Seven Smarandache-Coman sequences of primes

Marius Coman

Abstract. In a previous paper, "Fourteen Smarandache-Coman sequences of primes", I defined the "Smarandache-Coman sequences" as "all the sequences of primes obtained from the Smarandache concatenated sequences using basic arithmetical operations between the terms of such a sequence, like for instance the sum or the difference between two consecutive terms plus or minus a fixed positive integer, the partial sums, any other possible basic operations between terms like a(n) + a(n+2) – a(n+1), or on a term like a(n) + S(a(n)), where S(a(n)) is the sum of the digits of the term a(n) etc." In this paper I extend the notion to the sequences of primes obtained from the Smarandache concatenated sequences using any arithmetical operation and I present seven sequences obtained from the Smarandache concatenated sequences using concatenation between the terms of the sequence and other numbers and also fourteen conjectures on them.

Introduction:

In a previous paper, "Fourteen Smarandache-Coman sequences of primes", I defined the "Smarandache-Coman sequences" as "all the sequences of primes obtained from the Smarandache concatenated sequences using basic arithmetical operations between the terms of such a sequence, like for instance the sum or the difference between two consecutive terms plus or minus a fixed positive integer, the partial sums, any other possible basic operations between terms like a(n) + a(n+2) – a(n+1), or on a term like a(n) + S(a(n)), where S(a(n)) is the sum of the digits of the term a(n) etc." In this paper I extend the notion to the sequences of primes obtained from the Smarandache concatenated sequences using any arithmetical operation and I present seven sequences obtained from the Smarandache concatenated sequences using concatenation between the terms of the sequence and other numbers and also fourteen conjectures on them.

Note: The Smarandache concatenated sequences are well known for the very few terms which are primes; on the contrary, many Smarandache-Coman sequences can be constructed that probably have an infinity of terms (primes, by definition).

Note: I shall use the notation a(n) for a term of a Smarandache concatenated sequence and b(n) for a term of a Smarandache-Coman sequence.

SEQUENCE I

Starting from the Smarandache consecutive numbers sequence (defined as the sequence obtained through the concatenation of the first n positive integers, see A007908 in OEIS), we define the following Smarandache-Coman sequence: b(n) = a(n)1, i.e. the terms of the Smarandache sequence concatenated to the right with the number 1. I conjecture that there exist an infinity of terms b(n) which are primes.

We have:

: b(1) = 11, prime;
: b(3) = 1231, prime;
: b(9) = 1234567891, prime;
: b(11) = 12345678910111, prime;
: b(16) = 12345678910111213141516 1, prime;
: b(26) =12345678910111213141516171819202122232425261, prime;
(...)

I also conjecture that there exist an infinity of terms b(n) which are semiprimes (some of them p*q having the interesting property that q - p + 1 is prime; such terms are: b(5) = 123451 = 41*3011 and 3011 - 41 + 1 = 2971; b(6) = 1234561 = 211*5851 and 5851 - 211 + 1 = 5641, prime).

SEQUENCE II

Starting from the Smarandache concatenated odd sequence (defined as the sequence obtained through the concatenation of the odd numbers from 1 to 2*n - 1, see A019519 in OEIS), we define the following Smarandache-Coman sequence: b(n) = a(n)1, i.e. the terms of the Smarandache sequence concatenated to the right with the number 1. I conjecture that there exist an infinity of terms b(n) which are primes.

We have:

: b(1) = 11, prime;
: b(2) = 131, prime;
: b(9) = 13579111315171, prime;
: b(10) = 1357911131517191, prime;
: b(12) = 1357911131517192123 1, prime;

: b(15) = 135791113151719212325272 91, prime;
(...)

I also conjecture that there exist an infinity of terms b(n) which are semiprimes.

SEQUENCE III

Starting from the Smarandache reverse sequence (defined as the sequence obtained through the concatenation of the first n positive integers in reverse order, see A000422 in OEIS), we define the following Smarandache-Coman sequence: b(n) = a(n)1, i.e. the terms of the Smarandache sequence concatenated to the right with the number 1. I conjecture that there exist an infinity of terms b(n) which are primes.

We have:

: b(1) = 11, prime;
: b(2) = 211, prime;
: b(8) = 876543211, prime;
: b(9) = 9876543211, prime;
: b(22) = 22212019181716151413121110987654321 1, prime;
: b(26) =1234567891011121314151617181920212223242526 1, prime;
(...)

I also conjecture that there exist an infinity of terms b(n) which are semiprimes, some of them having the interesting property that one of the factor is much larger than the other one; such terms are:

: b(15) = 151413121110987654321 1 = 29*5221142107275436 3559;
: b(17) = 1716151413121110987654321 1 = 359*47803660532621475979229;
: b(18) = 181716151413121110987654321 1 = 31*586181133590713261250497 81;
: b(31) = 31302928272625242322212019181716151413121110987654321 1 = 519373*602706114346052688957878426135285265370381421207.

SEQUENCE IV

Starting from the Smarandache n2*n sequence (the n-th term of the sequence is obtained concatenating the numbers n and 2*n, see A019550 in OEIS), we define the following Smarandache-Coman sequence: b(n) = a(n)1, i.e. the terms of the Smarandache sequence concatenated to the right with the right with the number 1. I conjecture that there exist an infinity of terms b(n) which are primes.

We have:

: b(2) = 241, prime;
: b(5) = 5101, prime;
: b(6) = 6121, prime;
: b(8) = 8161, prime;
: b(9) = 9181, prime;
: b(12) = 12241, prime;
: b(14) = 14281, prime;
: b(17) = 17341, prime;
: b(19) = 19381, prime;
: b(22) = 22441, prime;
: b(24) = 24481, prime;
(...)
: b(104) = 1042081, prime;
: b(106) = 1062121, prime;
: b(108) = 1082161, prime;
: b(110) = 1102201, prime;
: b(112) = 1122241, prime;
(...)
: b(1004) = 100420081, prime;
: b(1007) = 100720141, prime;
: b(1011) = 101120221, prime;
(...)

I also conjecture that there exist an infinity of terms b(n) which are semiprimes, as well as an infinity of terms b(n) which are squares of primes: such terms are b(1) = 121 = 11^2, b(3) = 361 = 19^2, b(10) = 10201 = 101^2.

SEQUENCE V

Starting again from the Smarandache n2*n sequence (the n-th term of the sequence is obtained concatenating the numbers n and 2*n, see A019550 in OEIS), we define the following Smarandache-Coman sequence: b(n) = 1a(n)1, i.e. the terms of the Smarandache sequence concatenated both to the left and to the right with the number 1. I conjecture that there exist an infinity of terms b(n) which are primes.

We have:

: b(3) = 1361, prime;
: b(4) = 1481, prime;
: b(5) = 15101, prime;
: b(9) = 19181, prime;

: b(12) = 112241, prime;
: b(14) = 114281, prime;
: b(15) = 115301, prime;
: b(18) = 118361, prime;
: b(20) = 120401, prime;
: b(21) = 121421, prime;
(...)
: b(100) = 11002001, prime;
: b(104) = 11042081, prime;
: b(105) = 11052101, prime;
: b(107) = 11072141, prime;
: b(108) = 11082161, prime;
(...)

I also conjecture that there exist an infinity of terms b(n) which are semiprimes.

SEQUENCE VI

Starting from the Smarandache nn^2 sequence (the n-th term of the sequence is obtained concatenating the numbers n and n^2, see A053061 in OEIS), we define the following Smarandache-Coman sequence: b(n) = a(n)1, i.e. the terms of the Smarandache sequence concatenated to the right with the number 1. I conjecture that there exist an infinity of terms b(n) which are primes.

We have:

: b(2) = 241, prime;
: b(6) = 6361, prime;
: b(8) = 8641, prime;
: b(9) = 9181, prime;
: b(11) = 111211, prime;
: b(12) = 121441, prime;
: b(29) = 298411, prime;
(...)

I also conjecture that there exist an infinity of terms b(n) which are semiprimes.

SEQUENCE VII

Starting again from the Smarandache nn^2 sequence (the n-th term of the sequence is obtained concatenating the numbers n and n^2, see A053061 in OEIS), we define the following Smarandache-Coman sequence: b(n) = 1a(n)1, i.e. the terms of the Smarandache sequence concatenated both to the left and to the right with the number 1. I conjecture that there exist an infinity of terms b(n) which are primes.

We have:

```
:    b(6) = 16361, prime;
:    b(7) = 17491, prime;
:    b(11) = 111211, prime;
:    b(18) = 1183241, prime;
:    b(26) = 1266761, prime;
:    b(28) = 1287841, prime;
(...)
```

I also conjecture that there exist an infinity of terms b(n) which are semiprimes.