 has 1 byte of information because 8 bits (number) are involved in it, and 1100011100111101 has 2 bytes of information because 16 bits (number) are involved in it. Each character included in the information is considered to be 1 byte in size. For example, the letter "D" has a size of 1 byte or 8 bits; DA is 2 bytes in size; DAN is 3 bytes in size. There is also a unit larger than a byte. It is called a kilobyte (KB). 1 Kilobyte=1024 bytes. Units larger than kilobytes are defined as megabytes (MB), gigabytes (GB), terabytes (TB), petabytes (PB). The amount of information transmitted per unit of time is called the data transfer rate. Baud is accepted as a unit of data transmission speed: 1 baud=1 bit/1 second.

We know how to perform arithmetic operations on numbers in the decimal system used in our daily life. These methods are also suitable for all other positional counting systems. If we perform addition in the decimal number system, we first add units, tens, then hundreds, etc. This process is valid for all positional counting systems and continues

Qo‘shish	Ayirish	Ko‘paytirish
$0+0=0$	$0-0=0$	$0\cdot 0=0$
$0+1=1$	$1-0=0$	$0\cdot 1=0$
$1+0=1$	$10-0=10$	$1\cdot 0=0$
$1+1=10$	$10-1=1$	$1\cdot 1=1$

until the largest discharge is added to the last value. In this process, you should always know that if the result is greater than the value of the base of the number system when we add the numbers of a discharge, then a large part of the sum from the base of the number system should be transferred to the next discharge.[1-4]

For example, the addition operation in the decimal system:

$$\begin{array}{rr} & 193275_{10} \\ & 79538_{10} \\ + & 1983_{10} \\ \hline & 274796_{10} \end{array}$$

is done in the form.

We know that the binary number system consists of two numbers. These are the numbers 0 and 1. Subtraction, addition and multiplication operations in the binary number system are performed as follows:

Adding

The binary addition table is very simple. In only one case, when a 1 + 1 addition is performed, a throw to the most significant bit occurs.

1001 + 1010 = 10011
1101 + 1011 = 11000
11111 + 1 = 100000
1010011,111 + 11001,11 = 1101101,101

Subtract

When performing subtraction, the smaller number is always subtracted from the larger number and the corresponding sign is placed. A 0 to a 1 on the difference table indicates a high level of credit.

10111001,1 – 10001101,1 = 101100,0
101011111 – 110101101 = – 1001110

Increase

The multiplication operation is carried out by successively multiplying the multiplier by the next digit of the multiplier using the multiplication table according to the usual scheme used in the decimal system.

11001 * 1101 = 101000101
11001,01 * 11,01 = 1010010,0001

Throwing from the number system of 10 to other number systems

To cast from the 10 number system to any other k number system, we use the following sequence:

- The given number in the 10-number system is divided by the number k using the angular division method and the remainder is recorded.

- in the next step, the resulting division is again divided by the number k,

- bund a is continued until the divisor is smaller than the number k.

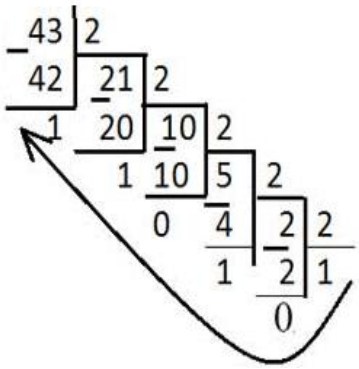
- the resulting division and remainders are recorded from the end to the beginning (from the bottom to the top).[5-10]

- this number will be the answer we were looking for!

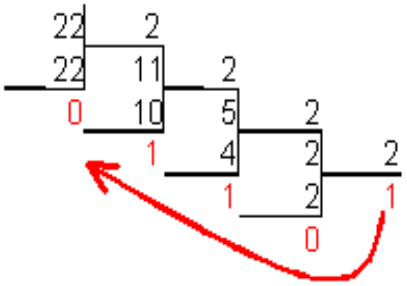
O'nlikdagi son	*Ikkilikdagi ko'rinishi*
0	0
1	1
2	10
3	11
4	100
5	101
6	110
7	111
8	1000
9	1001
10	1010
11	1011
12	1100
13	1101
14	1110
15	1111

Example: Express the number 43_{10} in the binary number system:

$43_{10}=101011_2$



Example: Express the number 22_{10} in the binary number system:



$22_{10}=10110_2$

In this example, we multiply the number by 2, multiply the resulting quotient by 2 again, and continue this process until the quotient is less than 2, and write the resulting remainders from back to front. As a result, our expression

$22_{10}=10110_2$ is formed. Converting from the binary system to the decimal system is done as follows:

Example: Convert the binary number 101110 to decimal.

$101110_2=1*2^5+0*2^4+1*2^3+1*2^2+1*2^1+0*2^0=32+0+8+4+2+0=46_{10}$ yoki $101110_2=25+23+22+21=32+8+4+2=46_{10}$

Answer: 46_{10}

For example, let's define a sum. We calculate the sum by multiplying each term of the sum into the binary number system. Then we will transfer it back to the system of counting seconds. When we compare the result with the first sum, they are equal.

Let's look at an example:

Example: let's determine the sum of $279_{10}+274_{10}+790_{10}=1343_{10}$. Now we convert each term in the sum to the binary number system:

$279_{10}=100010111_2$;

$274_{10}=100010010_2$

$790_{10}=1100010110_2$

We add the numbers in the binary number system and form the following sum: $100010111_2+100010010_2+1100010110_2=10100111111_2$

And we transfer the result to the instantaneous counting system:

$10100111111_2=1*2^{10}+0*2^9+1*2^8+0*2^7+0*2^6+1*2^5+1*2^4+1*2^3+1*2^2+1*2^1+1*2^0=1343_{10}$

So $10100111111_2=1343_{10}$.

It can be seen that in both cases the sum was the same.[11-15]

In short, the result of operations on numbers in the decimal number system, after converting them to the binary number system, the value when performing the operations is the same as the value when the number is transferred to the decimal number system.

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