The Smarandache Sequence Inventory

Compiled by Henry Ibstedt, July 1997

A large number of sequences which originate from F. Smarandache or are of similar nature appear scattered in various notes and papers. This is an attempt bring this together and make some notes on the state of the art of work done on these sequences. The inventory is most certainly not exhaustive. The sequences have been identified in the following sources where <u>Doc. No.</u> refers the list of Smarandache Documents compiled by the author. Nearly all of the sequences listed below are also found in Doc. No. 7: *Some Notions and Questions in Number Theory*, C. Dumitrescu and V. Seleacu, with, sometimes, more explicit definitions than those given below. Since this is also the most comprehensive list of Smarandache Sequences the paragraph number where each sequence is found in this document is included in a special column "D/S No"

Source	Seq. No.	Doc. No.
Numeralogy or Properties of Numbers	1-37	1
Proposed Problems, Numerical Sequences	38-46	2
A Set of Conjectures on Smarandache Sequences	47-57	16
Smarandache's Periodic Sequences	58-61	17
Only Problems, Not Solutions	62-118	4
Some Notions and Questions in Number Theory	119-133	7

Classification of sequences into eight different types (T):

The classification has been done according to what the author has found to be the dominant behaviour of the sequence in question. It is neither exclusive nor absolutely conclusive.

<u>Recursive:</u>	I	$t_n=f(t_{n-1})$, iterative, i.e. t_n is a function of t_{n-1} only.
	R	$t_n=f(t_i,t_j,\ldots)$, where $i,j<n$, $i\neq j$ and f is a function of at least two variables.
<u>Non-Recursive:</u>	F	$t_k=f(n)$, where f(n) may not be defined for all n, hence $k\leq n$.
<u>Concatenation</u>	C	Concatenation.
<u>Elimination:</u>	E	All numbers greater than a given number and with a certain property are eliminated.
<u>Arrangement:</u>	A	Sequence created by arranging numbers in a prescribed way.
<u>Mixed operations:</u>	M	Operations defined on one set (not necessarily N) to create another set.
<u>Permutation:</u>	P	Permutation applied on a set together with other formation rules.

Seq. No.	D/S No.	T	Name	Definition (intuitive and/or analytical)	State of the Art References
1		f	Reverse Sequence	1, 21, 321, 4321, 54321, ... 10987654321, ...	
2		R	Multiplicative Sequence	2, 3, 6, 12, 18, 24, 36, 48, 54, ... For arbitrary n_1 and n_2: $n_k=\mathrm{Min}(ni \cdot nj)$, where $k\geq 3$ and $j\leq k$, $i\leq k$, $i\neq j$.	
3		R	Wrong Numbers	$n=\underline{a_1a_2\ldots a_k}$, $k\geq 2$ (where $\underline{a_1a_2\ldots a_k}=a_1\cdot 10^{k-1}+a_2\cdot 10^{k-2}+\ldots+a_k$). For $n>k$ the terms of the sequence $a_1, a_2, \ldots a_n\ldots$ are defined through $a_n=\prod_{i=n-k}^{n-1} a_i$. n is a wrong number if the sequence contains n.	Reformulated
4		f	Impotent Numbers	2, 3, 4, 5, 7, 9, 13, 17, 19, 23, 25, 29, 31, 37, 41, 43, 47, 49, 53, 59, 61, ...A number n whose proper divisors product is less than n, i.e. $\{p, p^2;$ where p is prime$\}$	
5		E	Random Sieve	1,5,6,7,11,13, 17, 19, 23, 25, ...General definition: Choose a positive number u_1 at random; -delete all multiples of all its divisors, except this number; choose another number u_2 greater than u_1 among those remaining; -delete all multiples of all its divisors, except this number; ... and so on.	
6		F	Cubic Base	0,1,2,3,4,5,6,7,10,11,12,13,14,15,16,17,20,21,22,23,24,25,26, ... Each number n is written in the cubic base.	
7		I	Anti-Symmetric Sequence	11,1212,123,123,12341234, ... ,123456789101112123456789101112, ...	
8		R	ss2(n)	1,2,5,26,29,677,680,701, ... ss2(n) is the smallest number, strictly greater than the previous one, which is the squares sum of two previous distinct terms of the sequence.	Ashbacher, C. Doc.14, p 25.
9		R	ss1(n)	1,1,2,4,5,6,16,17,18,20, ... ss1(n) is the smallest number, strictly greater than the previous one (for $n\geq 3$), which is the squares sum of one ore more previous distinct terms of the sequence.	
10		R	nss2(n)	1,2,3,4,6,7,8,9,11,12,14,15,16,18, ... nss2(n) is the smallest number, strictly greater than the previous one, which is NOT the squares sum of two previous distinct terms of the sequence.	Ashbacher, C. Doc.14, p 29.
11		R	nss1(n)	1,2,3,6,7,8,11,12,15,16,17,18,19, ... nss1(n) is the smallest number, strictly greater than the previous one, which is NOT the squares sum of one ore more previous distinct terms of the sequence.	
12		R	cs2(n)	1,2,9,730,737,389017001, 389017008,389017729, ... cs2(n) is the smallest number, strictly greater than the previous one, which is the cubes sum of two previous distinct terms of the sequence	Ashbacher, C. Doc.14, p 28.
13		R	cs1(n)	1,1,2,8,9,10,512,513,514,520, ... cs1(n) is the smallest number, strictly greater than the previous one (for $n\geq 3$), which is the cubes sum of one ore more previous distinct terms of the sequence.	
14		R	ncs2(n)	1,2,3,4,5,6,7,8,10,11,12,13,14,15, ... ncs2(n) is the smallest number, strictly greater than the previous one, which is NOT then cubes sum of two previous distinct terms of the sequence.	Ashbacher, C. Doc.14, p 32.
15		R	ncs1(n)	1,2,3,4,5,6,7,10,...,26,29, ... ncs1(n) is the smallest number, strictly greater than the previous one, which is NOT the cubes sum of one or more previous distinct terms of the sequence.	
16		R	SGR, General Recurrence Type Sequence	Let $k\geq j$ be natural numbers, and $a_1, a_2, \ldots, a_k$ given elements, and R a j-relationsship (relation among j elements). Then: 1) The elements $a_1, a_2, \ldots, a_k$ belong to SGR. 2) If $m_1, m_2, \ldots, m_j$ belong to SGE, then $R(m_1, m_2, \ldots, m_j)$ belongs to SGR too. 3) Only elements, obtained by rules 1) and/or 2) applied a finite number of times, belong to SGR.	
17		F	Non-Null Squares, ns(n)	1,1,1,2,2,2,2,3,4,4, ..., The number of ways in which n can be written as a sum of non-null squares. Example: $9=1^2+1^2+1^2+1^2+1^2+1^2+1^2+1^2+1^2=1^2+1^2+1^2+1^2+1^2+2^2=1^2+2^2+$	

				$2^2=3^2$. Hence ns(9)=4.	
18		F	Non-Null Cubes	1,1,1,1,1,1,1,2,2,2,2,2,2,2,2,(8)3,(3)4, ...	
19		F	General Partition Sequence	Let f be an arithmetic function, and R a relation among numbers. {How many times can n be written in the form: $n=R(f(n_1),f(n_2), \ldots, f(n_k))$ for some k and $n_1, n_2, \ldots n_k$ such that $n_1+n_2+\ldots+n_k=n$?}.	
20		C	Concatenate Seq.	1,22,333,4444,55555,666666,....	
21		F	Triangular Base	1,2,10,11,12,100,101,102,110,1000, ... Numbers written in triangular base, defined as follows: $t_n=n(n+1)/2$ for $n\geq1$.	
22		F	Double Factorial Base	1,10,100,101,110,200,201,1000, ...	
23		R	Non-Multiplicative Sequence	Let $m_1, m_2, \ldots m_k$ be the first k given terms of the sequence, where $k\geq2$; then m_i, for $i\geq k+1$, is the smallest number not equal to the product of the k previous terms.	
24		R	Non-Arithmetic Sequence	If m_1, m_2 are the first k two terms of the sequence, then m_k for $k\geq3$, is the smallest number such that no 3-term arithmetic progression is in the sequence.	Ibstedt, H. Doc. 19, p. 1.
25		R	Prime Product Sequence	2,7,31,211,2311,30031,510511, ... $p_n=1+p_1p_2\ldots p_n$, where p_k is the k-th prime.	Ibstedt, H. Doc. 19, p.4.
26		R	Square Product Sequence	2,5,37,577,14401,518401,25401601, ... $S_n=1+s_1s_2\ldots s_n$, where s_k is the k-th square number.	Ibstedt, H. Doc. 19, p. 7.
27		R	Cubic Product Sequence	2,9,217,13825,1728001,373248001, ... $C_n=1+c_1c_2\ldots c_n$, where c_k is the k-th cubic number.	
28		R	Factorial Product Sequence	1,3,13,289,34561,24883201, ... $F_n=1+f_1f_2\ldots f_n$, where f_k is the k-th factorial number.	
29		R	U-Product Sequence (Generalization)	Let u_n, $n\geq1$, be a positive integer sequence. Then we define a U-sequence as follows: $U_n=1+u_1u_2\ldots u_n$.	
30		R	Non-Geometric Sequence	1,2,3,5,6,7,8,10,11,13,14,15, ... Definition: Let m_1 and m_2 be the first two term of the sequence, then m_k ,for $k\geq3$, is the smallest number such that no 3-term geometric progression is in the sequence.	
31		F	Unary Sequence	11, 111, 11111, 1111111, 11111111111, ... $u_n=11\ldots1$, p_n digits of "1", where p_n is the n-th prime.	
32		F	No Prime Digits Sequence	1,4,6,8,9,10,11,1,1,14,1,16,1,18, ... Take out all prime digits from n.	
33		F	No Square Digits Sequence	2,3,4,6,7,8,2,3,5,6,7,8,2,2,22,23,2,25, ... Take out all square digits from n.	
34		C	Concatenated Prime Sequence	2,23,235,2357, 235711, 23571113, ...	Ibstedt, H. Doc. 19, p. 13.
35		C	Concatenated Odd Sequence	1,13,135,1357,13579,1357911,135791113, ...	Ibstedt, H. Doc. 19, p. 12
36		C	Concatenated Even Sequence	2,24.246,2468,246810,24681012, ...	Ibstedt, H. Doc. 19, p. 12.
37		C	Concatenated S-Sequence (Generalization)	Let $s_1, s_2, s_3, \ldots s_n$ be an infinite integer sequence. Then s_1, s_1s_2, $s_1s_2s_3$, $s_1s_2s_3\ldots s_n$ is called the concatenated S-sequence.	
38		A	Crescendo Sub-Seq.	1, 1,2 1,2,3 1,2,3,4 1,2,3,4,5 ...	
39		A	Decrescendo Sub-S.	1, 2,1 3,2,1 4,3,2,1 5,4,3,2,1 ...	
40		A	Cresc. Pyramidal Sub-S	1, 1,2,1 1,2,3,2,1, 1,2,3,4,3,2,1 ...	
41		A	Decresc. Pyramidal Sub-S	1, 2,1,2, 3,2,1,2,3, 4,3,2,1,2,3,4, ...	
42		A	Cresc. Symmetric Sub-S	1, 1, 2,1,1,2, 3,2,1,1,2,3, 1,2,3,4,4,3,2,1 ...	
43		A	Decresc. Symmetric Sub-S	1,1, 2,1,1,2, 3,2,1,1,2,3, 4,3,2,1,1,2,3,4, ...	
44		A	Permutation Sub-S	1, 2, 1,3,4,2, 1,3,5,6,4,2, 1,3,5,7,8,6,4,2,1, ...	
45		E	Square-Digital Sub-Sequence	0, 1, 4, 9, 49, 100, 144, 400, 441, ...	Ashbacher, C. Doc.14, p 45.
46		E	Cube-Digital Sub-Sequence	0, 1, 8, 1000, 8000, ...	Ashbacher, C. Doc.14, p 46.
47		E	Prime-Digital Sub-Sequence	2, 3, 5, 7, 23,37,53,73	Ashbacher, C. Doc.14, p 48. Ibstedt, H. Doc. 19, p. 9.

48		E	Square-Partial-Digital Sub-Seq.	49, 100, 144, 169, 361, 400, 441, ...Squares which can be partitioned into groups of digits which are perfect squares	Ashbacher, C. Doc.14, p 44.
49		E	Cube-Partial-Digital Sub-Sequence	1000, 8000, 10648, 27000, ...	Ashbacher, C. Doc.14, p 47.
50		E	Prime-Partial-Digital Sub-Sequence	23, 37, 53, 73, 113, 137, 173, 193, 197, ... Primes which can be partitioned into groups of digits which are also primes.	Ashbacher, C. Doc.14, p 49.
51		F	Lucas-Partial Digital Sub-Sequence	123, ... (1+2=3, where 1,2 and 3 are Lucas numbers)	Ashbacher, C. Doc.14, p 34.
52		E	f-Digital Sub-Sequence	If a sequence $\{a_n\}$, $n\geq1$ is defined by $a_n=f(n)$ (a function of n), then the f-digital subsequence is obtained by screening the sequence and selecting only those terms which can be partitioned into two groups of digits g_1 and $g_2=f(g_1)$.	
53		E	Even-Digital Sub-S.	12, 24, 36, 48, 510, 612, 714, 816, 918, 1020, 1122, 1224, ...	Ashbacher, C. Doc.14, p 43.
54		E	Lucy-Digital Sub-S.	37, 49, ... (i.e. 37 can be partioned as 3 and 7, and $l_3=7$; the lucky numbers are 1,3,7,9,113,15,21,25,31,33,37,43,49,51,63, ...	Ashbacher, C. Doc.14, p 51.
55		M	Uniform Sequence	Let n be an integer≠0, and d_1, d_2, ... d_r distinct digits in base B. Then: multiples of n, written with digits d_1, d_2, ... d_r only (but all r of them), in base B, increasingly ordered, are called the uniform S.	
56		M	Operation Sequence	Let E be an ordered set of elements, $E=\{e_1, e_2, ...\}$ and θ a set of binary operations well defined for these elements. Then: $a_1\varepsilon\{e_1, e_2, ...\}$, $a_{n+1}=\min\{e_1\,\theta_1\,e_2\,\theta_2 ... \theta_A\,e_{n+1}\}>a_n$ for $n\geq1$.	
57		M	Random Operation Sequence	Let E be an ordered set of elements, $E=\{e_1, e_2, ...\}$ and θ a set of binary operations well defined for these elements. Then: $a_1\varepsilon\{e_1, e_2, ...\}$, $a_{n+1}=\{e_1\,\theta_1\,e_2\,\theta_2 ... \theta_A\,e_{n+1}\}>a_n$ for $n\geq1$.	
58		M	N-digit Periodic Sequence	42,18,63,27,45,09,81,63,27, ... Start with a positive integer N with not all its digits the same, and let N' be its digital reverse. Put $N_1=\mid N-N'\mid$ and let N_1' be the digital reverse of N_1. Put $N_2=\mid N_1-N_1'\mid$, and so on.	Ibstedt, H. Doc. 20, p. 3.
59		M	Subtraction Periodic Sequence	52,24,41,13,30,02,19,90,08,79,96,68,85,57,74,46,63,35,52, ... Let c be a fixed positive integer. Start with a positive integer N and let N' be its digital reverse. Put $N_1=\mid N'-c\mid$ and let N_1' be the digital reverse of N_1. Put $N_2=\mid N_1'-c\mid$, and so on.	Ibstedt, H. Doc. 20, p. 4.
60		M	Multiplication Periodic Sequence	68,26,42,84,68, ... Let c>1 be a fixed integer. Start with a positive integer N, multiply each digit x of N by c and replace that digit by the last digit of cx to give N_1, and so on.	Ibstedt, H. Doc. 20, p. 7.
61		M	Mixed Composition Periodic Sequence	75,32,51,64,12,31,42,62,84,34,71,86,52,73,14,53,82,16,75, ... Let N be a two-digit number. Add the digits, and add them again if the sum is greater then 10. Also take the absolute value of their difference. These are the first and second digits of N_1. Now repeat this.	Ibstedt, H. Doc. 20, p. 8.
62	1	I	Consecutive Seq.	1, 12, 123, 12345, 123456, 1234567,	
63	2	I/P	Circular Sequence	1, (12, 21), (123, 231, 312), (1234, 2341, 3412, 4123), ...	Kashihara, K. Doc. 15, p. 25.
64	3	A	Symmetric Sequence	1, 11, 121, 1221, 12321, 123321, 1234321, 12344321,	Ashbacher, C. Doc.14, p 57.
65	4	A	Deconstructive Sequence	1, 23, 456, 7891, 23456, 789123, 4567891, 23456789, 123456789, 1234567891,	Kashihara, K. Doc. 15, p.6.
66	5	A	Mirror Sequence	1, 212, 32123, 4321234, 543212345, 65432123456,	Ashbacher, C. Doc.14, p 59.
67	6 7	A/P	Permutation Sequence Gen. in doc. no. 7	12, 1342, 135642, 13578642, 13579108642, 135791112108642, 1357911131412108642, ..	Ashbacher, C. Doc.14, p 5.
68 *		M	Digital Sum	(0,1,2,3,4,5,6,7,8,9), (1,2,3,4,5,6,7,8,9,10), (2,3,4,5,6,7,8,9,10,11), .. ($d_s(n)$ is the sum of digits)	Kashihara, K. Doc. 15, p.6.
69 *		M	Digital Products	0,1,2,3,4,5,6,7,8,9,0,1,2,3,4,5,6,7,8,9,0,2,4,6,8,19,12,14,16,18, 0,3,6,9,12,15,18,21,24,27,0,4,8,12,16,20,24,28,32,36,0,5,10,1 5,20,25, ... $d_p(n)$ is the product of digits	Kashihara, K. Doc. 15, p.7.
70	15	F	Simple Numbers	2,3,4,5,6,7,8,9,10,11,13,14,15,17, .. A number is called a	Ashbacher, C.

				simple number if the product of its proper divisors is less than or equal to n.	Doc.14, p20.
71	19	I	Pierced Chain	101, 1010101, 10101010101, 101010101010101, ... c(2)=101*10001, c(3)=101*100010001, etc Qn. How many c(n)/100 are primes?	Ashbacher, C. Doc.14, p 60. Kashihara, K. Doc. 15, p. 7.
72	20	F	Divisor Products	1,2,3,8,5,36,7,64,27,100,11,1728,13,196,225,1024,17,... $p_d(n)$ is the product of all positive divisors of n.	Kashihara, K. Doc. 15, p. 8.
73	21	F	Proper Divisor Products	1,1,1,2,1,6,1,8,3,10,1,144,1,14,15,64,1.324, ... $p_d(n)$ is the product of all positive divisors of n except n.	Kashihara, K. Doc. 15, p. 9.
74	22	F	Square Complements	1,2,3,1,5,6,7,2,1,10,11,3,14,15,1,17,2,19,5,21,22,23,6,1,26,... For each integer n find the smallest integer k such that nk is a perfect square.	Ashbacher, C. Doc.14, p 9. Kashihara, K. Doc. 15, p. 10.
75	23 24	F	Cubic Complements Gen. to m-power complements in doc. no. 7	1,4,9,2,25,36,49,1,3,100,121,18,169,196,225,4,289, ... For each integer n find the smallest integer k such that nk is a perfect cube.	Ashbacher, C. Doc.14, p 9. Kashihara, K. Doc. 15, p. 11.
76	25 26	E	Cube free sieve Gen. in doc. no. 7	2,3,4,5,6,7,9,10,11,12,13,14,15,17,18,19,20,21,22,23,24,25,26 ,28, ...	
77	27	E	Irrational Root Sieve	2.3.5.6.7.10.11.12.13.14.15.17. Eliminate all a^k, when a is squarefree.	
78	37	F	Prime Part (Inferior)	2,3,3,5,5,7,7,7,7,11,11,13,13,13,13,17,17,19,19,19,19,23,23,2 3,23,23,23, ... For any positive real number n $p_b(n)$ equals the largest prime less than or equal to n.	Kashihara, K. Doc. 15, p. 12.
79	38	F	Prime Part (Superior)	2,2,2,3,5,5,7,7,11,11,11,11,13,13,17,17,17,17,19,19,23,23,23, 23, ... For any positive real number n $p_p(n)$ equals the smallest prime number greater than or equal to n.	Kashihara, K. Doc. 15, p. 12.
80	39	F	Square Part (Inferior)	0,1,1,1,4,4,4,4,4,9,9,9,9,9,9,9, ... The largest square less than or equal to n.	Kashihara, K. Doc. 15, p. 13.
81	40	F	Square Part (Superior)	0,1,4,4,4,9,9,9,9,9, ... The smallest square greater than or equal to n.	Kashihara, K. Doc. 15, p. 13.
82	41	F	Cube Part (Inferior)	0,1,1,1,1,1,1,1,8,8,8,8,8,8,8,8,8,8,8,8,8,8,8,8,8,8,8, ... The largest cube less than or equal to n.	
83	42	F	Cube Part (Superior)	0,1,8,8,8,8,8,8,8, ... The smalest cube greater than or equal to n.	
84	43	F	Factorial Part (Inferior)	1,2,2,2,2, (18)6, ... $F_p(n)$ is the largest factorial less than or equal to n.	
85	44	F	Factorial Part (Superior)	1,2, (4)6, (18)24, (11)120, ... $f_p(n)$ is the smallest factorial greater than or equal to n.	
86	45	F	Double Factorial Complements	1,1,1,2,3,8,15,1,105,192,945,4,10395,46080,1,3,2027025, ... For each n find the smallest k such that nk is a double factorial, i.e. nk=1·3·5·7·9·...·n (for odd n) and nk=2·4·6·8·...·n (for even n)	
87	46	F	Prime additive complements	1,0,0,1,0,1,0,3,2,1,0,1,0,3,3,2, ... t_n=n+k where k is the smallest integer for which n+k is prime (reformulated).	Ashbacher, C. Doc.14, p 21. Kashihara, K. Doc. 15, p. 14.
88		F	Factorial Quotients	1,1,2,6,24,1,720,3,80,12,3628800, ... t_n=nk where k is the smallest integer such that nk is a factorial number (reformulated).	Kashihara, K. Doc. 15, p. 16.
89 *		F	Double Factorial Numbers	1,2,3,4,5,6,7,4,9,10,11,6,... $d_f(n)$ is the smallest integer such that $d_{f(n)}$!! is a multiple of n.	
90	55	F	Primitive Numbers (of power 2)	2,4,4,6,8,8,8,10,12,12,14,16,16,16,16, ... $S_2(n)$ is the smallest integer such that $S_2(n)$! is divisible by 2^n.	Important
91	56 57	F	Primitive Numbers (of power 3) Gen. to power p, p prime.	3,6,9,9,12,15,18,18, ... $S_3(n)$ is the smallest integer such that $S_3(n)$! is divisible by 3^n.	Kashihara, K. Doc. 15, p. 16.
92		M	Sequence of Position	Definition: Unsolved problem: 55	
93	58	F	Square Residues	1,2,3,2,5,6,7,2,3,10,11,6, ... $S_r(n)$ is the largest square free number which divides n.	
94	59 60	F	Cubical Residues Gen. to m-power residues.	1,2,3,4,5,6,7,9,10,11,12,13, ... $C_r(n)$ is the largest cube free number which divides n.	
95	61	F	Exponents (of power	0,1,0,2,0,1,0,3,0,1,0,2,0,1,0,4, ... $e_2(n)$=k if 2^k divides n but	Ashbacher, C.

			2)	2^{k+1} if it does not.	Doc.14, p 22.
96	62 63	F	Exponents (of power 3). Gen. to exp. of power p	0,0,1,0,0,1,0,0,2,0,0,1,0,0,1,0,0,2,... $e_2(n)$=k if 3^k divides n but 3^{k+1} if it does not.	Ashbacher Doc.14, p 24.
97	64 65 66	F/P	Pseudo-Primes of first kind. Ext. to second and third kind in doc. no. 7.	2,3,5,7,11,13,14,16,17,19,20, ... A number is a pseudo-prime if some permutation of its digits is a prime (including the identity permutation).	Kashihara, K. Doc. 15, p. 17.
98	69 70 71	F/P	Pseudo-Squares of first kind. Ext. to second and third kind in doc. no. 7.	1,4,9,10,16,18,25,36,40, ... A number is a pseudo-square if some permutation of its digits is a perfect square (including the identity permutation).	Ashbacher, C. Doc.14, p 14. Kashihara, K. Doc. 15, p. 18.
99	72 73 74 75 76 77	F/P	Pseudo-Cubes of first kind. Ext. to second and third kind in doc. no. 7. (Gen. Pseudo-m-powers)	1,8,10,27,46,64,72,80,100, ... A number is a pseudo-cube if some permutation of its digits is a cube (including the identity permutation).	Ashbacher, C. Doc.14, p 14. Kashihara, K. Doc. 15, p. 18.
100	78 79 80	F/P	Pseudo-Factorials of first kind. Ext. to second and third kind in doc. no. 7.	1,2,6,10,20,24,42,60,100,102,120, ... A number is a pseudo-factorial if some permutation of its digits is a factorial number (including the identity permutation).	
101	81 82 83	F/P	Pseudo-Divisors of first kind. Ext. to second and third kind in doc. no. 7.	1,10,100,1,2,10,20,100,200,1,3,10,30, ... A number is a pseudo-divisor of n if some permutation of its digits is a divisor of n (including the identity permutation).	
102	84 85 86	F/P	Pseudo-Odd Numbers of first kind. Ext. to second and third kind in doc. no. 7.	1,3,5,7,9,10,11,12,13,14,15,16,17, ... A number is a pseudo-odd number if some permutation of its digits is an odd number.	Ashbacher, C. Doc.14, p 16.
103	87	F/P	Pseudo-Triangular Numbers	1,3,6,10,12,15,19,21,28,30,36, ... A number is a pseudo-triangular number if some permutation of its digits is a triangular number.	
104	88 89 90	F/P	Pseudo-Even Numbers of first kind. Ext. to second and third kind in doc. no. 7.	0,2,4,6,8,10,12,14,16,18,20,21,22,23, ... A number is a pseudo-even number if some permutation of its digits is an even number.	Ashbacher, C. Doc.14, p17.
105	91 92 93 94 95 96	F/P	Pseudo-Multiples (of 5) of first kind. Ext. to second and third kind in doc. no. 7. (Gen. to Pseudo-multiples of p.)	0,5,10,15,20,25,30,35,40,45,50,51, ... A number is a pseudo-multiple of 5 if some permutation of its digits is a multiple of 5 (including the identity permutation).	Ashbacher, C. Doc.14, p19.
106	100	F	Square Roots	0,1,1,1,2,2,2,2,2,3,3,3,3,3,3,3, ... $s_q(n)$ is the superior integer part of the square root of n.	
107	101 102	F	Cubical Roots Gen. to m-power roots $m_c(n)$	0,1,1,1,1,1,1,1, 19(2), 37(3), ... $c_q(n)$ is the superior integer part of the cubical root of n.	
108	47	F	Prime Base	0,1,10,100,101,1000,1001,10000,10001,10010, ... See Unsolved problem: 90	Kashihara, K. Doc. 15, p. 32.
109	48 49	F	Square Base Gen. to m-power base and gen. base (Unsolved problem 93)	0,1,2,3,10,11,12,13,20,100,101, ... See Unsolved problem: 91	
110	28	M	Odd Sieve	7,13,19,23,25,31,33,37,43, ... All odd numbers that are not equal to the difference between two primes.	
111	29	E	Binary Sieve	1,3,5,9,11,13,17,21,25, ... Starting to count on the natural numbers set at any step from 1: -delete every 2-nd numbers; -delete, from the remaining ones, every 4-th numbers ... and so on: delete, from the remaining ones, every 2^k-th numbers, k=1,2,3,... .	Ashbacher, C. Doc.14, p 53.
112	30 31	E	Trinary Sieve Gen. to n-ary sieve	1,2,4,5,7,8,10,11,14,16,17, ... (Definition equiv. to 114)	Ashbacher, C. Doc.14, p 54.
113	32	E	Consecutive Sieve	1,3,5,9,11,17,21,29,33,41,47,57, ... From the natural numbers: - keep the first number, delete one number out	Ashbacher, C. Doc.14, p 55.

				of 2 from all remaining numbers; - keep the first remaining number, delete one number out of 3 from the next remaining numbers; and so on	
114	33	E	General-Sequence Sieve	Let $u_i>1$, for i=1, 2, 3, ... , be a strictly increasing integer sequence. Then: From the natural numbers: -keep one number among 1,2,3, ... ,u_1-1 and delete every u_1-th numbers; -keep one number among the next u_2-1 remaining numbers and delete every u_2-th numbers; and so on, for step k (k≥1): keep one number among the next u_k-1 remaining numbers and delete every u_k-th numbers;	
115	36	M	General Residual Sequence	$(x+C_1)$ .... $(x+C_{F(m)})$,m=2, 3, 4, ... , where C_i, 1≤i≤F(m), forms a reduced set of residues mod m. x is an integer and f is Euler's totient.	Kashihara, K. Doc. 15, p. 11.
116		M	Table:(Unsolved 103)	6,10,14,18,26,30,38,42,42,54,62,74,74,90, ... t_n is the largest even number such that any other even number not exceeding it is the sum of two of the first n odd primes.	Kashihara, K. Doc. 15, p. 19.
117		M	Second Table	9,15,21,29,39,47,57,65,71,93,99,115,129,137, ... v_n is the largest odd number such that any odd number ≥9 not exceeding it is the sum of three of the first n odd primes.	Kashihara, K. Doc. 15, p. 20.
118		M	Second Table Sequence	0,0,0,0,1,2,4,4,6,7,9,10,11,15,17,16,19,19,23, ... a_{2k+1} represents the number of different combinations such that 2k+1 is written as a sum of three odd primes.	Kashihara, K. Doc. 15, p. 20.
119	34	E	More General-Sequence Sieve	Let $u_i>1$, for i=1, 2, 3, ... , be a strictly increasing integer sequence, and $v_i≤u_i$ another positive integer sequence. Then: From the natural numbers: -keep the v_1-th number among 1,2,3, ... ,u_1-1 and delete every u_1-th numbers; -keep the v_2-th number among the next u_2-1 remaining numbers and delete every u_2-th numbers; and so on, for step k (k≥1): -keep the v_k-th number among the next u_k-1 remaining numbers and delete every u_k-th numbers;	
120	35	F	Digital Sequences Special case: Construction sequences	In any number base B, for any given infinite integer or rational sequence s_1, s_2, s_3, ..., and any digit D from 0 to B-1, build up a new integer sequence which associates to s_1 the number of digits of D of s_1 in base B, to s_2 the number of digits D of s_2 in base B, and so on.	
121	50	F	Factorial Base	0,1,10,11,20,21,100,101,110,111,120,121,200,201,210,211, ... (Each number n written in the Smarandache factorial base.)(Smarandache defined over the set of natural numbers the following infinite base: for k≥1, f_k=k!)	
122	51	F	Generalized Base	(Each number n written in the Smarandache generalized base.)(Smarandache defined over the set of natural numbers the following infinite base: $1=g_0<g_1<\ldots<g_k<\ldots$)	
123	52	F	Smarandache Numbers	1,2,3,4,5,3,7,4,6,5, ... S(n) is the smallest integer such that s(n)! is divisible by n.	
124	53	F	Smarandache Quotients	1,1,2,6,24,1,720,3,80,12,3628800, ... For each n find the smallest k such that nk is a factorial number.	
125	54	F	Double Factorial Numbers	1,2,3,4,5,6,7,4,9,10,11,6,13, ... $d_f(n)$ is the smallest integer such that $d_f(n)$!! is a multiple of n.	
126	67	R	Smarandache almost Primes of the first kind	$a_1≥2$, for n≥2 a_n= the smallest number that is not divisible by any of the previous terms.	
127	68	R	Smarandache almost Primes of the second kind	$a_1≥2$, for n≥2 a_n= the smallest number that is coprime with all the previous terms.	
128	97	C R	Constructive Set S (of digits 1 and 2)	I: 1,2 belong to S II: if a and b belong to S, then ab (concatenation) belongs to S III: Only elements obtained be applying rules I and II a finite number of times belong to S	
129	98 99	C R	Constructive Set S (of digits 1,2 and 3) Gen. Constructive Set (of digits d_1, d_2, ... d_m) 1≤m≤9.	I: 1,2 , 3 belong to S II: if a and b belong to S, then ab (concatenation) belongs to S III: Only elements obtained be applying rules I and II a finite number of times belong to S	
130	104	F	Goldbach-Smarandache Table	6,10,14,18,26,30,38,42,42,54, ...t(n) is the largest even number such that any other even number not exceeding it is the sum of two of the first n odd primes.	

131	105	F	Smarandache-Vinogradov Table	9,15,21,29,39,47,57,65,71,93, … . V(n) is the largest odd number such that any odd number ≥9 not exceeding it is the sum of three of the first n odd primes.	
132	106	F	Smarandache-Vinogradov Sequence	0,0,0,0,1,2,4,4,6,7,9,10, … .a(2k+1) represents the number of different combinations such that 2k+1 is written as a sum of three odd primes.	
133	115	F	Sequence of Position	Let $\{x_n\}$, $n\geq 1$, be a sequence of integers and $0\leq k\leq 9$ a digit. The Smarandache sequence of position is defined as $U_n^{(k)}=U^{(k)}(x_n)=\max\{i\}$ if k is the 10-th digit of x_n else -1.	