**Sistema de numeretie binar:**

1. Adunarea

1011101,11012+1110,0112=

Pasul 1: aranjam numerele virgula sub virgula

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 1 | 1 | 1 | 1 | 1 | 1 | 1 |  |  |  |  |
| 1 | 0 | 1 | 1 | 1 | 0 | 1, | 1 | 1 | 0 | 1 | + |
|  |  |  | 1 | 1 | 1 | 0, | 0 | 1 | 1 |  |  |
| 1 | 1 | 0 | 1 | 1 | 0 | 0, | 0 | 0 | 1 | 1 |  |

1. Scaderea

101100,1012 – 1101,012

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| . | 1 | 10. | 10. | 1 | 10 | . | 10 |  |  |
| 1 | 0 | 1 | 1 | 0 | 0, | 1 | 0 | 1 | - |
|  |  | 1 | 1 | 0 | 1, | 0 | 1 |  |  |
|  | 1 | 1 | 1 | 1 | 1, | 0 | 1 | 1 |  |

1. Inmultirea

11011,112 \* 110,12 =

Pasul 1: aranjam numerele dupa partea dreapta

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  | 1 | 1 | 0 | 1 | 1, | 1 | 1 | \* |
|  |  |  |  |  |  |  |  |  |  |  | 1 | 1 | 0, | 1 |  |
|  |  |  |  |  |  |  |  | 1 | 1 | 0 | 1 | 1 | 1 |  |  |
|  |  |  |  |  |  |  | 0 | 0 | 0 | 0 | 0 | 0 | 0 |  |  |
|  |  |  |  |  |  | 1 | 0 | 1 | 1 | 1 | 1 | 1 |  |  |  |
|  |  |  |  |  | 1 | 1 | 0 | 1 | 1 | 1 | 1 |  |  |  |  |
|  |  |  |  | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 0, | 0 | 1 | 1 |  |

1. Impartirea

11011,112 / 110,12 =

Pasul 1: deplasam virgule la ambele numere cu atitea pozitii la drepta cate cifre dupa virgula ale numarului la care impartim (scapam de virgule in numarul al 2)

(Шаг 1: переносим запятые к обоим числам на столько позиций вправо, сколько цифр после запятой делимого числа (избавляемся от запятых в числе 2))

Pasul 2: determinam numarul de cifre care formeaza un numar mai mare de cit cel la care impartim, daca pina la virgula nu avem asa numar de cifre vom pune 0, si vom repeta procedeu.

(Шаг 2: определяем количество цифр, образующих число большее того, на которое делим, если до точки у нас нет такого количества цифр, то поставим 0, и повторим процедуру.)

Pasul 3: efectuam impartirea si calculam citul si resrul; ne convingem despre corectitudinea impartirii comparind restul cu numarul la care impartim (restul < impartitorul)

(Шаг 3: выполняем деление и вычисляем сколько и остаток; убеждаемся в правильности деления, сравнивая остаток с числом, на которое делим (остаток < делителя))

Pasul 4: coborim cite o cifra din numarul pe care impartim si repetam pasul 3, in caz cind nu putem face impartirea dupa coborirea

(Шаг 4: Мы вычитаем одну цифру из числа, которое мы делим, и повторяем шаг 3, если мы не можем разделить после убывания.)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| - | 1 | 1 | 0 | 1 | 1, | 1 | 1 |  | 1 | 1 | 0 | 1 |  |  |  |  |  |  |  |  |  |
|  | 1 | 1 | 0 | 1 |  |  |  |  | 1 | 0 |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  | 0 | 1 | 1 | 1 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  | 1 | 1 | 0 | 1 |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  | 0 | 1 | 0 | 0 | 0 | 0 |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  | 1 | 1 | 0 | 1 |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

11110101,110112 + 1111,011012 =

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |  |  |
|  | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 1, | 1 | 1 | 0 | 1 | 1 | + |
|  |  |  |  |  | 1 | 1 | 1 | 1, | 0 | 1 | 1 | 0 | 1 |  |
| 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1, | 0 | 1 | 0 | 0 | 0 |  |

11,012 \* 101,12 =

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  | 1 | 0 | 1, | 1 | \* |
|  |  |  |  | 1 | 1, | 0 | 1 |  |
|  |  |  |  | 1 | 0 | 1 | 1 |  |
|  |  |  | 0 | 0 | 0 | 0 |  |  |
|  |  | 1 | 0 | 1 | 1 |  |  |  |
|  | 1 | 0 | 1 | 1 |  |  |  | + |
| 1 | 0 | 0 | 0 | 1, | 1 | 1 | 1 |  |

1011001,01012 – 1011,1012 =

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | . | .10 | 1 | 1 | .10 | 10 | . | 10 |  |  |  |  |
| 1 | 0 | 1 | 1 | 0 | 0 | 1, | 0 | 1 | 0 | 1 | - |  |  |
|  |  |  | 1 | 0 | 1 | 1, | 1 | 0 | 1 |  |  |  |  |
| 1 | 0 | 0 | 1 | 1 | 0 | 1, | 1 | 0 | 1 | 1 |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |

**Sistemul de numeratie octal**

* Adunarea

376,528 + 24,7618 =

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 1 | 1 | 1 | 1 |  |  |  |
| 3 | 7 | 6, | 5 | 2 | 0 | + |
|  | 2 | 4, | 7 | 6 | 1 |  |
| 4 | 2 | 3, | 5 | 0 | 1 |  |

* Scaderea

30200,458 – 3567,278 =

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| \* | 7 | \*10 | \* | 7 | \* | 10 |  |
| 3 | 0 | 2 | 0 | 0, | 4 | 5 | - |
|  | 3 | 5 | 6 | 7, | 2 | 7 |  |
| 2 | 4 | 4 | 1 | 1, | 1 | 6 |  |

50102,438 – 367,358 =

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| \* | 7 | \*10 | 7 | 10 | \* | 10 |  |
| 5 | 0 | 1 | 0 | 2, | 4 | 3 | - |
|  |  | 3 | 6 | 7, | 2 | 7 |  |
| 4 | 7 | 5 | 1 | 3, | 0 | 6 |  |

* Inmultirea

37,58 \* 4,628 =

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  | 3 | 2 |  |  |
|  |  |  |  |  | 3 | 7, | 5 | \* |
|  |  |  |  |  | 4, | 6 | 2 |  |
|  |  |  |  |  | 7 | 7 | 2 |  |
|  |  |  | 2 | 7 | 5 | 6 |  |  |
|  |  | 1 | 7 | 6 | 4 |  |  | + |
|  |  |  |  |  |  | 5 | 2 |  |

16 + 1 = 17

52 + 3 = 55

22 + 5 = 27

34 + 2 = 36

14 + 3 = 17

15 + 4 = 21

* Impartirea

352,168 / 7,48 =

1. Deplasam virgula
2. Alegem lungimea nr care poate fi / (daca pana la “,” nu exista nr cu suficiente cifre ca se faem /, atunci la rezultat punem 0, si luam cifre necesare dupa “,”)
3. Efectuam impartirea, corectitudinea acesteia o verificam omparand restul obtinut cu valoarea impartitorului (r < i)
4. Vom cobori cate o cifra in caz daca nr obtinut dupa coborare poate fi /, atunci facem /, in caz contrar punem 0 la rs si repetam pasul 4.
5. Stopam daca: restul elte 0, sau rezultatul se repet periodic, sau este indicate precizia

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 3 | 5 | 2 | 1, | 6 | 7 | 4 |  |  |  |
| 2 | 6 | 4 |  |  | 3 | 7, | 1 | 6 | 5 |
|  | 6 | 6 | 1 |  |  |  |  |  |  |
|  | 6 | 4 | 4 |  |  |  |  |  |  |
|  |  | 1 | 5 | 6 |  |  |  |  |  |
|  |  |  | 7 | 4 |  |  |  |  |  |
|  |  |  | 6 | 2 | 0 |  |  |  |  |
|  |  |  | 5 | 5 | 0 |  |  |  |  |
|  |  |  |  | 5 | 0 | 0 |  |  |  |
|  |  |  |  | 4 | 5 | 4 |  |  |  |
|  |  |  |  |  | 2 | 4 |  |  |  |

**Sistem hexazecemal**

* Adunarea

B47,C5D16 + 6E,BFA316 = 15D,B73 + F9,2ACE =

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | 1 | 1 | 1 | 1 |  |  |  |
| B | 4 | 7, | C | 5 | D |  | + |
|  | 6 | E, | B | F | A | 3 |  |
| B | B | 6, | 8 | 5 | 7 | 3 |  |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 1 |  | 1 |  |  |  |  |  |
| 1 | 5 | D, | B | 7 | 3 |  | + |  |
|  | F | 9, | 2 | A | C | E |  |  |
| 2 | 5 | 6 | E | 1 | F | E |  |  |

* Scadere

2A500,39B16 – FA5,DCA16 =

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | . | .10 | F | F | .10 | 10 |  |  |
| 2 | A | 5 | 0 | 0, | 3 | 9 | B | - |
|  |  | F | A | 5, | D | C | A |  |
| 2 | 9 | 5 | 5 | A, | 5 | D | 1 |  |

**• Inmultirea**

F3,816 x E8,C16 =

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  | 3 | 7 |  |  |  |
|  |  |  |  |  | F | 3, | 8 | \* |  |
|  |  |  |  |  | E | 8, | C |  |  |
|  |  |  |  | B | 6 | A | 0 |  |  |
|  |  |  | 7 | 9 | C | 0 |  |  |  |
|  |  | D | 2 | 1 | 0 |  |  | + |  |
|  |  | D | A | 6 | 2, | A | 0 |  |  |

24+6=2A

18+4=1C

2A+7=31

• Impartirea

2F3,816 : E,C116 =

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 2 | F | 3 | 8 | 0 | E | C | 1 |  |
|  | 2 | C | 4 | 3 |  | 3 | 3, | 3 | 4 |
|  |  | 2 | F | 5 | 0 |  |  |  |  |
|  |  | 2 | C | 4 | 3 |  |  |  |  |
|  |  |  | 3 | 0 | D | 0 |  |  |  |
|  |  |  | 2 | C | 4 | 3 |  |  |  |
|  |  |  |  | 4 | 8 | D | 0 |  |  |
|  |  |  |  | 3 | B | 0 | 4 |  |  |
|  |  |  |  |  | D | C | C | 0 |  |
|  |  |  |  |  |  |  |  |  |  |

2A+2=2C

38+3=3B

Д/З: Составить и решить примеры в каждой системе счисления (всего 12)

**Двоичная система счисления:**

1. Сложение

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0, | 1 | 1 | 1 | 0 | 1 |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

101100111,01012 + 11010010,1012 =

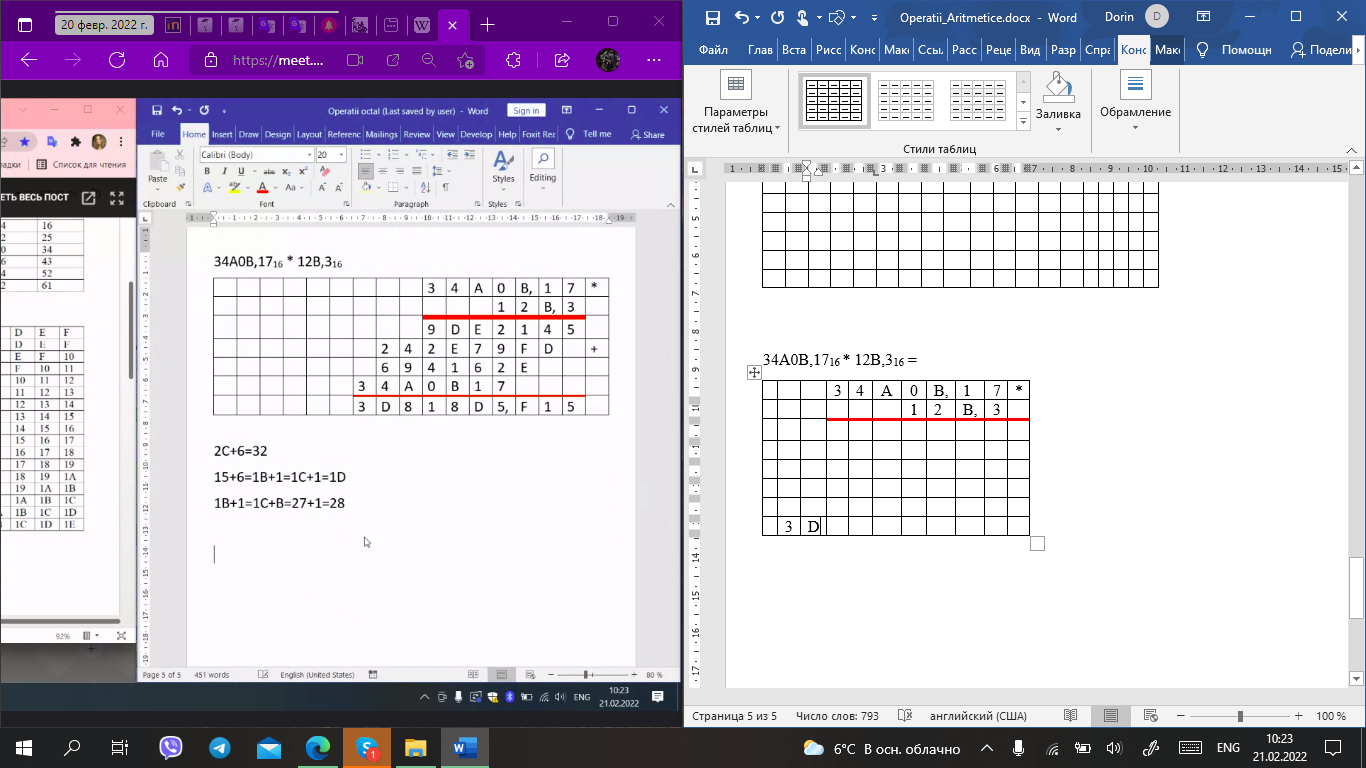
Delenie v dvoichoy sisteme schislinia

1001101,1012 / 11,012 =

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0, | 1 | 1 | 1 | 0 | 1 |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

34A0B,1716 \* 12B,316 =

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  | 3 | 4 | A | 0 | B, | 1 | 7 | \* |
|  |  |  |  |  |  | 1 | 2 | B, | 3 |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  | 3 | D |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |



3AB,1F5D16 / E,C416 =

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 3 | A | B | 1 | F, | 5 | D | E | C | 4 |  |  |  |  |
| 2 | C | 4 | C |  |  |  | 3 | F, | 9 | A | 1 | 9 | … |
|  | E | 6 | 5 | F |  |  |  |  |  |  |  |  |  |
|  | D | D | 7 | C |  |  |  |  |  |  |  |  |  |
|  |  | 8 | E | 3 | 5 |  |  |  |  |  |  |  |  |
|  |  | 8 | 4 | E | 4 |  |  |  |  |  |  |  |  |
|  |  |  | 9 | 5 | 1 | D |  |  |  |  |  |  |  |
|  |  |  | 9 | 3 | A | 8 |  |  |  |  |  |  |  |
|  |  |  |  | 1 | 7 | 5 | 0 |  |  |  |  |  |  |
|  |  |  |  |  | E | C | 4 |  |  |  |  |  |  |
|  |  |  |  |  | 8 | 8 | C | 0 |  |  |  |  |  |
|  |  |  |  |  | 8 | 4 | E | 4 |  |  |  |  |  |
|  |  |  |  |  |  | 3 | D | C | … |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |

6 + 7E

|  |  |  |
| --- | --- | --- |
| 7 | E | + |
|  | 6 |  |
| 8 | 4 |  |

8C+7=93

30065,3148 - 76,528 =

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| \* | 7 | 7 | 10 | \*10 | 10 |  |  |  |  |
| 3 | 0 | 0 | 6 | 5, | 3 | 1 | 4 | - |  |
|  |  |  | 7 | 6, | 5 | 2 |  |  |  |
| 2 | 7 | 7 | 6 | 6, | 5 | 7 | 4 |  |  |
|  |  |  |  |  |  |  |  |  |  |

100101,11012 – 111,0112 =

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| . | 1 | 1 | .10 | 10 |  | . | .10 | 10 |  |  |
| 1 | 0 | 0 | 1 | 0 | 1, | 1 | 1 | 0 | 1 | - |
|  |  |  | 1 | 1 | 1, | 0 | 1 | 1 |  |  |
|  | 1 | 1 | 1 | 1 | 0, | 0 | 1 | 1 | 1 |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |

A3007,B216 – FE,5DC16 =

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | . | F | F | 10 | . | .10 | 10 |  |
| A | 3 | 0 | 0 | 7, | B | 2 |  | - |
|  |  |  | F | E, | 5 | D | C |  |
| A | 2 | F | 0 | 9, | 5 | 4 | 4 |  |