

Сумматор Склянского, Radix-16, 16-ти битный

Двоичный Сумматор Склянского, Radix-16, двоичный, 16-ти битный, быстрый (с параллельными операторами C) в виде системы логических уравнений:

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'--- Step 0 -----
S000 =  A0 XOR  B0  '1dt
C000 =  A0 AND  B0  '1dt

S001 =  A1 XOR  B1  '1dt
C001 =  A1 AND  B1  '1dt

S002 =  A2 XOR  B2  '1dt
C002 =  A2 AND  B2  '1dt

S003 =  A3 XOR  B3  '1dt
C003 =  A3 AND  B3  '1dt

S004 =  A4 XOR  B4  '1dt
C004 =  A4 AND  B4  '1dt

S005 =  A5 XOR  B5  '1dt
C005 =  A5 AND  B5  '1dt

S006 =  A6 XOR  B6  '1dt
C006 =  A6 AND  B6  '1dt

S007 =  A7 XOR  B7  '1dt
C007 =  A7 AND  B7  '1dt

S008 =  A8 XOR  B8  '1dt
C008 =  A8 AND  B8  '1dt

S009 =  A9 XOR  B9  '1dt
C009 =  A9 AND  B9  '1dt

S010 = A10 XOR B10  '1dt
C010 = A10 AND B10  '1dt

S011 = A11 XOR B11  '1dt
C011 = A11 AND B11  '1dt

S012 = A12 XOR B12  '1dt
C012 = A12 AND B12  '1dt

S013 = A13 XOR B13  '1dt
C013 = A13 AND B13  '1dt

S014 = A14 XOR B14  '1dt
C014 = A14 AND B14  '1dt

S015 = A15 XOR B15  '1dt
C015 = A15 AND B15  '1dt

'--- Step 1 -----
C100 = C000                                     '1dt
C101 = C001 OR_
        S001 AND C000                             '3dt
C102 = C002 OR_
        S002 AND C001 OR_
        S002 AND S001 AND C000                     '3dt
C103 = C003 OR_
        S003 AND C002 OR_
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S003 AND S002 AND C001 OR_
 S003 AND S002 AND S001 AND C000 '3dt
 C104 = C004 OR_
 S004 AND C003 OR_
 S004 AND S003 AND C002 OR_
 S004 AND S003 AND S002 AND C001 OR_
 S004 AND S003 AND S002 AND S001 AND C000 '3dt
 C105 = C005 OR_
 S005 AND C004 OR_
 S005 AND S004 AND C003 OR_
 S005 AND S004 AND S003 AND C002 OR_
 S005 AND S004 AND S003 AND S002 AND C001 OR_
 S005 AND S004 AND S003 AND S002 AND S001 AND C000 '3dt
 C106 = C006 OR_
 S006 AND C005 OR_
 S006 AND S005 AND C004 OR_
 S006 AND S005 AND S004 AND C003 OR_
 S006 AND S005 AND S004 AND S003 AND C002 OR_
 S006 AND S005 AND S004 AND S003 AND S002 AND C001 OR_
 S006 AND S005 AND S004 AND S003 AND S002 AND S001 AND C000 '3dt
 C107 = C007 OR_
 S007 AND C006 OR_
 S007 AND S006 AND C005 OR_
 S007 AND S006 AND S005 AND C004 OR_
 S007 AND S006 AND S005 AND S004 AND C003 OR_
 S007 AND S006 AND S005 AND S004 AND S003 AND C002 OR_
 S007 AND S006 AND S005 AND S004 AND S003 AND S002 AND C001 OR_
 S007 AND S006 AND S005 AND S004 AND S003 AND S002 AND S001 AND C000 '3dt
 C000 '3dt
 C108 = C008 OR_
 S008 AND C007 OR_
 S008 AND S007 AND C006 OR_
 S008 AND S007 AND S006 AND C005 OR_
 S008 AND S007 AND S006 AND S005 AND C004 OR_
 S008 AND S007 AND S006 AND S005 AND S004 AND C003 OR_
 S008 AND S007 AND S006 AND S005 AND S004 AND S003 AND C002 OR_
 S008 AND S007 AND S006 AND S005 AND S004 AND S003 AND S002 AND C001 OR_
 C001 OR_
 S008 AND S007 AND S006 AND S005 AND S004 AND S003 AND S002 AND S001 AND C000 '3dt
 C109 = C009 OR_
 S009 AND C008 OR_
 S009 AND S008 AND C007 OR_
 S009 AND S008 AND S007 AND C006 OR_
 S009 AND S008 AND S007 AND S006 AND C005 OR_
 S009 AND S008 AND S007 AND S006 AND S005 AND C004 OR_
 S009 AND S008 AND S007 AND S006 AND S005 AND S004 AND C003 OR_
 S009 AND S008 AND S007 AND S006 AND S005 AND S004 AND S003 AND C002 OR_
 C002 OR_
 S009 AND S008 AND S007 AND S006 AND S005 AND S004 AND S003 AND S002 AND S001 AND C000 '3dt
 S002 AND C001 OR_
 S009 AND S008 AND S007 AND S006 AND S005 AND S004 AND S003 AND S002 AND S001 AND C000 '3dt
 C110 = C010 OR_
 S010 AND C009 OR_
 S010 AND S009 AND C008 OR_
 S010 AND S009 AND S008 AND C007 OR_
 S010 AND S009 AND S008 AND S007 AND C006 OR_
 S010 AND S009 AND S008 AND S007 AND S006 AND C005 OR_
 S010 AND S009 AND S008 AND S007 AND S006 AND S005 AND C004 OR_
 S010 AND S009 AND S008 AND S007 AND S006 AND S005 AND S004 AND C003 OR_
 C003 OR_
 S010 AND S009 AND S008 AND S007 AND S006 AND S005 AND S004 AND S003 AND S002 AND S001 AND C000 '3dt
 S003 AND C002 OR_
 S010 AND S009 AND S008 AND S007 AND S006 AND S005 AND S004 AND S003 AND S002 AND S001 AND C000 '3dt
 S003 AND S002 AND C001 OR_

S010 AND S009 AND S008 AND S007 AND S006 AND S005 AND S004 AND
 S003 AND S002 AND S001 AND C000 '3dt
 C111 = C011 OR_
 S011 AND C010 OR_
 S011 AND S010 AND C009 OR_
 S011 AND S010 AND S009 AND C008 OR_
 S011 AND S010 AND S009 AND S008 AND C007 OR_
 S011 AND S010 AND S009 AND S008 AND S007 AND C006 OR_
 S011 AND S010 AND S009 AND S008 AND S007 AND S006 AND C005 OR_
 S011 AND S010 AND S009 AND S008 AND S007 AND S006 AND S005 AND
 C004 OR_
 S011 AND S010 AND S009 AND S008 AND S007 AND S006 AND S005 AND
 S004 AND C003 OR_
 S011 AND S010 AND S009 AND S008 AND S007 AND S006 AND S005 AND
 S004 AND S003 AND C002 OR_
 S011 AND S010 AND S009 AND S008 AND S007 AND S006 AND S005 AND
 S004 AND S003 AND S002 AND C001 OR_
 S011 AND S010 AND S009 AND S008 AND S007 AND S006 AND S005 AND
 S004 AND S003 AND S002 AND S001 AND C000 '3dt
 C112 = C012 OR_
 S012 AND C011 OR_
 S012 AND S011 AND C010 OR_
 S012 AND S011 AND S010 AND C009 OR_
 S012 AND S011 AND S010 AND S009 AND C008 OR_
 S012 AND S011 AND S010 AND S009 AND S008 AND C007 OR_
 S012 AND S011 AND S010 AND S009 AND S008 AND S007 AND C006 OR_
 S012 AND S011 AND S010 AND S009 AND S008 AND S007 AND S006 AND
 C005 OR_
 S012 AND S011 AND S010 AND S009 AND S008 AND S007 AND S006 AND
 S005 AND C004 OR_
 S012 AND S011 AND S010 AND S009 AND S008 AND S007 AND S006 AND
 S005 AND S004 AND C003 OR_
 S012 AND S011 AND S010 AND S009 AND S008 AND S007 AND S006 AND
 S005 AND S004 AND S003 AND C002 OR_
 S012 AND S011 AND S010 AND S009 AND S008 AND S007 AND S006 AND
 S005 AND S004 AND S003 AND S002 AND C001 OR_
 S012 AND S011 AND S010 AND S009 AND S008 AND S007 AND S006 AND
 S005 AND S004 AND S003 AND S002 AND S001 AND C000 '3dt
 C113 = C013 OR_
 S013 AND C012 OR_
 S013 AND S012 AND C011 OR_
 S013 AND S012 AND S011 AND C010 OR_
 S013 AND S012 AND S011 AND S010 AND C009 OR_
 S013 AND S012 AND S011 AND S010 AND S009 AND C008 OR_
 S013 AND S012 AND S011 AND S010 AND S009 AND S008 AND C007 OR_
 S013 AND S012 AND S011 AND S010 AND S009 AND S008 AND S007 AND
 C006 OR_
 S013 AND S012 AND S011 AND S010 AND S009 AND S008 AND S007 AND
 S006 AND C005 OR_
 S013 AND S012 AND S011 AND S010 AND S009 AND S008 AND S007 AND
 S006 AND S005 AND C004 OR_
 S013 AND S012 AND S011 AND S010 AND S009 AND S008 AND S007 AND
 S006 AND S005 AND S004 AND C003 OR_
 S013 AND S012 AND S011 AND S010 AND S009 AND S008 AND S007 AND
 S006 AND S005 AND S004 AND S003 AND C002 OR_
 S013 AND S012 AND S011 AND S010 AND S009 AND S008 AND S007 AND
 S006 AND S005 AND S004 AND S003 AND S002 AND C001 OR_
 S013 AND S012 AND S011 AND S010 AND S009 AND S008 AND S007 AND
 S006 AND S005 AND S004 AND S003 AND S002 AND S001 AND C000 '3dt
 C114 = C014 OR_
 S014 AND C013 OR_
 S014 AND S013 AND C012 OR_
 S014 AND S013 AND S012 AND C011 OR_
 S014 AND S013 AND S012 AND S011 AND C010 OR_
 S014 AND S013 AND S012 AND S011 AND S010 AND C009 OR_
 S014 AND S013 AND S012 AND S011 AND S010 AND S009 AND C008 OR_

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    S014 AND S013 AND S012 AND S011 AND S010 AND S009 AND S008 AND
C007 OR_
    S014 AND S013 AND S012 AND S011 AND S010 AND S009 AND S008 AND
S007 AND C006 OR_
    S014 AND S013 AND S012 AND S011 AND S010 AND S009 AND S008 AND
S007 AND S006 AND C005 OR_
    S014 AND S013 AND S012 AND S011 AND S010 AND S009 AND S008 AND
S007 AND S006 AND S005 AND C004 OR_
    S014 AND S013 AND S012 AND S011 AND S010 AND S009 AND S008 AND
S007 AND S006 AND S005 AND S004 AND C003 OR_
    S014 AND S013 AND S012 AND S011 AND S010 AND S009 AND S008 AND
S007 AND S006 AND S005 AND S004 AND S003 AND C002 OR_
    S014 AND S013 AND S012 AND S011 AND S010 AND S009 AND S008 AND
S007 AND S006 AND S005 AND S004 AND S003 AND S002 AND C001 OR_
    S014 AND S013 AND S012 AND S011 AND S010 AND S009 AND S008 AND
S007 AND S006 AND S005 AND S004 AND S003 AND S002 AND S001 AND C000 '3dt
C115 = C015 OR_
    S015 AND C014 OR_
    S015 AND S014 AND C013 OR_
    S015 AND S014 AND S013 AND C012 OR_
    S015 AND S014 AND S013 AND S012 AND C011 OR_
    S015 AND S014 AND S013 AND S012 AND S011 AND C010 OR_
    S015 AND S014 AND S013 AND S012 AND S011 AND S010 AND C009 OR_
    S015 AND S014 AND S013 AND S012 AND S011 AND S010 AND S009 AND
C008 OR_
    S015 AND S014 AND S013 AND S012 AND S011 AND S010 AND S009 AND
S008 AND C007 OR_
    S015 AND S014 AND S013 AND S012 AND S011 AND S010 AND S009 AND
S008 AND S007 AND C006 OR_
    S015 AND S014 AND S013 AND S012 AND S011 AND S010 AND S009 AND
S008 AND S007 AND S006 AND C005 OR_
    S015 AND S014 AND S013 AND S012 AND S011 AND S010 AND S009 AND
S008 AND S007 AND S006 AND S005 AND C004 OR_
    S015 AND S014 AND S013 AND S012 AND S011 AND S010 AND S009 AND
S008 AND S007 AND S006 AND S005 AND S004 AND C003 OR_
    S015 AND S014 AND S013 AND S012 AND S011 AND S010 AND S009 AND
S008 AND S007 AND S006 AND S005 AND S004 AND S003 AND C002 OR_
    S015 AND S014 AND S013 AND S012 AND S011 AND S010 AND S009 AND
S008 AND S007 AND S006 AND S005 AND S004 AND S003 AND S002 AND C001 OR_
    S015 AND S014 AND S013 AND S012 AND S011 AND S010 AND S009 AND
S008 AND S007 AND S006 AND S005 AND S004 AND S003 AND S002 AND S001 AND
C000 '3dt

'--- Sum -----
S0 = S000          '1dt
S1 = S001 XOR C100 '2dt
S2 = S002 XOR C101 '4dt
S3 = S003 XOR C102 '4dt
S4 = S004 XOR C103 '4dt
S5 = S005 XOR C104 '4dt
S6 = S006 XOR C105 '4dt
S7 = S007 XOR C106 '4dt
S8 = S008 XOR C107 '4dt
S9 = S009 XOR C108 '4dt
S10 = S010 XOR C109 '4dt
S11 = S011 XOR C110 '4dt
S12 = S012 XOR C111 '4dt
S13 = S013 XOR C112 '4dt
S14 = S014 XOR C113 '4dt
S15 = S015 XOR C114 '4dt
C15 =              C115 '3dt, C15=Cout

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Программа проверки системы логических уравнений двоичного сумматора
Склянского, Radix-16, 16-ти битного, быстрого, на TurboBasic'e:

<https://andserkul.narod.ru/R16PPA16.bas>

Для 64-битного сумматора Склянского потребуется 4 Radix-16 блока, которые образуют 2-х ступенчатый сумматор Склянского 4x16, или 8 Radix-8 блоков, которые образуют тоже 2-х ступенчатый сумматор Склянского 8x8, но количество входов в наибольших операторах вычисления Р и G будет вдвое меньшим, поэтому, по аппаратным затратам, 64-х битный сумматор Склянского Radix-8 более экономичен, чем 64-х битный сумматор Склянского Radix-16. 64-х битный же двоичный сумматор Склянского Radix-4 16x4 будет иметь три ступени и, поэтому, будет менее быстродействующим, чем сумматор Склянского Radix-8 8x8.

Литература:

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2. [Logical Effort of Higher Valency Adders. David Harris](#)
3. [Design Space Exploration for Power-Efficient Mixed-Radix Ling Adders. Chung-Kuan Cheng. Computer Science and Engineering Depart. University of California, San Diego.](#)
4. [Сумматор Склянского, Radix-2, 4-х битный. Куликов А. С.](#)
5. [Сумматор Склянского, Radix-2, 8-ми битный. Куликов А. С.](#)
6. [Сумматор Склянского, Radix-2, 16-ти битный. Куликов А. С.](#)
7. [Сумматор Склянского, Radix-3, 4-х битный. Куликов А. С.](#)
8. [Сумматор Склянского, Radix-3, 8-ми битный. Куликов А. С.](#)
9. [Сумматор Склянского, Radix-3, 16-ти битный. Куликов А. С.](#)
10. [Сумматор Склянского, Radix-4, 4-х битный. Куликов А. С.](#)
11. [Сумматор Склянского, Radix-4, 8-ми битный. Куликов А. С.](#)
12. [Сумматор Склянского, Radix-4, 16-ти битный. Куликов А. С.](#)
13. [Сумматор Склянского, Radix-8, 8-ми битный. Куликов А. С.](#)
14. [Сумматор Склянского, Radix-8, 16-ти битный. Куликов А. С.](#)

Приложение 1.

[TurboBasic 1.0](#)

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