A fractal sequence with prime sums

S = 1 2 1 2 3 4 5 1 2 6 3 4 7 8 5 9 1 2 10 6 3 4 11 7 8 5 12
13 9 1 2 14 10 6 3 4 15 16 17 11 7 8 5 18 19 20 12 13 9 1 2
21 22 23 14 24 10 6 3 4 25 26 15 27 16 28 17 11 7 8 5 29 18
30 19 20 12 13 9 1 2 31 21 22 32 23 14 33 34 35 24 36 10 6 3
4 37 38 25 26 15 39...

This sequence is fractal if you "upper trim" it (mark in
yellow the first occurrence of "1", then the first "2", the
first "3", the first "4", etc. -- *i*.e. the natural numbers);
the non yellowed terms are the sequence itself:

S = **1 2** 1 2 **3 4 5** 1 2 **6** 3 4 **7 8** 5 **9** 1 2 **10** 6 3 4 **11** 7 8 5 **12**
13 9 1 2 **14** 10 6 3 4 **15 16 17** 11 7 8 5 **18 19 20** 12 13 9 1 2
21 22 23 14 **24** 10 6 3 4 **25 26** 15 **27** 16 **28** 17 11 7 8 5 **29** 18
30 19 20 12 13 9 1 2 **31** 21 22 **32** 23 14 **33 34 35** 24 **36** 10 6 3
4 **37 38** 25 26 15 **39...**

This sequence is also fractal if you look at it from another
point of view.

Rule: if, in an (a,b,c) triplet of consecutive terms *a+b* is
prime, then mark **c** in yellow:

S = 1 2 **1 2 3 4 5** 1 2 **6** 3 4 **7 8** 5 **9** 1 2 **10** 6 3 4 **11** 7 8 5 **12**
13 9 1 2 **14** 10 6 3 4 **15 16 17** 11 7 8 5 **18 19 20** 12 13 9 1 2
21 22 23 14 **24** 10 6 3 4 **25 26** 15 **27** 16 **28** 17 11 7 8 5 **29** 18
30 19 20 12 13 9 1 2 **31** 21 22 **32** 23 14 **33 34 35** 24 **36** 10 6 3
4 **37 38** 25 26 15 **39...**

Voilà, the non yellowed terms rebuild also the sequence.

Different rules, same result. I just wanted to sow as
chaotically as possible the "upper trimmed" integers in the
sequence...

Here is the construction algorithm:

1) Lots of dots ("holes"):

S = ...

.

2) Start with integers 1 and 2:

S = 1 2 . . . .
. .

3) Last two terms sum to a prime, so next term is in "yellow":

S = 1 2 . . . .
. .

4) Sow in the first empty yellow hole the smallest natural number not yet in yellow:

S = 1 2 **1** . . . .
. .

5) Last two terms sum to a prime, next term is in yellow:

S = 1 2 **1** . . . .
. .

6) Sow in the first empty yellow hole the smallest natural number not yet in yellow:

S = 1 2 **1 2** . . . .
. .

7) Last two terms sum to a prime, next term is in yellow:

S = 1 2 **1 2** . . . .
.   .

8) Sow in the first empty yellow hole the smallest natural number not yet in yellow:

S = 1 2 **1 2 3** . . . .
. .

9) Last two terms sum to a prime, next term is in yellow:

S = 1 2 **1 2 3** . . . .
. .

10) Sow in the first empty yellow hole the smallest natural number not yet in yellow:

S = 1 2 **1 2 3 4** . . . .
. .

11) Last two terms sum to a prime, next term is in yellow:

S = 1 2 **1 2 3 4** . . . .
. .

12) Sow in the first empty yellow hole the smallest natural
number not yet in yellow:

S = 1 2 **1 2 3 4 5** . . . .
. .

13) Last two terms sum <u>NOT</u> to a prime, next term is the 3<u>rd</u>
term:

S = 1 2 **1 2 3 4 5** 1 . . . .
. .

13) Last two terms sum <u>NOT</u> to a prime, next term is the 4<u>th</u>
term:

S = 1 2 **1 2 3 4 5** 1 2 . . . .
. .

14) Last two terms sum to a prime, next term is in yellow:

S = 1 2 **1 2 3 4 5** 1 2 . . . .
. .

15) Sow in the first empty yellow hole the smallest natural
number not yet in yellow:

S = 1 2 **1 2 3 4 5** 1 2 **6** . . . .
. .

16) Last two terms sum <u>NOT</u> to a prime, next term is the 5<u>th</u>
term:

S = 1 2 **1 2 3 4 5** 1 2 **6** 3 . . . .
. . . .

17) Last two terms sum <u>NOT</u> to a prime, next term is the 6<u>th</u>
term:

S = 1 2 **1 2 3 4 5** 1 2 **6** 3 4 . . . .
. .

18) Last two terms sum to a prime, next term is in yellow:

S = 1 2 **1 2 3 4 5** 1 2 **6** 3 4 . . . .

. .

19) Sow in the first empty yellow hole the smallest natural number not yet in yellow:

S = 1 2 **1 2 3 4 5** 1 2 **6** 3 4 **7** . . . .
. .

20) Last two terms sum to a prime, next term is in yellow:

S = 1 2 **1 2 3 4 5** 1 2 **6** 3 4 **7** . . . .
. .

21) Sow in the first empty yellow hole the smallest natural number not yet in yellow:

S = 1 2 **1 2 3 4 5** 1 2 **6** 3 4 **7 8** . . . .
. .

22) Last two terms sum <u>NOT</u> to a prime, next term is the 7<u>th</u> term:

S = 1 2 **1 2 3 4 5** 1 2 **6** 3 4 **7 8** 5 . . . .
. .

23) Last two terms sum to a prime, next term is in yellow:

S = 1 2 **1 2 3 4 5** 1 2 **6** 3 4 **7 8** 5 . . . .
. .

24) Sow in the first empty yellow hole the smallest natural number not yet in yellow:

S = 1 2 **1 2 3 4 5** 1 2 **6** 3 4 **7 8** 5 **9** . . . .
. .

25) Last two terms sum <u>NOT</u> to a prime, next term is the 8<u>th</u> term:

S = 1 2 **1 2 3 4 5** 1 2 **6** 3 4 **7 8** 5 **9** 1 . . . .
. .

etc.

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At what index does 2007 appear?
;-)
Best,
É.

- - -

Breaking News (oct. 15th, 2007): Maximilian Hasler asks me if 2007 =
a(14868). I'm afraid I don't know :-/

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