

Cinquante signes

Chunk & Sum



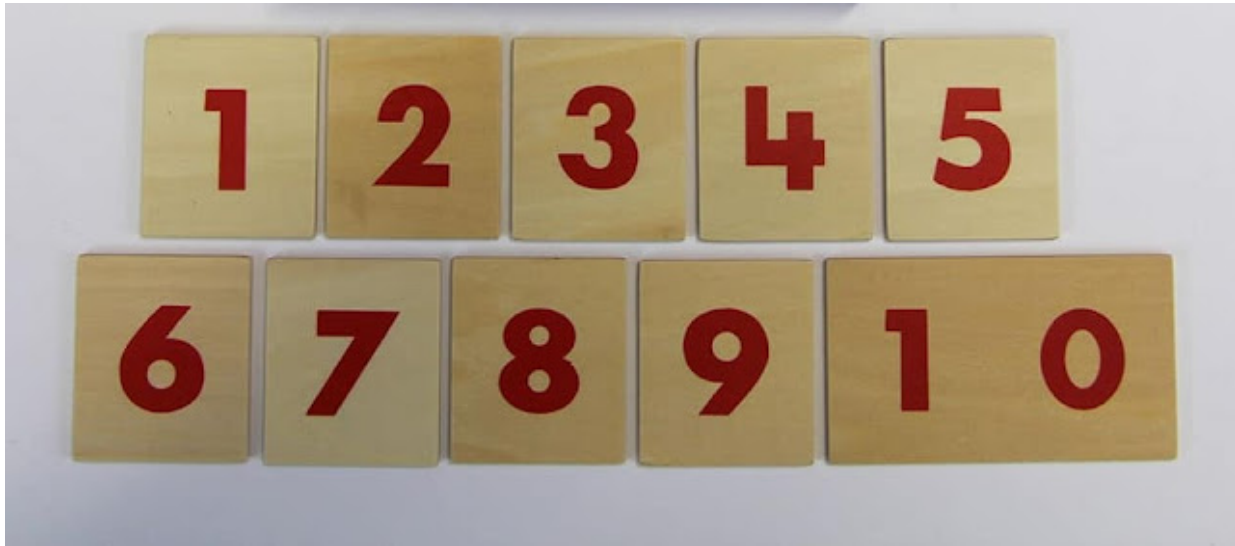
octobre 26, 2019



[a lot of stuff erased from the last 3 days]

Update October 29th, 2019:

Hello *Math-Funsters* and *Seqfans*,
forget the mails I've sent recently to both your mailing lists, they were criticized by so many people (for ***Vantablack* *obscurity***) that I've decided to rephrase the **Chunk & Sum** idea from scratch...



Imagine I give you the 10 wooden blocks shown here – each one is marked with an integer taken from the set 1 to 10.

It is asked to concatenate those blocks to form a single integer – for instance the *11-digit* integer 51263478910.

The next step is to chunk this number in as many pieces as you want – but you must obey three rules:

Rule (0): you cannot cut between the digits of a single block marked with an integer > 9 (this means here that you don't split the 1 and the 0 of "10").

Rule (1): the chunks must be monotonically increasing.

Rule (2): their sum must be the smallest possible one.

Example:

According to the rule (1) we can chunk 51263478910 (the above integer) in a lot of different ways; here are a few legal ones:

- a) 51263478910 --> 5 / 1263478910
- b) 51263478910 --> 5 / 12 / 634 / 78910
- c) 51263478910 --> 51 / 263 / 478 / 910
- d) 51263478910 --> 512 / 6347 / 8910
- e) 51263478910 --> 51263478910 (a single chunk is always possible)
- f) 51263478910 --> 5 / 12634 / 78910
- g) 51263478910 --> 51263 / 478910

h) ...

Now if we make, line by line, the sum of the chunks, we'll get:

a) $5 + 1263478910 = 1263478915$

b) $5 + 12 + 634 + 78910 = 79561$

c) $51 + 263 + 478 + 910 = 1702$

d) $512 + 6347 + 8910 = 15769$

e) 51263478910

f) $5 + 12634 + 78910 = 91549$

g) $51263 + 478910 = 530173$

h) ...

We will declare that the *smallest sum* wins the "Chunk & Sum" game.

The answer (c), above, beats the others, yes, but the real winner is $5+12+63+478+910$ with sum 1468. Impossible to chunk the starting 51263478910 in monotonically increasing chunks having an inferior sum.

Lets call this 1468 the *golden sum* of 51263478910.

[Side note]:

The "Chunk & Sum" game was inspired by [this sequence](#), which I had completely forgotten, signed by **Dan Hoey** and me eleven years ago. Its definition could be adapted to this game:

« Lightest finite monotonically increasing sequence obtained by chunking a given integer. »

"*Lightest*" --> the weight of such a sequence is the sum of all its terms;

"*Finite*" --> by definition all such sequences are finite;

"*Monotonically*" --> no two adjacent terms in the sequence are the same;

"*Increasing*" --> $a(n) < a(n+1)$;

"*Chunking*" --> cutting in slices.

And now for the real challenge!



The real challenge is to give **Alice** and **Bob** a bunch of blocks, marked 1 to n , and ask them to cooperate to form an integer who's *golden sum* beats any other one, obtained with the same blocks!

For our 1 to 10 example above, we've used the concatenation 51263478910 with *golden sum* 1468. But the best reordering of the 1 to 10 blocks is 98471106532 with *golden sum* 107101 (found by **Frank Stevenson**).

Here is the beginning of a sequence of such *golden sums* that might enter the OEIS – all its terms were computed by **Frank Stevenson** – and I thank him 1000 times!

Best,
É.

Frank Stevenson's list for $n = 1$ to 14 :

Available wooden block(s): 1

Lexicographically best wooden block(s) arrangement: 1

Best way to cut in chunk(s) that will minimize the chunks' sum: 1

Sum of the chunks: 1

$a(1) = 1$

$S = 1, \dots$

Available wooden blocks: 1 and 2

Lexicographically best wooden blocks arrangement: 21

Best way to cut in chunks that will minimize the chunks' sum: 21

Sum of the chunks: 21

$a(2) = 21$

$S = 1, 21, \dots$

Available wooden blocks: 1, 2 and 3

Lexicographically best wooden blocks arrangement: 132

Best way to cut in chunks that will minimize the chunks' sum: $1+32$

Sum of the chunks: 33

$$a(3) = 33$$

$$S = 1, 21, 33, \dots$$

Available wooden blocks: 1, 2, 3 and 4

Lexicographically best wooden blocks arrangement: 4321

Best way to cut in chunks that will minimize the chunks' sum: $4+321$

Sum of the chunks: 325

$$a(4) = 325$$

$$S = 1, 21, 33, 325, \dots$$

Available wooden blocks: 1, 2, 3, 4 and 5

Lexicographically best wooden blocks arrangement: 43521

Best way to cut in chunks that will minimize the chunks' sum: $43+521$

Sum of the chunks: 564

$$a(5) = 564$$

$$S = 1, 21, 33, 325, 564, \dots$$

Available wooden blocks: 1, 2, 3, 4, 5 and 6

Lexicographically best wooden blocks arrangement: 154632

Best way to cut in chunks that will minimize the chunks' sum: $1+54+632$

Sum of the chunks: 687

$$a(6) = 687$$

$$S = 1, 21, 33, 325, 564, 687, \dots$$

Available wooden blocks: 1, 2, 3, 4, 5, 6 and 7

Lexicographically best wooden blocks arrangement: 6517432

Best way to cut in chunks that will minimize the chunks' sum: $6+51+7432$

Sum of the chunks: 7489

$$a(7) = 7489$$

$$S = 1, 21, 33, 325, 564, 687, 7489, \dots$$

Available wooden blocks: 1, 2, 3, 4, 5, 6, 7 and 8

Lexicographically best wooden blocks arrangement: 76518432

Best way to cut in chunks that will minimize the chunks' sum: $7+651+8432$

Sum of the chunks: 9090

$a(8) = 9090$

$S = 1, 21, 33, 325, 564, 687, 7489, 9090, \dots$

Available wooden blocks: 1, 2, 3, 4, 5, 6, 7, 8 and 9

Lexicographically best wooden blocks arrangement: 768519432

Best way to cut in chunks that will minimize the chunks' sum: $76+851+9432$

Sum of the chunks: 10359

$a(9) = 10359$

$S = 1, 21, 33, 325, 564, 687, 7489, 9090, 10359, \dots$

Available wooden blocks: 1, 2, 3, 4, 5, 6, 7, 8, 9 and 10

Lexicographically best wooden blocks arrangement: 98471106532

Best way to cut in chunks that will minimize the chunks' sum: $98+471+106532$

Sum of the chunks: 107101

$a(10) = 107101$

$S = 1, 21, 33, 325, 564, 687, 7489, 9090, 10359, 107101, \dots$

Available wooden blocks: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 and 11

Lexicographically best wooden blocks arrangement: 1651142910873

Best way to cut in chunks that will minimize the chunks' sum: $1+65+1142+910873$

Sum of the chunks: 912081

$a(11) = 912081$

$S = 1, 21, 33, 325, 564, 687, 7489, 9090, 10359, 107101, 912081, \dots$

Available wooden blocks: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 and 12

Lexicographically best wooden blocks arrangement: 411129101287653

Best way to cut in chunks that will minimize the chunks' sum: $41+112+910+1287653$

Sum of the chunks: 1288716

$a(12) = 1288716$

$S = 1, 21, 33, 325, 564, 687, 7489, 9090, 10359, 107101, 912081, 1288716, \dots$

Available wooden blocks: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 and 13

Lexicographically best wooden blocks arrangement: 97864125313121110

Best way to cut in chunks that will minimize the chunks' sum: $97+864+1253+13121110$

Sum of the chunks: 13123324

$a(13) = 13123324$

$S = 1, 21, 33, 325, 564, 687, 7489, 9090, 10359, 107101, 912081, 1288716, 13123324, \dots$

Available wooden blocks: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13 and 14

Lexicographically best wooden blocks arrangement: 4211113109141287653

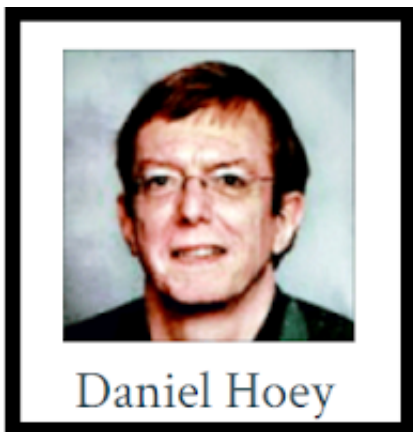
Best way to cut in chunks that will minimize the chunks' sum: $42+111+13109+141287653$

Sum of the chunks: 141300915

$a(14) = 141300915$

$S = 1, 21, 33, 325, 564, 687, 7489, 9090, 10359, 107101, 912081, 1288716, 13123324, 141300915, \dots$

Both lists (sums and arrangements) were submitted a couple of minutes ago to the OEIS by **Maximilian Hasler**. They are <https://oeis.org/A328861> and <https://oeis.org/A328862>. Many thanks to him too (and to his elegant and short definitions!-)



L'idée que développe cette page, m'est venue hier soir alors que je cherchais dans l'OEIS des occurrences du mot "Skolem" (je dois envoyer un petit texte sur le sujet à la revue *Tangente*). Je suis tombé sur cette suite [<https://oeis.org/A143789>] qui date de 2008, et j'ai trouvé que sa définition et les premières lignes de la section "Comments" avaient été

particulièrement bien écrites (par **Dan Hoey**). Je me suis demandé ce qu'était devenu Dan, j'ai cliqué sur son nom et lu ceci :

> **Dan Hoey** made many contributions to the OEIS. It is sad to report that he passed away in 2011. Here is an [obituary](#) from the Washington Post.

Cela m'a fait de la peine -- puis je suis [tombé sur ceci](#), par **Keith F. Lynch** (contributeur lui aussi de l'OEIS)

> Anne Hoey wrote:

I am as you may guess dreadfully sorry to report that Dan Hoey is dead, and by his own hand. He committed suicide on 31 August. The police found him in the bath, dead, with blood all over the bathroom. I have been trying to locate people who knew him. His two sisters and I are planning a memorial service, also an obituary in the Washington Post. So much to do, and such a sad business. We will keep you informed.

Dan was an occasional poster here in the rec.arts.sf.fandom newsgroup starting in 1992. His last post here was just 26 days ago.

He was a PRSFS member and meeting host, having last hosted the July meeting. He was the only host to live in DC proper. I learned of his death when a member received a phone call during last night's meeting and announced it to the group.

In the '80s and '90s he was a WSFA member. In 1995 he chaired Disclave, the DC area's premier con from 1950 through 1997.

He was a Wikipedia contributor from 2005 until last month. In his Wikipedia user page he describes himself:

I'm Dan Hoey, a mathematician, programmer, computer science researcher, science fiction fan, and wise guy. In 2005-2006, my

Wiki contributions were mostly to Combinatorial game theory, but now I've decided to be a combinatorial games theorist and so I'll mostly recuse myself from that fray.

He was a contributor to open source projects.

He had at least one cat in his apartment in DC. I wonder what will become of it.

I had no idea he was considering suicide.

I will miss him.

--

Keith F. Lynch

Je dédie donc cette page à **Dan**, à ses proches et à ses amis.

(Les images de Day-Lewis en boucher ne sont pas très heureuses dans ce contexte, pardon à ceux que cela pourrait choquer).



Pour laisser un commentaire, cliquez sur le bouton ci-dessous afin de vous connecter avec Google.



Posts les plus consultés de ce blog

A square for three (chess)

juin 22, 2024



(English translation after the French text) Voici cinq problèmes d'échecs disjoints : a) combien faut-il de coups au minimum pour que trois pions soient capturés sur la même case ? b) trois tours c) trois c ...

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Le tripalin se présente

avril 11, 2024



Un tripalin est constitué de trois images. Chaque image illustre un substantif. Accolés, ces trois substantifs forment une chaîne palindromique. Laquelle nous vous invitons à trouver. Exer ...

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Some strings au cinéma Galeries

juillet 19, 2024




Lettre ouverte au cinéma Galeries Bonsoir à tous, Je viens de voir pour la seconde fois chez vous le beau film de Léos Carax (la première fois c'était le 26 juin en présence du

réalisateur, au BRIFF). Apparut à l'écran aujourd'hui, avant la projection propre ...

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