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5318
3271
3415
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THE UNIVERSITY OF CALGARY

FACULTY OF ARTS AND SCIENCE / DEPARTMENT OF MATHEMATICS, STATISTICS AND COMPUTING SCIENCE

75:iv:1

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Dear Neil,

I have been collecting sequences at a great rate, and have now left it so long that I've forgotten what most of them are about, and they have probably many of them already reached you through other channels, but here goes, in no particular order:

91 1. Two pages, 69-70, copied from "Conceptual Blockbusting. A guide to better ideas" by James L. Adams, Freeman, 1974. The second sequence is your #1164, but the others are not in your book or in Supplement I (is there a supplement II?).

91 2. C. Domb and A.J. Barrett, Enumeration of ladder graphs, Discrete Math., 9(1974) 341-358, esp. p.355. The Catalan numbers, #577 rear their beautiful heads on the lower diagonal, and the top diagonal is familiar to some of us (#1174). You may want to include some others. This raises a question that you must have already given some thought to: display of the more interesting triangular and rectangular arrays (binomial coeffs., Bell numbers, Stirling numbers of 2 kinds, Eulerian numbers, etc.).

91 3. Amer. Math. Monthly, 82(1975) 76 contains a sequence you don't have.

91 4. A table of *P*-positions in a family of nim-like games. Powers of 2 and Fibs are familiar; rest are not, they are recurring sequences* with irregularities. Paper forthcoming in due course.

91 5. "On general dissections of a polygon", R.C. Read
"On the cell-growth problem for arbitrary polygons", Harary, Palmer & Read.
"On enumerating dissections of polygons", Beineke and Pippert.

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* the orders of the (eventual) recurrences form 2 more sequences (neither of them in Sloane) but I don't have many terms yet!
$\leq$ 1 2 4 6 8 11 14 ...
$<$ 1 3 6 8 11 14 ...

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These three papers were received in the course of refereeing, so you had better not acknowledge their source at present, particularly since I was not very complimentary! They each contain tables of sequences, a few of which will be familiar to you.

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6. I was horrified to find that you don't have THE sequence (Conway-Guy). $u_{n+1} = 2u_n - u_{n-r}$ where r is the nearest integer to $\sqrt{2n}$.

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1,2,4,7,13,24,44,84,161,309,594,... 5318

I enclose a copy of a partly written paper, which seems likely to remain partly written.

7. Mohan Lal, Iterates of the unitary totient function, Math. Comp., 28(1974) 301-302. Defines, for $n = p_1^{\alpha_1} \ldots p_s^{\alpha_s}$, $\varphi^*(n) = \left(p_1^{\alpha_1}-1\right) \ldots \left(p_s^{\alpha_s}-1\right)$ and iterates $\varphi_1^*(n) = \varphi^*(n)$, $\varphi_r^*(n) = \varphi_1^*(\varphi_{r-1}^*(n))$. The minimum n for which $\varphi_r^*(n) = 1$ is, for $1 \leq r \leq 27$:

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2,3,4,5,9,16,17,41,83,113,137,257,773,977,1657,2048,2313,4001,5725,7129,

11117,17279,19897,22409,39283,43657,55457.

od 17.iv.75

8. E.J. Barbeau, Remarks on an arithmetic derivative, Canad. Math. Bull., 4(1961) 117-122 and Problem in Canad. Math. Congress Notes, 5 #8 (April 1973) 6-7. $D(n)$ for $n = 2,3,\ldots$ is, according to my notes (please check!)

Program

3415

≈N1291.5

1,1,4,1,5,1,12,6,7,1,16,1,9,8,32,1,21,1,24,10,13,1,44,10,15,27,32,1,31,1,80,...

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9. "Discovering primes with Euclid" was rejected by Math. Mag. and Math. Gaz. I never tried it on the Monthly. Successive remarks by referees and a letter from H.J.J. te Riele have resulted in improvements, however, and, subject to changes which I now claim to have made, it has been accepted by Delta. I enclose the definitive version. Note that te Riele's calculations now extend the sequence of "discovered primes".

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10. I claim that sequence #175 is a horror! Nothing is divisible by zero!! Too bad

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11. I have an embryo paper entitled "A piece of cake" (title copied from John Crook, Invariant, 8 (actually unnumbered) Spring (?) 1972, 20-22). It is mostly old hat, concerning number of bits n hyperplanes chops d-space into. It raises the problem of putting arrays in your book again: (the

..../3

first row is probably the most commonly occurring sequence not in your book. I tried to fit it in by deleting initial ones, but had to give up.)

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d	*n* 0	1	2	3	4	5										
0	1	1	1	1	1	1	1	1	1	1	1					
1	1	2	3	4	5	6	7	8	9	10	11	12				
2	1	2	4	7	11	16	22	29	37	46	56	67	79			
3	1	2	4	8	15	26	42	64	93	130	176	232	299	378		
4	1	2	4	8	16	31	57	99	163	256	386	562	794			
5	1	2	4	8	16	32	63	120	219	382	638	1024	1586	2380		
6	1	2	4	8	16	32	64	127	247	466	848	1486	2510	4096	6476	
7	1	2	4	8	16	32	64	128	255	502	968	1816	3302	5812	9908	16384

You can find sequences #1059,1382,1585,1725,1851,... and #173,391,419,427,... and #1428,1611,... which raises a self-reference problem of the kind: sequence numbers in Sloane of sequences which have some property!

Finally I answer yours of 75:i:9, for which thanks. I have done no more about combination locks, actuarial problems and barycentric division of simplexes; your point is well taken, the last few pages were scribbled out in L.A. just before a talk and are in the wrong order for a proper motivation.

Thanks for the Denniston discovery; is there a reference, or is it just in preprint form?

Best wishes,

Yours sincerely,

Richard.

Richard K. Guy

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RKG:km
encl.