|a-b| divides the concatenation [a,b]

Hello SeqFans,

S =
1,144,146,153,156,160,165,176,184,197,274,288,294,315,324,336,352,374,
...

We want:
1) S to be strictly increasing
2) all first diff to be different one from another and not yet present in S
3) a(n+1) to be the smallest integer such that |a(n)-a(n+1)| divides the concatenation [a(n),a(n+1)]

Here is how we get S, starting with 1:

S = 1,
144,146,153,156,160,165,176,184,197,274,288,294,315,324,336,352,374,
...
1st dif: 143 2 7 3 4 5 11 8 13 77 14 6 21 9
12 16 22

143 is the smallest integer not yet present and dividing 1144 (=8)
2 is the smallest integer not yet present and dividing 144146 (=72073)
7 is the smallest integer not yet present and dividing 146153 (=20879)
3 is the smallest integer not yet present and dividing 153156 (=51052)
4 is the smallest integer not yet present and dividing 156160 (=39040)
5 is the smallest integer not yet present and dividing 160165 (=32033)
11 is the smallest integer not yet present and dividing 165176 (=15016)
...

If we drop the "strictly increasing" constraint, we'll get T (which is an incredible nightmare to calculate by hand -- WARNING, the correct T seq is not this one -- see **Doug**'s comment below):

T = 1, 144, 43, 134, 108, 9, 6, 4, 158, ...
1st dif: 143 101 91 26 99 3 2 154 ...

More terms for S & T (if of interest)?

Best,
É.

_____

[**Douglas McNeil**]:

Assuming I understand correctly:

```
sage: S
[1, 144, 146, 153, 156, 160, 165, 176, 184, 197, 274, 288, 294, 315,
324, 336, 352, 374, 391, 414, 432, 456, 475, 500, 510, 525, 558,
584, 612, 646, 684, 720, 740, 775, 806, 868, 912, 951, 1024, 1056,
1104, 1150, 1200, 1230, 1271, 1408, 1472, 1564, 1632, 1683, 1782,
1809, 1876, 2010, 2211, 2430, 2475, 2530, 2640, 2680, 2948, 3240,
3294, 3355, 3660, 3720, 3813, 3936, 4018, 4067, 4150, 4316, 4368,
4410, 4473, 4544, 4686, 4752, 4824, 5226, 5304, 5406, 5459, 5562,
5768, 5824, 5915, 5980, 6095, 6360, 6466, 6588, 6696, 6820, 6975,
7050, 7097, 7248, 7550, 7915, 8600]
```

which I think agrees with your values, and

```
sage: T
[1, 144, 43, 120, 80, 60, 5, 390, 87, 58, 56, 42, 9, 6, 160, 108,
72, 48, 4, 186, 124, 93, 100, 75, 90, 103, 114, 76, 57, 148, 111,
132, 104, 78, 117, 180, 110, 88, 96, 64, 176, 192, 126, 175, 140,
130, 195, 300, 98, 384, 153, 102, 68, 85, 204, 216, 162, 135, 234,
252, 168, 315, 150, 200, 420, 224, 432, 159, 106, 477, 906, 360,
330, 209, 342, 513, 266, 684, 152, 460, 138, 92, 69, 230, 345, 598,
260, 624, 288, 444, 185, 592, 518, 999, 222, 1044, 225, 270, 459,
238, 425]
```

Note I find T(4)=120.

Doug

--
Department of Earth Sciences
University of Hong Kong

Beautiful! Many thanks!
Best,
É.