Sieve of prime numbers using tables

MSCN(2010) : 11A99

Author : Barar Stelian Liviu

Adress : Bnei Barak 51321

Jabotinski str. 124/2

Israel

e-mail : stelibarar@mail.com

O V E R V I E W

This study proposes the groupin of numbers that cannot be divided with 3 and/or 5 in eight columns and the allocation of the results obtained from their multiplication , depending on the column which thei belong to .

By using this calculus procedure for establishing prime numbers up to a certain number , the number of prime number multiplication operations is reduced to minimum .

I want tu present the paper entitled "Sieve of prime numbers using tables " tu the vixra.org .

SIEVE OF PRIME NUMBERS USING TABLES

This paper deals with the study of odd numbers that cannot be divided with 3 and/or 5 by grouping them in eight columns, as follows:

Table no. 1

C O L U M N

Position	1	2	3	4	5	6	7	8
0	7	11	13	17	19	23	29	31
1	37	41	43	47	49	53	59	61
2	67	71	73	77	79	83	89	91
3	97	101	103	107	109	113	119	121

....

The multiplication versions are in number of 36 , their results being allocated according to columns, as follows :

Col.1 = Col.	1x8;	2x4;	3x5;			6x7;		
Col.2 = Col.	1x6;	2x8;	3x4;		5x7;			
Col.3 = Col.	1x5;	2x6;	3x8;	4x7;				
Col.4 = Col.	1x2;		3x7;	4x8;	5x6;			
Col.5 = Col.	1x1;	2x7;	3x3;	4x4;	5x8;	6x6;		
Col.6 = Col.	1x7;	2x3;		4x5;		6x8;		
Col.7 = Col.	1x4;	2x5;	3x6;				7x8;	
Col.8 = Col.	1x3;	2x2;		4x6;	5x5;		7x7;	8x8;

Position calculus

The number in position zero is subtracted from the number resulted from the multiplication of to numbers i(p0) of the respective column, namely one from the numbers 7 - 11 - 13 - 17 - 19 - 23 - 29 - 31 , the result being divided with 30 . The number obtained shows the position held by that number depending on the column it belongs to.

The determination of the position calculus formulae :

Due to the multiplication operations between numbers i(p0) : 7-11-13-17-19-23-29-31 and all numbers from table 1 , the results of their positions are obtained, as follows :

Be ,

	7 x 7	7 x 37	7 x 67	7 x 97	...	
p =	1	1+7	1+7x2	1+7x3	... 1 + 7n	col. 5
	7 x 11	7 x 41	7 x 71	7 x 101	...	
p =	2	2+7	2+7x2	2+7x3	... 2 + 7n	col. 4
	7 x 13	7 x 43	7 x 73	7 x 103	...	
p =	2	2+ 7	2+7x2	2+7x3	... 2 + 7n	col. 8
	7 x 17	7 x 47	7 x 77	7 x 107	...	
p =	3	3+7	3+7x2	3+7x3	... 3 + 7n	col.7

....

	11 x 7	11 x 37	11 x 67	11 x 97	...	
P =	2	2+11	2+11x2	2+11x3	... 2 + 11n	col.4
	11 x 11	11 x 41	11 x 71	11 x 101	...	
P =	3	3+11	3+11x2	3+11x3	... 3 + 11n	col.8

....

Or , i(p1) : 37-41-43-47-49-23-29-31 multiplication and all numbers from table 1

	37 x 7	37 x 37	37 x 67	37 x 97	...	
P =	1+7	1+7+37	1+7+37x2	1+7+37x3	... 1 + 7 + 37n	col.5
	37 x 11	37 x 41	37 x 71	37 x 101	...	
P =	2+11	2+11+37	2+11+37x2	2+11+37x3	... 2 + 11 + 37n	col.4

....

Or , i(p2) : 67-71-73-77-79-83-89-91 multiplication and all numbers from table 1

	67 x 7	67 x 37	67 x 67	67 x 97	...	
P =	1+7x2	1+7x2+67	1+7x2+67x2	1+7x2+67x3	... 1 + 7x2 + 67n	col.5

....

Or , i(p3) : 97-101-103-107-109-113-119-121 multiplication and all numbers from table 1

	97 x 7	97 x 37	97 x 67	97 x 97	...
P =	1+7x3	1+7x3+97	1+7x3+97x2	1+7x3+97x3	... 1 + 7x3 + 97n

....

The calculus procedure is applied to each of the eight i(p0) , i(p1) , i(p2) , ... , i(pn) , the results of the positions in tables, as follows:

Table no. 2

C O L U M N

1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
7	5	4	2	1	6	3	2	+7n
6	11	8	2	10	4	6	3	+11n
8	7	13	12	5	4	9	2	+13n
6	7	16	17	9	10	3	12	+17n
8	18	4	14	19	10	6	11	+19n
22	5	8	14	17	23	9	12	+23n
22	18	16	12	10	6	29	27	+29n
7	11	13	17	19	23	29	31	+31n

The filled positions (p0) by the result of the multiplication of the numbers i(po) with the other numbers from table no. 1 ;

n = 0 , 1 , 2 , 3 , ...

7+31	5+23	4+19	2+11	1+7	6+29	3+17	2 +13	+37n
6+17	11+31	8+23	2+7	10+29	4+13	6+19	3+11	+41n
8+19	7+17	13+31	12+29	5+13	4+11	9+23	2+ 7	+43n
6+11	7+13	16+29	17+31	9+17	10+19	3+ 7	12+23	+47n
8+13	**18+29**	**4+ 7**	**14+23**	**19+31**	**10+17**	**6+11**	**11+19**	**+49n**
22+29	5+ 7	8+11	14+19	17+23	23+31	9+13	12+17	+53n
22+23	18+19	16+17	12+13	10+11	6+ 7	29+31	27+29	+59n
7+7	11+11	13+13	17+17	19+19	23+23	29+29	31+31	+61n

The filled positions (p1) by the result of the multiplication of the numbers i(p1) with the other numbers from table no. 1

n = 1 , 2 , 3 , 4 , ...

The positions of (p1) are used for the calculus of (p2) , (p3) , ... , (pn) , through the multiplication operation of i(p0) , as follows :

7+31x2	5+23x2	4+19x2	2+11x2	1+7x2	6+29x2	3+17x2	2+13x2	+67n
6+17x2	11+31x2	8+23x2	2+7x2	10+29x2	4+13x2	6+19x2	3+11x2	+71n
8+19x2	7+17x2	13+31x2	12+29x2	5+13x2	4+11x2	9+23x2	2+7x2	+73n
6+11x2	**7+13x2**	**16+29x2**	**17+31x2**	**9+17x2**	**10+19x2**	**3+7x2**	**12+23x2**	**+77n**
8+13x2	18+29x2	4+7x2	14+23x2	19+31x2	10+17x2	6+11x2	11+19x2	+79n
22+29x2	5+7x2	8+11x2	14+19x2	17+23x2	23+31x2	9+13x2	12+17x2	+83n
22+23x2	18+19x2	16+17x2	12+13x2	10+11x2	6+7x2	29+31x2	27+29x2	+89n
7+7x2	**11+11x2**	**13+13x2**	**17+17x2**	**19+19x2**	**23+23x2**	**29+29x2**	**31+31x2**	**+91n**

The filled positions (p2) by the result of the multiplication of the numbers i(p2) with the other numbers from table no. 1

n = 2 , 3 , 4 , 5 , ...

....

Calculus algorithm :

1. Table no.1 is filled in with all the numbers subject to the primality test;
2. All the numbers subject to the test are introduced in their increasing order in column 9, table no. 2;
3. The p0 calculus formulae are completed from table no. 2 ;
4. All the divisible numbers from table no. 1 are marked according to p0 formulae;

5.All the number are eliminated from column 9, table no. 2 which were marked in table no. 1 according to p0 formulae;

6.The p1 formulae from table 2 are completed; number 49 is not taken into account as being eliminated from table 1;

7.The operations from step 4 and 5 are repeated according to the p1 formula ;

8.The p2 formulae from table 2 are completed and the operations from step 4 and 5 are repeated.

The numbers remained in the column 9 table 2, not being eliminated are prime numbers.

Exemple : Determining prime numbers up to N = 1.001

- divisibility by 7 :

Col.1 : 7 + 7n = 7(217) – 14(427) – 21(637) – 28(847)

Col.2 : 5 + 7n = 5(161) – 12(371) – 19(581) – 26(791) -33(1001)

Col.3 : 4 + 7n = 4(133) – 11(343) – 18(553) – 25(763) – 32(973)

Col.4 : 2 + 7n = 2(77) – 9(287) – 16(497) – 23(707) – 30(917)

Col.5 : 1 + 7n = 1(49) – 8(259) – 15(469) – 22(679) – 29(889)

Col.6 : 6 + 7n = 6(203) – 13(413) – 20(623) – 27(833)

Col.7 = 3 + 7n = 3(119) – 10(329) – 17(539) – 24(749) – 31(959)

Col.8 = 2 + 7n = 2(91) – 9(301) – 16(511) – 23(321) – 30(931)

- divisibility by 11 :

Col.1 = 6 + 11n = 6(187) – 17(517) – 28(847)

Col.2 = 11 + 11n = 11(341) – 22(671) – 33(1001)

Col.3 = 8 + 11n = 8(253) – 19(583) – 30(913)

Col.4 = 2 + 11n = 2(77) – 13(407) – 24(737)

Col.5 = 10 + 11n = 10(319) – 21(649) – 32(979)

Col.6 = 4 + 11n = 4(143) – 15(473) – 26(803)

Col.7 = 6 + 11n = 6(209) – 17(539) – 28(869)

Col.8 = 3 + 11n = 3(121) – 14(451) – 25(781)

- divisibility by 13 :

Col.1 = 8 + 13n = 8(247) – 21(637)

Col.2 = 7 + 13n = 7(221) – 20(611) – 33(1001)

Col.3 = 13 + 13n = 13(403) – 26(793)

Col.4 = 12 + 13n = 12(377) – 25(767)

Col.5 = 5 + 13n = 5(169) – 18(559) – 31(949)

Col.6 = 4 + 13n = 4(143) – 17(533) – 30(923)

Col.7 = 9 + 13n = 9(299) – 22(689)

Col.8 = 2 + 13n = 2(91) – 15(481) – 28(871)

- divisibility by 17 :

Col.1 = 6 + 17n = 6(187) – 23(697)

Col.2 = 7 + 17n = 7(221) – 24(731)

Col.3 = 16 + 17n = 16(493)

Col.4 = 17 + 17n = 17(527)

Col.5 = 9 + 17n = 9(289) – 26(799)

Col.6 = 10 + 17n = 10(323) – 27(833)

Col.7 = 3 + 17n = 3(119) – 20(629)

Col.8 = 12 + 17n = 12(391) – 29(901)

- divisibility by 19 :

Col.1 = 8 + 19n = 8(247) – 27(817)

Col.2 = 18 + 19n = 18(551)

Col.3 = 4 + 19n = 4(133) – 23(703)

Col.4 = 14 + 19n = 14(437)

Col.5 = 19 + 19n = 19(589)

Col.6 = 10 + 19n = 10(323) – 29(893)

Col.7 = 6 + 19n = 6(209) – 25(779)

Col.8 = 11 + 19n = 11(361) – 30(961)

- divisibility by 23 :

Col.1 = 22 + 23n = 22(667)

Col.2 = 5 + 23n = 5(161) – 28(851)

Col.3 = 8 + 23n = 8(253) – 31(943)

Col.4 = 14 + 23n = 14(437)

Col.5 = 17 + 23n = 17(529)

Col.6 = 23 + 23n = 23(713)

Col.7 = 9 + 23n = 9(299) – 32(789)

Col.8 = 12 + 23n = 12(391)

- divisibility by 29 :

Col.1 = 22 + 29n = 22(667)

Col.2 = 18 + 29n = 18(551)

Col.3 = 16 + 29n = 16(493)

Col.4 = 12 + 29n = 12(377)

Col.5 = 10 + 29n = 10(319)

Col.6 = 6 + 29n = 6(203)

Col.7 = 29 + 29n = 29(899)

Col.8 = 27 + 29n = 27(841)

- divisibility by 31 :

Col.1 = 7 + 31n = 7(217)

Col.2 = 11 + 31n = 11(341)

Col.3 = 13 + 31n = 13(403)

Col.4 = 17 + 31n = 17(527)

Col.5 = 19 + 31n = 19(589)

Col.6 = 23 + 31n = 23(713)

Col.7 = 29 + 31n = 29(899)

Col.8 = 31 + 31n = 31(961)

The numbers remained not being eliminated are prime numbers .

Author : Barar Stelian Liviu