Operații aritmetice de bază

Adunarea

în baza 10:

$$\begin{array}{r} 2046_{(10)} + \\ 352_{(10)} \\ \hline 2428_{(10)} \end{array}$$

$0+6+2=8$; $8:10=0$ rest 8

$0+4+8=12$; $12:10=1$ rest 2

$1+0+3=4$; $4:10=0$ rest 4

$0+2+0=2$; $2:10=0$ rest 2

în baza p

$$\begin{array}{r} a_n a_{n-1} \dots a_1 a_{0(p)} + \\ b_m b_{m-1} \dots b_1 b_{0(p)} \\ \hline c_k c_{k-1} \dots c_1 c_{0(p)} \end{array}$$

$i=\overline{0, max(m,n)}$

$t_0=0$

$(t_i+a_i+b_i):p=t_{i+1}$ rest c_i

$k=\begin{cases} max(m,n) & , t_{max(n,m)+1} \\ max(m,n)+1, & \text{altfel} \end{cases}$; $c_k=t_{max(n,m)+1}$

$$\begin{array}{r} 1D_{(16)} + \\ 25C_{(16)} \\ \hline 279_{(16)} \end{array}$$

$13+12=25_{(10)}=19_{(16)}$

$$\begin{array}{r} 8786231_{(9)} + \\ 432113_{(9)} \\ \hline 10328344_{(9)} \end{array}$$

$3+8=11_{(10)}=$

$11:9=1$ rest 2

$7+4+1=12$

$12:9=1$ rest 3

$$\begin{array}{r} 101101001_{(2)} + \\ 1011010_{(2)} \\ \hline 111000011_{(2)} \end{array}$$

$$\begin{array}{r} 10221_{(3)} + \\ 2201_{(3)} \\ \hline 20122_{(3)} \end{array}$$

$$\begin{array}{r} 135621_{(7)} + \\ 512653_{(7)} \\ \hline 651604_{(7)} \end{array}$$

$$\begin{array}{r} 25432_{(6)} + \\ 5411_{(6)} \\ \hline 35243_{(6)} \end{array}$$

$4+4=8_{(10)}$

$8:6=1$ r 2

$6+5=11_{(10)}$

$11:6=1$ r 5

$$\begin{array}{r} 67345_{(8)} + \\ 2134_{(8)} \\ \hline 71501_{(8)} \end{array}$$

$1+8=9$

$$\begin{array}{r} 3412_{(5)} + \\ 233_{(5)} \\ \hline 4200_{(5)} \end{array}$$

$$\begin{array}{r} 12302_{(4)} + \\ 21231_{(4)} \\ \hline 100133_{(4)} \end{array}$$

Scăderea

în baza 10:

$$\begin{array}{r} \overset{0}{5}\overset{-1}{8}05_{(10)} - \\ 723_{(10)} \\ \hline 5082_{(10)} \end{array}$$

$0 + 5 - 3 = 2 \geq 0$

$0 + 0 - 2 = -2 < 0;\ 10 - 2 = 8$

$-1 + 8 - 7 = 0 \geq 0$

$0 + 5 - 0 = 5 \geq 0$

în baza p

precondiție: $A \geq B$

$$\begin{array}{r} a_n a_{n-1} \ldots a_1 a_{0(p)} - \\ b_m b_{m-1} \ldots b_1 b_{0(p)} \\ \hline c_n c_{n-1} \ldots c_1 c_{0(p)} \end{array}$$

$i = \overline{0, n}$

$t_0 = 0$

$$c_i = \begin{cases} t_i + a_i - b_i, & \text{dacă } t_i + a_i - b_i \geq 0,\ t_{i+1} = 0 \\ t_i + a_i - b_i + p, & \text{altfel};\ t_{i+1} = -1 \end{cases}$$

$$\begin{array}{r} \overset{-1}{1}\overset{-1}{0}\overset{-1}{0}\overset{-1}{0}00_{(16)} - \\ 732A_{(16)} \\ \hline 8CD6_{(16)} \end{array}$$

$$\begin{array}{r} \overset{-1}{1}0101\overset{-1}{1}\overset{-1}{1}00_{(2)} - \\ 1100110_{(2)} \\ \hline 1000110_{(2)} \end{array}$$

$$\begin{array}{r} 1\overset{-1}{3}\overset{-1}{2}01_{(4)} - \\ 2311_{(4)} \\ \hline 10230_{(4)} \end{array}$$

$$\begin{array}{r} 52\overset{-1}{3}14_{(6)} - \\ 42123_{(6)} \\ \hline 10151_{(6)} \end{array}$$

$$\begin{array}{r} 2\overset{-1}{2}\overset{-1}{1}\overset{-1}{0}1_{(3)} - \\ 212_{(3)} \\ \hline 21112_{(3)} \end{array}$$

$$\begin{array}{r} 3\overset{-1}{2}411_{(5)} - \\ 2141_{(5)} \\ \hline 30220_{(5)} \end{array}$$

Înmulțirea cu o cifră

în baza 10:

$$\begin{array}{r} 7024_{(10)} * \\ 6_{(10)} \\ \hline 42144_{(10)} \end{array}$$

(transporturi: +4, 0, +1, +2)

$0+4*6=24$; $24:10=2$ rest 4
$2+2*6=14$; $14:10=1$ rest 4
$1+0*6=1$; $1:10=0$ rest 1
$0+7*6=42$; $42:10=4$ rest 2

în baza p

$$\begin{array}{r} a_n a_{n-1} \dots a_1 a_{0(p)} * \\ b_{(p)} \\ \hline c_{n+1} c_n \dots c_1 c_{0(p)} \end{array}$$

$i=\overline{0,n}$
$t_0=0$
$(t_i+a_i*b):p=t_{i+1}$ rest c_i
$c_{n+1}=t_{n+1}$

$$\begin{array}{r} 30121_{(4)} * \\ 2_{(4)} \\ \hline 120302_{(4)} \end{array}$$

$$\begin{array}{r} 703210_{(8)} * \\ 3_{(8)} \\ \hline 1511630_{(8)} \end{array}$$

$$\begin{array}{r} A23D_{(16)} * \\ 5_{(16)} \\ \hline 32B31_{(16)} \end{array}$$

$B \cdot 5 = 65$

$$\begin{array}{r} 643012_{(7)} * \\ 6_{(7)} \\ \hline 1254105_{(7)} \end{array}$$

$$\begin{array}{r} 3\ 1\ 0\ 5\ 4_{(6)} * \\ 5_{(6)} \\ \hline 2\ 3\ 5\ 4\ 4\ 2_{(6)} \end{array}$$

$5*4=20$
$20:6=3$ rest 2
$5\cdot 5+3=25+3=28$
$28:6=4$ rest 4
$5\cdot 0+4=4:6=0$ rest 4
$5:6=0$ rest 5
$15:6=2$ rest 3

Împărțirea la o cifră

în baza 10: $\overrightarrow{2034}_{(10)} : 3_{(10)} = 0678_{(10)}$ rest $0_{(10)}$

$(0 * 10 + 2) : 3 = 0$ rest 2

$(2 * 10 + 0) : 3 = 20 : 3 = 6$ rest 2

$(2 * 10 + 3) : 3 = 23 : 3 = 7$ rest 2

$(2 * 10 + 4) : 3 = 24 : 3 = 8$ rest 0

în baza p:

$\overrightarrow{a_n a_{n-1} \ldots a_1 a_0}_{(p)} : b_{(p)} = c_n c_{n-1} \ldots c_1 c_{0(p)}$ rest $r_{(p)}$

$i = \overline{n, 0}$

$t_n = 0 \qquad (t_i * p + a_i) : b = c_i$ rest t_{i-1} ; $r = t_{-1}$

$17A_{(16)} : 2_{(16)} = 0BD_{(16)}$ r $0_{(16)}$

$1 : 2 = 0$ r 1

$(16 \cdot 1 + 7) : 2 = 23 : 2 = 11$ r 1

$(16 \cdot 1 + 10) : 2 = 26 : 2 = 13$ r 0

$42037_{(9)} : 4_{(9)} = 10454_{(9)}$ rest $= 0_{(9)}$

$4 : 4 = 1, r = 0$

$2 : 4 = 0, r = 2 \Rightarrow (2 \cdot 9 + 0) : 4 = 18 : 4 = 4, r = 2$

$(2 \cdot 9 + 3) : 4 = 21 : 4 = 5, r = 1$

$(1 \cdot 9 + 7) : 4 = 16 : 4 = 4, r = 0$