

CONJECTURES ABOUT MIN/MAX PRIME DIVISOR OF THE NATURAL NUMBERS AND PRIME NUMBERS

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Applying maxrad, minrad or its difference to the sequence of natural numbers and taking the differences of this sequence you can split this in subsequences by the sum equals length rule so that you can associate each subsequence to each gap between consecutive prime numbers

Premise

All this research has been done using Mathematica©, a symbolic computation environment that uses a programming language called Wolfram Language.

Some useful function

Define rad(n) as the product of all prime numbers that are divisors of n. Now define minrad(n) as the lower of such prime numbers, maxrad(n) the greater of such prime numbers and maxmindiff(n) the difference of the two if positive, minrad otherwise:

```
In[1]:= rad[n_Integer] := Times@@(First/@FactorInteger[n])
maxrad[n_Integer] := Max[First/@FactorInteger[n]]
minrad[n_Integer] := Min[First/@FactorInteger[n]]
maxmindiff[n_Integer] := If[maxrad[n] - minrad[n] > 0,
    maxrad[n] - minrad[n],
    minrad[n]]
]
```

Above function FactorInteger(n) returns a list of couples. Each couple is done by a prime number p and an exponent number e where p^e is a divisor of n but not $p^{(e+1)}$. As an example:

```
In[5]:= FactorInteger[60]
```

```
Out[5]= {{2, 2}, {3, 1}, {5, 1}}
```

Now apply minrad, maxrad and maxmindiff to the natural number starting from 2:

```
In[6]:= r1=minrad/@Range [2,200]
r2=maxrad/@Range [2,200]
r3=maxmindiff/@Range [2,200]
```

```
Out[6]= {2, 3, 2, 5, 2, 7, 2, 3, 2, 11, 2, 13, 2, 3, 2, 17, 2, 19, 2, 3, 2, 23, 2, 5, 2, 3, 2, 29, 2, 31, 2,
3, 2, 5, 2, 37, 2, 3, 2, 41, 2, 43, 2, 3, 2, 47, 2, 7, 2, 3, 2, 53, 2, 5, 2, 3, 2, 59, 2, 61,
2, 3, 2, 5, 2, 67, 2, 3, 2, 71, 2, 73, 2, 3, 2, 7, 2, 79, 2, 3, 2, 83, 2, 5, 2, 3, 2, 89, 2,
7, 2, 3, 2, 5, 2, 97, 2, 3, 2, 101, 2, 103, 2, 3, 2, 107, 2, 109, 2, 3, 2, 113, 2, 5, 2, 3, 2,
7, 2, 11, 2, 3, 2, 5, 2, 127, 2, 3, 2, 131, 2, 7, 2, 3, 2, 137, 2, 139, 2, 3, 2, 11, 2, 5, 2,
3, 2, 149, 2, 151, 2, 3, 2, 5, 2, 157, 2, 3, 2, 7, 2, 163, 2, 3, 2, 167, 2, 13, 2, 3, 2, 173,
2, 5, 2, 3, 2, 179, 2, 181, 2, 3, 2, 5, 2, 11, 2, 3, 2, 191, 2, 193, 2, 3, 2, 197, 2, 199, 2}
```

```
Out[7]= {2, 3, 2, 5, 3, 7, 2, 3, 5, 11, 3, 13, 7, 5, 2, 17, 3, 19, 5, 7, 11, 23, 3, 5, 13, 3, 7, 29, 5, 31, 2,
11, 17, 7, 3, 37, 19, 13, 5, 41, 7, 43, 11, 5, 23, 47, 3, 7, 5, 17, 13, 53, 3, 11, 7, 19, 29,
59, 5, 61, 31, 7, 2, 13, 11, 67, 17, 23, 7, 71, 3, 73, 37, 5, 19, 11, 13, 79, 5, 3, 41, 83,
7, 17, 43, 29, 11, 89, 5, 13, 23, 31, 47, 19, 3, 97, 7, 11, 5, 101, 17, 103, 13, 7, 53, 107,
3, 109, 11, 37, 7, 113, 19, 23, 29, 13, 59, 17, 5, 11, 61, 41, 31, 5, 7, 127, 2, 43, 13, 131,
11, 19, 67, 5, 17, 137, 23, 139, 7, 47, 71, 13, 3, 29, 73, 7, 37, 149, 5, 151, 19, 17, 11,
31, 13, 157, 79, 53, 5, 23, 3, 163, 41, 11, 83, 167, 7, 13, 17, 19, 43, 173, 29, 7, 11, 59,
89, 179, 5, 181, 13, 61, 23, 37, 31, 17, 47, 7, 19, 191, 3, 193, 97, 13, 7, 197, 11, 199, 5}
```

```
Out[8]= {2, 3, 2, 5, 1, 7, 2, 3, 3, 11, 1, 13, 5, 2, 2, 17, 1, 19, 3, 4, 9, 23, 1, 5, 11, 3, 5, 29, 3, 31,
2, 8, 15, 2, 1, 37, 17, 10, 3, 41, 5, 43, 9, 2, 21, 47, 1, 7, 3, 14, 11, 53, 1, 6, 5, 16, 27,
59, 3, 61, 29, 4, 2, 8, 9, 67, 15, 20, 5, 71, 1, 73, 35, 2, 17, 4, 11, 79, 3, 3, 39, 83, 5,
12, 41, 26, 9, 89, 3, 6, 21, 28, 45, 14, 1, 97, 5, 8, 3, 101, 15, 103, 11, 4, 51, 107, 1,
109, 9, 34, 5, 113, 17, 18, 27, 10, 57, 10, 3, 11, 59, 38, 29, 5, 5, 127, 2, 40, 11, 131,
9, 12, 65, 2, 15, 137, 21, 139, 5, 44, 69, 2, 1, 24, 71, 4, 35, 149, 3, 151, 17, 14, 9,
26, 11, 157, 77, 50, 3, 16, 1, 163, 39, 8, 81, 167, 5, 13, 15, 16, 41, 173, 27, 2, 9, 56,
87, 179, 3, 181, 11, 58, 21, 32, 29, 6, 45, 4, 17, 191, 1, 193, 95, 10, 5, 197, 9, 199, 3}
```

These sequences appear quite unpredictable but more can be conjectured on the difference sequence. The operator difference simply substitute an item in the sequence with the difference between the following item and the item itself for every item; it's like a derivative of the sequence.

```
In[9]:= s1=Differences [minrad/@Range [2,500] ]
s2=Differences [maxrad/@Range [2,500] ]
s3=Differences [maxmindiff/@Range [2,500] ]
```

```

Out[9]= {1, -1, 3, -3, 5, -5, 1, -1, 9, -9, 11, -11, 1, -1, 15, -15, 17, -17, 1, -1, 21, -21, 3, -3, 1,
-1, 27, -27, 29, -29, 1, -1, 3, -3, 35, -35, 1, -1, 39, -39, 41, -41, 1, -1, 45, -45, 5, -5,
1, -1, 51, -51, 3, -3, 1, -1, 57, -57, 59, -59, 1, -1, 3, -3, 65, -65, 1, -1, 69, -69, 71,
-71, 1, -1, 5, -5, 77, -77, 1, -1, 81, -81, 3, -3, 1, -1, 87, -87, 5, -5, 1, -1, 3, -3, 95,
-95, 1, -1, 99, -99, 101, -101, 1, -1, 105, -105, 107, -107, 1, -1, 111, -111, 3, -3, 1,
-1, 5, -5, 9, -9, 1, -1, 3, -3, 125, -125, 1, -1, 129, -129, 5, -5, 1, -1, 135, -135, 137,
-137, 1, -1, 9, -9, 3, -3, 1, -1, 147, -147, 149, -149, 1, -1, 3, -3, 155, -155, 1, -1, 5,
-5, 161, -161, 1, -1, 165, -165, 11, -11, 1, -1, 171, -171, 3, -3, 1, -1, 177, -177, 179,
-179, 1, -1, 3, -3, 9, -9, 1, -1, 189, -189, 191, -191, 1, -1, 195, -195, 197, -197, 1,
-1, 5, -5, 3, -3, 1, -1, 9, -9, 209, -209, 1, -1, 3, -3, 5, -5, 1, -1, 11, -11, 221, -221,
1, -1, 225, -225, 227, -227, 1, -1, 231, -231, 3, -3, 1, -1, 237, -237, 239, -239, 1, -1,
3, -3, 11, -11, 1, -1, 249, -249, 9, -9, 1, -1, 255, -255, 5, -5, 1, -1, 261, -261, 3, -3,
1, -1, 267, -267, 269, -269, 1, -1, 3, -3, 275, -275, 1, -1, 279, -279, 281, -281, 1, -1,
5, -5, 15, -15, 1, -1, 291, -291, 3, -3, 1, -1, 11, -11, 5, -5, 1, -1, 3, -3, 305, -305,
1, -1, 309, -309, 311, -311, 1, -1, 315, -315, 9, -9, 1, -1, 15, -15, 3, -3, 1, -1, 5, -5,
329, -329, 1, -1, 3, -3, 335, -335, 1, -1, 9, -9, 5, -5, 1, -1, 345, -345, 347, -347, 1, -1,
351, -351, 3, -3, 1, -1, 357, -357, 17, -17, 1, -1, 3, -3, 365, -365, 1, -1, 5, -5, 371,
-371, 1, -1, 11, -11, 377, -377, 1, -1, 381, -381, 3, -3, 1, -1, 387, -387, 15, -15, 1,
-1, 3, -3, 395, -395, 1, -1, 399, -399, 11, -11, 1, -1, 9, -9, 407, -407, 1, -1, 5, -5, 3,
-3, 1, -1, 417, -417, 419, -419, 1, -1, 3, -3, 5, -5, 1, -1, 429, -429, 431, -431, 1, -1,
17, -17, 437, -437, 1, -1, 441, -441, 3, -3, 1, -1, 447, -447, 9, -9, 1, -1, 3, -3, 455,
-455, 1, -1, 459, -459, 461, -461, 1, -1, 465, -465, 5, -5, 1, -1, 9, -9, 3, -3, 1, -1, 477,
-477, 11, -11, 1, -1, 3, -3, 485, -485, 1, -1, 489, -489, 15, -15, 1, -1, 5, -5, 497, -497}

Out[10]= {1, -1, 3, -2, 4, -5, 1, 2, 6, -8, 10, -6, -2, -3, 15, -14, 16, -14, 2, 4, 12, -20, 2, 8, -10,
4, 22, -24, 26, -29, 9, 6, -10, -4, 34, -18, -6, -8, 36, -34, 36, -32, -6, 18, 24, -44, 4,
-2, 12, -4, 40, -50, 8, -4, 12, 10, 30, -54, 56, -30, -24, -5, 11, -2, 56, -50, 6, -16, 64,
-68, 70, -36, -32, 14, -8, 2, 66, -74, -2, 38, 42, -76, 10, 26, -14, -18, 78, -84, 8, 10,
8, 16, -28, -16, 94, -90, 4, -6, 96, -84, 86, -90, -6, 46, 54, -104, 106, -98, 26, -30,
106, -94, 4, 6, -16, 46, -42, -12, 6, 50, -20, -10, -26, 2, 120, -125, 41, -30, 118, -120,
8, 48, -62, 12, 120, -114, 116, -132, 40, 24, -58, -10, 26, 44, -66, 30, 112, -144, 146,
-132, -2, -6, 20, -18, 144, -78, -26, -48, 18, -20, 160, -122, -30, 72, 84, -160, 6, 4,
2, 24, 130, -144, -22, 4, 48, 30, 90, -174, 176, -168, 48, -38, 14, -6, -14, 30, -40, 12,
172, -188, 190, -96, -84, -6, 190, -186, 188, -194, 62, 34, -72, -12, 24, 62, -80, -10, 6,
-12, 204, -158, 18, 36, -64, -40, 28, 78, -36, -62, 6, 20, 186, -216, -2, 108, 114, -208,
210, -206, -12, 18, 204, -220, 34, 12, 20, -62, 222, -234, 236, -230, -8, 58, -54, 34,
-22, 12, 52, -78, 246, -244, 16, 104, -110, -15, 255, -214, -6, -24, 16, 102, 132, -252,
42, -34, 70, -22, 202, -264, 266, -254, -4, 124, -126, 12, 254, -138, -108, -24, 274,
-234, 236, -212, -52, -6, 28, -38, 14, 12, 68, -24, 220, -286, 52, -22, -26, 138, -126,
-18, 38, 108, -50, -82, 42, -44, 290, -296, 92, -72, 280, -298, 300, -156, -150, 72, 238,
-264, -24, -24, 102, -84, -4, -16, 10, 150, -54, -68, 6, -36, 320, -248, -46, 130, -100,
-60, 330, -324, 100, -96, 14, -12, -12, 36, -20, 150, 174, -318, 320, -342, 6, -2, 342,
-294, 12, 18, -72, 162, 180, -354, 14, 162, -170, 2, 60, -12, 306, -344, 18, -4, 16, -22,
342, -356, -12, 42, -18, -22, 372, -360, 108, 64, 192, -380, 8, 182, -150, 54, 292, -376,
10, -16, 124, 66, -118, -68, 386, -198, -180, -14, 396, -334, -36, 70, -96, 24, 8, -20,
392, -368, 96, -34, -44, -36, 60, -70, 126, -120, 400, -412, 414, -210, -164, 6, -36, 54,
-10, 46, -94, 30, 388, -428, 430, -402, -2, 80, -86, 50, 366, -428, -4, 10, 426, -406, 52,
134, -74, -142, 442, -444, 36, 72, 38, 76, -214, 6, 438, -228, -212, 6, 438, -450, 452,
-434, 2, 202, 234, -454, 54, -20, 110, -98, -16, 36, -60, -2, 36, 186, 240, -474, 32, 204,
-218, -12, 86, -94, 484, -426, 102, -156, 484, -450, -12, -10, -8, 20, 40, 12, 416, -494}

```

```
Out[11]= {1, -1, 3, -4, 6, -5, 1, 0, 8, -10, 12, -8, -3, 0, 15, -16, 18, -16, 1, 5, 14, -22, 4, 6, -8, 2,
24, -26, 28, -29, 6, 7, -13, -1, 36, -20, -7, -7, 38, -36, 38, -34, -7, 19, 26, -46, 6,
-4, 11, -3, 42, -52, 5, -1, 11, 11, 32, -56, 58, -32, -25, -2, 6, 1, 58, -52, 5, -15, 66,
-70, 72, -38, -33, 15, -13, 7, 68, -76, 0, 36, 44, -78, 7, 29, -15, -17, 80, -86, 3, 15,
7, 17, -31, -13, 96, -92, 3, -5, 98, -86, 88, -92, -7, 47, 56, -106, 108, -100, 25, -29,
108, -96, 1, 9, -17, 47, -47, -7, 8, 48, -21, -9, -24, 0, 122, -125, 38, -29, 120, -122,
3, 53, -63, 13, 122, -116, 118, -134, 39, 25, -67, -1, 23, 47, -67, 31, 114, -146, 148,
-134, -3, -5, 17, -15, 146, -80, -27, -47, 13, -15, 162, -124, -31, 73, 86, -162, 8, 2,
1, 25, 132, -146, -25, 7, 47, 31, 92, -176, 178, -170, 47, -37, 11, -3, -23, 39, -41, 13,
174, -190, 192, -98, -85, -5, 192, -188, 190, -196, 61, 35, -77, -7, 21, 65, -81, -9, -3,
-3, 206, -160, 17, 37, -67, -37, 23, 83, -37, -61, -5, 31, 188, -218, -3, 109, 116, -210,
212, -208, -13, 19, 206, -222, 31, 15, 19, -61, 224, -236, 238, -232, -6, 56, -57, 37,
-33, 23, 51, -77, 248, -246, 7, 113, -111, -12, 255, -216, -11, -19, 15, 103, 134, -254,
39, -31, 69, -21, 204, -266, 268, -256, -5, 125, -129, 15, 256, -140, -109, -23, 276,
-236, 238, -214, -53, -5, 23, -33, 16, 10, 67, -23, 222, -288, 49, -19, -27, 139, -137,
-7, 33, 113, -51, -81, 39, -41, 292, -298, 91, -71, 282, -300, 302, -158, -151, 73, 240,
-266, -33, -15, 101, -83, -19, -1, 7, 153, -55, -67, 1, -31, 322, -250, -47, 131, -103,
-57, 332, -326, 99, -95, 5, -3, -10, 34, -21, 151, 176, -320, 322, -344, 5, -1, 344, -296,
9, 21, -73, 163, 182, -356, 16, 160, -171, 3, 57, -9, 308, -346, 17, -3, 11, -17, 344,
-358, -13, 43, -29, -11, 374, -362, 107, 65, 194, -382, 5, 185, -151, 55, 294, -378, -5,
-1, 123, 67, -121, -65, 388, -200, -181, -13, 398, -336, -47, 81, -97, 25, -1, -11, 394,
-370, 95, -33, -49, -31, 57, -67, 125, -119, 402, -414, 416, -212, -165, 7, -39, 57, -15,
51, -95, 31, 390, -430, 432, -404, -3, 81, -103, 67, 368, -430, -5, 11, 428, -408, 49,
137, -75, -141, 444, -446, 27, 81, 37, 77, -217, 9, 440, -230, -213, 7, 440, -452, 454,
-436, 1, 203, 236, -456, 49, -15, 109, -97, -25, 45, -63, 1, 35, 187, 242, -476, 21, 215,
-219, -11, 83, -91, 486, -428, 101, -155, 486, -452, -27, 5, -9, 21, 35, 17, 418, -496}
```

At the first sight it seems that this step added more variability with the introduction of negative items. Moreover these two sequences start with same three terms but after that are completely different. Now apply a simple rule to each sequence. **Collect items in a subsequence until the sum of items equals its length so write it and restart with a new one.** This algorithm can be described with this function:

```
In[12]= splitseq[l_List] := Module[{i, parz = {}, res = {}},
  For[i = 1, i <= Length[l], i++,
    AppendTo[parz, l[[i]]];
    If[Total[parz] == Length[parz],
      AppendTo[res, parz];
      parz = {}
    ]
  ];
  Return[res]
]
```

So you can apply the above function to the sequences and you will get:

In[13]:=

t1=splitseq[s1]

```

Out[13]= {{1}, {-1, 3}, {-3, 5}, {-5, 1, -1, 9}, {-9, 11}, {-11, 1, -1, 15}, {-15, 17}, {-17, 1, -1, 21},
{-21, 3, -3, 1, -1, 27}, {-27, 29}, {-29, 1, -1, 3, -3, 35}, {-35, 1, -1, 39},
{-39, 41}, {-41, 1, -1, 45}, {-45, 5, -5, 1, -1, 51}, {-51, 3, -3, 1, -1, 57},
{-57, 59}, {-59, 1, -1, 3, -3, 65}, {-65, 1, -1, 69}, {-69, 71}, {-71, 1, -1, 5, -5, 77},
{-77, 1, -1, 81}, {-81, 3, -3, 1, -1, 87}, {-87, 5, -5, 1, -1, 3, -3, 95},
{-95, 1, -1, 99}, {-99, 101}, {-101, 1, -1, 105}, {-105, 107}, {-107, 1, -1, 111},
{-111, 3, -3, 1, -1, 5, -5, 9, -9, 1, -1, 3, -3, 125}, {-125, 1, -1, 129},
{-129, 5, -5, 1, -1, 135}, {-135, 137}, {-137, 1, -1, 9, -9, 3, -3, 1, -1, 147},
{-147, 149}, {-149, 1, -1, 3, -3, 155}, {-155, 1, -1, 5, -5, 161}, {-161, 1, -1, 165},
{-165, 11, -11, 1, -1, 171}, {-171, 3, -3, 1, -1, 177}, {-177, 179},
{-179, 1, -1, 3, -3, 9, -9, 1, -1, 189}, {-189, 191}, {-191, 1, -1, 195}, {-195, 197},
{-197, 1, -1, 5, -5, 3, -3, 1, -1, 9, -9, 209}, {-209, 1, -1, 3, -3, 5, -5, 1, -1, 11, -11, 221},
{-221, 1, -1, 225}, {-225, 227}, {-227, 1, -1, 231}, {-231, 3, -3, 1, -1, 237},
{-237, 239}, {-239, 1, -1, 3, -3, 11, -11, 1, -1, 249}, {-249, 9, -9, 1, -1, 255},
{-255, 5, -5, 1, -1, 261}, {-261, 3, -3, 1, -1, 267}, {-267, 269}, {-269, 1, -1, 3, -3, 275},
{-275, 1, -1, 279}, {-279, 281}, {-281, 1, -1, 5, -5, 15, -15, 1, -1, 291},
{-291, 3, -3, 1, -1, 11, -11, 5, -5, 1, -1, 3, -3, 305}, {-305, 1, -1, 309},
{-309, 311}, {-311, 1, -1, 315}, {-315, 9, -9, 1, -1, 15, -15, 3, -3, 1, -1, 5, -5, 329},
{-329, 1, -1, 3, -3, 335}, {-335, 1, -1, 9, -9, 5, -5, 1, -1, 345}, {-345, 347},
{-347, 1, -1, 351}, {-351, 3, -3, 1, -1, 357}, {-357, 17, -17, 1, -1, 3, -3, 365},
{-365, 1, -1, 5, -5, 371}, {-371, 1, -1, 11, -11, 377}, {-377, 1, -1, 381},
{-381, 3, -3, 1, -1, 387}, {-387, 15, -15, 1, -1, 3, -3, 395}, {-395, 1, -1, 399},
{-399, 11, -11, 1, -1, 9, -9, 407}, {-407, 1, -1, 5, -5, 3, -3, 1, -1, 417},
{-417, 419}, {-419, 1, -1, 3, -3, 5, -5, 1, -1, 429}, {-429, 431},
{-431, 1, -1, 17, -17, 437}, {-437, 1, -1, 441}, {-441, 3, -3, 1, -1, 447},
{-447, 9, -9, 1, -1, 3, -3, 455}, {-455, 1, -1, 459}, {-459, 461},
{-461, 1, -1, 465}, {-465, 5, -5, 1, -1, 9, -9, 3, -3, 1, -1, 477},
{-477, 11, -11, 1, -1, 3, -3, 485}, {-485, 1, -1, 489}, {-489, 15, -15, 1, -1, 5, -5, 497}}

```

In[14]=

t2=splitseq[s2]

```

Out[14]= {{1}, {-1, 3}, {-2, 4}, {-5, 1, 2, 6}, {-8, 10}, {-6, -2, -3, 15}, {-14, 16}, {-14, 2, 4, 12},
{-20, 2, 8, -10, 4, 22}, {-24, 26}, {-29, 9, 6, -10, -4, 34}, {-18, -6, -8, 36}, {-34, 36},
{-32, -6, 18, 24}, {-44, 4, -2, 12, -4, 40}, {-50, 8, -4, 12, 10, 30}, {-54, 56},
{-30, -24, -5, 11, -2, 56}, {-50, 6, -16, 64}, {-68, 70}, {-36, -32, 14, -8, 2, 66},
{-74, -2, 38, 42}, {-76, 10, 26, -14, -18, 78}, {-84, 8, 10, 8, 16, -28, -16, 94},
{-90, 4, -6, 96}, {-84, 86}, {-90, -6, 46, 54}, {-104, 106}, {-98, 26, -30, 106},
{-94, 4, 6, -16, 46, -42, -12, 6, 50, -20, -10, -26, 2, 120}, {-125, 41, -30, 118},
{-120, 8, 48, -62, 12, 120}, {-114, 116}, {-132, 40, 24, -58, -10, 26, 44, -66, 30, 112},
{-144, 146}, {-132, -2, -6, 20, -18, 144}, {-78, -26, -48, 18, -20, 160},
{-122, -30, 72, 84}, {-160, 6, 4, 2, 24, 130}, {-144, -22, 4, 48, 30, 90}, {-174, 176},
{-168, 48, -38, 14, -6, -14, 30, -40, 12, 172}, {-188, 190}, {-96, -84, -6, 190},
{-186, 188}, {-194, 62, 34, -72, -12, 24, 62, -80, -10, 6, -12, 204},
{-158, 18, 36, -64, -40, 28, 78, -36, -62, 6, 20, 186}, {-216, -2, 108, 114},
{-208, 210}, {-206, -12, 18, 204}, {-220, 34, 12, 20, -62, 222}, {-234, 236},
{-230, -8, 58, -54, 34, -22, 12, 52, -78, 246}, {-244, 16, 104, -110, -15, 255},
{-214, -6, -24, 16, 102, 132}, {-252, 42, -34, 70, -22, 202},
{-264, 266}, {-254, -4, 124, -126, 12, 254}, {-138, -108, -24, 274},
{-234, 236}, {-212, -52, -6, 28, -38, 14, 12, 68, -24, 220},
{-286, 52, -22, -26, 138, -126, -18, 38, 108, -50, -82, 42, -44, 290},
{-296, 92, -72, 280}, {-298, 300}, {-156, -150, 72, 238},
{-264, -24, -24, 102, -84, -4, -16, 10, 150, -54, -68, 6, -36, 320},
{-248, -46, 130, -100, -60, 330}, {-324, 100, -96, 14, -12, -12, 36, -20, 150, 174}, {-318, 320},
{-342, 6, -2, 342}, {-294, 12, 18, -72, 162, 180}, {-354, 14, 162, -170, 2, 60, -12, 306},
{-344, 18, -4, 16, -22, 342}, {-356, -12, 42, -18, -22, 372}, {-360, 108, 64, 192},
{-380, 8, 182, -150, 54, 292}, {-376, 10, -16, 124, 66, -118, -68, 386}, {-198, -180, -14, 396},
{-334, -36, 70, -96, 24, 8, -20, 392}, {-368, 96, -34, -44, -36, 60, -70, 126, -120, 400},
{-412, 414}, {-210, -164, 6, -36, 54, -10, 46, -94, 30, 388}, {-428, 430},
{-402, -2, 80, -86, 50, 366}, {-428, -4, 10, 426}, {-406, 52, 134, -74, -142, 442},
{-444, 36, 72, 38, 76, -214, 6, 438}, {-228, -212, 6, 438}, {-450, 452},
{-434, 2, 202, 234}, {-454, 54, -20, 110, -98, -16, 36, -60, -2, 36, 186, 240},
{-474, 32, 204, -218, -12, 86, -94, 484},
{-426, 102, -156, 484}, {-450, -12, -10, -8, 20, 40, 12, 416}}

```

In[15]=

t3=splitseq[s3]

```

Out[15]= {{1}, {-1, 3}, {-4, 6}, {-5, 1, 0, 8}, {-10, 12}, {-8, -3, 0, 15}, {-16, 18}, {-16, 1, 5, 14},
{-22, 4, 6, -8, 2, 24}, {-26, 28}, {-29, 6, 7, -13, -1, 36}, {-20, -7, -7, 38}, {-36, 38},
{-34, -7, 19, 26}, {-46, 6, -4, 11, -3, 42}, {-52, 5, -1, 11, 11, 32}, {-56, 58},
{-32, -25, -2, 6, 1, 58}, {-52, 5, -15, 66}, {-70, 72}, {-38, -33, 15, -13, 7, 68},
{-76, 0, 36, 44}, {-78, 7, 29, -15, -17, 80}, {-86, 3, 15, 7, 17, -31, -13, 96},
{-92, 3, -5, 98}, {-86, 88}, {-92, -7, 47, 56}, {-106, 108}, {-100, 25, -29, 108},
{-96, 1, 9, -17, 47, -47, -7, 8, 48, -21, -9, -24, 0, 122}, {-125, 38, -29, 120},
{-122, 3, 53, -63, 13, 122}, {-116, 118}, {-134, 39, 25, -67, -1, 23, 47, -67, 31, 114},
{-146, 148}, {-134, -3, -5, 17, -15, 146}, {-80, -27, -47, 13, -15, 162},
{-124, -31, 73, 86}, {-162, 8, 2, 1, 25, 132}, {-146, -25, 7, 47, 31, 92},
{-176, 178}, {-170, 47, -37, 11, -3, -23, 39, -41, 13, 174}, {-190, 192},
{-98, -85, -5, 192}, {-188, 190}, {-196, 61, 35, -77, -7, 21, 65, -81, -9, -3, -3, 206},
{-160, 17, 37, -67, -37, 23, 83, -37, -61, -5, 31, 188}, {-218, -3, 109, 116},
{-210, 212}, {-208, -13, 19, 206}, {-222, 31, 15, 19, -61, 224}, {-236, 238},
{-232, -6, 56, -57, 37, -33, 23, 51, -77, 248}, {-246, 7, 113, -111, -12, 255},
{-216, -11, -19, 15, 103, 134}, {-254, 39, -31, 69, -21, 204},
{-266, 268}, {-256, -5, 125, -129, 15, 256}, {-140, -109, -23, 276},
{-236, 238}, {-214, -53, -5, 23, -33, 16, 10, 67, -23, 222},
{-288, 49, -19, -27, 139, -137, -7, 33, 113, -51, -81, 39, -41, 292},
{-298, 91, -71, 282}, {-300, 302}, {-158, -151, 73, 240},
{-266, -33, -15, 101, -83, -19, -1, 7, 153, -55, -67, 1, -31, 322},
{-250, -47, 131, -103, -57, 332}, {-326, 99, -95, 5, -3, -10, 34, -21, 151, 176}, {-320, 322},
{-344, 5, -1, 344}, {-296, 9, 21, -73, 163, 182}, {-356, 16, 160, -171, 3, 57, -9, 308},
{-346, 17, -3, 11, -17, 344}, {-358, -13, 43, -29, -11, 374}, {-362, 107, 65, 194},
{-382, 5, 185, -151, 55, 294}, {-378, -5, -1, 123, 67, -121, -65, 388}, {-200, -181, -13, 398},
{-336, -47, 81, -97, 25, -1, -11, 394}, {-370, 95, -33, -49, -31, 57, -67, 125, -119, 402},
{-414, 416}, {-212, -165, 7, -39, 57, -15, 51, -95, 31, 390}, {-430, 432},
{-404, -3, 81, -103, 67, 368}, {-430, -5, 11, 428}, {-408, 49, 137, -75, -141, 444},
{-446, 27, 81, 37, 77, -217, 9, 440}, {-230, -213, 7, 440}, {-452, 454},
{-436, 1, 203, 236}, {-456, 49, -15, 109, -97, -25, 45, -63, 1, 35, 187, 242},
{-476, 21, 215, -219, -11, 83, -91, 486},
{-428, 101, -155, 486}, {-452, -27, 5, -9, 21, 35, 17, 418}}

```

As you can see comparing above three sequences, **corresponding subsequences have same length**. But the astounding result is that if you couple each natural number starting with 2 with the corresponding item in the sequences **each prime corresponds with each first item of each subsequence**.

Now let's analyze deeply sequence t1. To do this let's define a function that couple each number with the corresponding natural number:

```

In[23]:= couplesn[s_List,start_Integer]:=Module[{i,j,k,t,res={}},
  For[i=1;j=start,i<=Length[s],i++,
    t={};
    For[k=1,k<=Length[s[[i]]],k++,
      AppendTo[t,{s[[i,k]],j++}]
    ];
  AppendTo[res,t]
  ];
  Return[res]
]
```

To stat investigations execute function above and then extract all the couples from the subsequences to simplify investigations:

```

In[17]:= u1=couplesn[t1,2]
z=Flatten[u1,1]
```

```

Out[17]= {{1, 2}}, {{-1, 3}, {3, 4}}, {{-3, 5}, {5, 6}}, {{-5, 7}, {1, 8}, {-1, 9}, {9, 10}},
  {{-9, 11}, {11, 12}}, {{-11, 13}, {1, 14}, {-1, 15}, {15, 16}},
  {{-15, 17}, {17, 18}}, {{-17, 19}, {1, 20}, {-1, 21}, {21, 22}},
  {{-21, 23}, {3, 24}, {-3, 25}, {1, 26}, {-1, 27}, {27, 28}},
  {{-27, 29}, {29, 30}}, {{-29, 31}, {1, 32}, {-1, 33}, {3, 34}, {-3, 35}, {35, 36}},
  {{-35, 37}, {1, 38}, {-1, 39}, {39, 40}},
  {{-39, 41}, {41, 42}}, {{-41, 43}, {1, 44}, {-1, 45}, {45, 46}},
  {{-45, 47}, {5, 48}, {-5, 49}, {1, 50}, {-1, 51}, {51, 52}},
  {{-51, 53}, {3, 54}, {-3, 55}, {1, 56}, {-1, 57}, {57, 58}},
  {{-57, 59}, {59, 60}}, {{-59, 61}, {1, 62}, {-1, 63}, {3, 64}, {-3, 65}, {65, 66}},
  {{-65, 67}, {1, 68}, {-1, 69}, {69, 70}}, {{-69, 71}, {71, 72}},
  {{-71, 73}, {1, 74}, {-1, 75}, {5, 76}, {-5, 77}, {77, 78}},
  {{-77, 79}, {1, 80}, {-1, 81}, {81, 82}},
  {{-81, 83}, {3, 84}, {-3, 85}, {1, 86}, {-1, 87}, {87, 88}},
  {{-87, 89}, {5, 90}, {-5, 91}, {1, 92}, {-1, 93}, {3, 94}, {-3, 95}, {95, 96}},
  {{-95, 97}, {1, 98}, {-1, 99}, {99, 100}}, {{-99, 101}, {101, 102}},
  {{-101, 103}, {1, 104}, {-1, 105}, {105, 106}},
  {{-105, 107}, {107, 108}}, {{-107, 109}, {1, 110}, {-1, 111}, {111, 112}},
  {{-111, 113}, {3, 114}, {-3, 115}, {1, 116}, {-1, 117}, {5, 118}, {-5, 119},
  {9, 120}, {-9, 121}, {1, 122}, {-1, 123}, {3, 124}, {-3, 125}, {125, 126}},
  {{-125, 127}, {1, 128}, {-1, 129}, {129, 130}},
  {{-129, 131}, {5, 132}, {-5, 133}, {1, 134}, {-1, 135}, {135, 136}},
  {{-135, 137}, {137, 138}}, {{-137, 139}, {1, 140}, {-1, 141}, {9, 142}, {-9, 143},
  {3, 144}, {-3, 145}, {1, 146}, {-1, 147}, {147, 148}}, {{-147, 149}, {149, 150}},
  {{-149, 151}, {1, 152}, {-1, 153}, {3, 154}, {-3, 155}, {155, 156}},
  {{-155, 157}, {1, 158}, {-1, 159}, {5, 160}, {-5, 161}, {161, 162}},
  {{-161, 163}, {1, 164}, {-1, 165}, {165, 166}},
  {{-165, 167}, {11, 168}, {-11, 169}, {1, 170}, {-1, 171}, {171, 172}},
  {{-171, 173}, {3, 174}, {-3, 175}, {1, 176}, {-1, 177}, {177, 178}},
  {{-177, 179}, {179, 180}}, {{-179, 181}, {1, 182}, {-1, 183}, {3, 184},
  {-3, 185}, {9, 186}, {-9, 187}, {1, 188}, {-1, 189}, {189, 190}},
  {{-189, 191}, {191, 192}}, {{-191, 193}, {1, 194}, {-1, 195}, {195, 196}},
  {{-195, 197}, {197, 198}}, {{-197, 199}, {1, 200}, {-1, 201}, {5, 202}, {-5, 203}},
```



```

{3, 204}, {-3, 205}, {1, 206}, {-1, 207}, {9, 208}, {-9, 209}, {209, 210}},
{{-209, 211}, {1, 212}, {-1, 213}, {3, 214}, {-3, 215}, {5, 216}, {-5, 217}, {1, 218},
{-1, 219}, {11, 220}, {-11, 221}, {221, 222}}, {{-221, 223}, {1, 224}, {-1, 225}, {225, 226}},
{{-225, 227}, {227, 228}}, {{-227, 229}, {1, 230}, {-1, 231}, {231, 232}},
{{-231, 233}, {3, 234}, {-3, 235}, {1, 236}, {-1, 237}, {237, 238}}, {{-237, 239}, {239, 240}},
{{-239, 241}, {1, 242}, {-1, 243}, {3, 244}, {-3, 245}, {11, 246}, {-11, 247}, {1, 248},
{-1, 249}, {249, 250}}, {{-249, 251}, {9, 252}, {-9, 253}, {1, 254}, {-1, 255}, {255, 256}},
{{-255, 257}, {5, 258}, {-5, 259}, {1, 260}, {-1, 261}, {261, 262}},
{{-261, 263}, {3, 264}, {-3, 265}, {1, 266}, {-1, 267}, {267, 268}},
{{-267, 269}, {269, 270}}, {{-269, 271}, {1, 272}, {-1, 273}, {3, 274}, {-3, 275}, {275, 276}},
{{-275, 277}, {1, 278}, {-1, 279}, {279, 280}}, {{-279, 281}, {281, 282}},
{{-281, 283}, {1, 284}, {-1, 285}, {5, 286}, {-5, 287}, {15, 288}, {-15, 289}, {1, 290},
{-1, 291}, {291, 292}}, {{-291, 293}, {3, 294}, {-3, 295}, {1, 296}, {-1, 297}, {11, 298},
{-11, 299}, {5, 300}, {-5, 301}, {1, 302}, {-1, 303}, {3, 304}, {-3, 305}, {305, 306}},
{{-305, 307}, {1, 308}, {-1, 309}, {309, 310}}, {{-309, 311}, {311, 312}},
{{-311, 313}, {1, 314}, {-1, 315}, {315, 316}},
{{-315, 317}, {9, 318}, {-9, 319}, {1, 320}, {-1, 321}, {15, 322}, {-15, 323},
{3, 324}, {-3, 325}, {1, 326}, {-1, 327}, {5, 328}, {-5, 329}, {329, 330}},
{{-329, 331}, {1, 332}, {-1, 333}, {3, 334}, {-3, 335}, {335, 336}}, {{-335, 337}, {1, 338},
{-1, 339}, {9, 340}, {-9, 341}, {5, 342}, {-5, 343}, {1, 344}, {-1, 345}, {345, 346}},
{{-345, 347}, {347, 348}}, {{-347, 349}, {1, 350}, {-1, 351}, {351, 352}},
{{-351, 353}, {3, 354}, {-3, 355}, {1, 356}, {-1, 357}, {357, 358}},
{{-357, 359}, {17, 360}, {-17, 361}, {1, 362}, {-1, 363}, {3, 364}, {-3, 365}, {365, 366}},
{{-365, 367}, {1, 368}, {-1, 369}, {5, 370}, {-5, 371}, {371, 372}},
{{-371, 373}, {1, 374}, {-1, 375}, {11, 376}, {-11, 377}, {377, 378}},
{{-377, 379}, {1, 380}, {-1, 381}, {381, 382}},
{{-381, 383}, {3, 384}, {-3, 385}, {1, 386}, {-1, 387}, {387, 388}},
{{-387, 389}, {15, 390}, {-15, 391}, {1, 392}, {-1, 393}, {3, 394}, {-3, 395}, {395, 396}},
{{-395, 397}, {1, 398}, {-1, 399}, {399, 400}},
{{-399, 401}, {11, 402}, {-11, 403}, {1, 404}, {-1, 405}, {9, 406}, {-9, 407}, {407, 408}},
{{-407, 409}, {1, 410}, {-1, 411}, {5, 412}, {-5, 413}, {3, 414},
{-3, 415}, {1, 416}, {-1, 417}, {417, 418}}, {{-417, 419}, {419, 420}},
{{-419, 421}, {1, 422}, {-1, 423}, {3, 424}, {-3, 425}, {5, 426}, {-5, 427},
{1, 428}, {-1, 429}, {429, 430}}, {{-429, 431}, {431, 432}},
{{-431, 433}, {1, 434}, {-1, 435}, {17, 436}, {-17, 437}, {437, 438}},
{{-437, 439}, {1, 440}, {-1, 441}, {441, 442}},
{{-441, 443}, {3, 444}, {-3, 445}, {1, 446}, {-1, 447}, {447, 448}},
{{-447, 449}, {9, 450}, {-9, 451}, {1, 452}, {-1, 453}, {3, 454}, {-3, 455}, {455, 456}},
{{-455, 457}, {1, 458}, {-1, 459}, {459, 460}}, {{-459, 461}, {461, 462}},
{{-461, 463}, {1, 464}, {-1, 465}, {465, 466}}, {{-465, 467}, {5, 468}, {-5, 469}, {1, 470},
{-1, 471}, {9, 472}, {-9, 473}, {3, 474}, {-3, 475}, {1, 476}, {-1, 477}, {477, 478}},
{{-477, 479}, {11, 480}, {-11, 481}, {1, 482}, {-1, 483}, {3, 484}, {-3, 485}, {485, 486}},
{{-485, 487}, {1, 488}, {-1, 489}, {489, 490}},
{{-489, 491}, {15, 492}, {-15, 493}, {1, 494}, {-1, 495}, {5, 496}, {-5, 497}, {497, 498}}

```

```

Out[18]= {{1, 2}, {-1, 3}, {3, 4}, {-3, 5}, {5, 6}, {-5, 7}, {1, 8}, {-1, 9}, {9, 10}, {-9, 11}, {11, 12},
{-11, 13}, {1, 14}, {-1, 15}, {15, 16}, {-15, 17}, {17, 18}, {-17, 19}, {1, 20}, {-1, 21},
{21, 22}, {-21, 23}, {3, 24}, {-3, 25}, {1, 26}, {-1, 27}, {27, 28}, {-27, 29}, {29, 30},
{-29, 31}, {1, 32}, {-1, 33}, {3, 34}, {-3, 35}, {35, 36}, {-35, 37}, {1, 38}, {-1, 39},
{39, 40}, {-39, 41}, {41, 42}, {-41, 43}, {1, 44}, {-1, 45}, {45, 46}, {-45, 47}, {5, 48},
{-5, 49}, {1, 50}, {-1, 51}, {51, 52}, {-51, 53}, {3, 54}, {-3, 55}, {1, 56}, {-1, 57},
{57, 58}, {-57, 59}, {59, 60}, {-59, 61}, {1, 62}, {-1, 63}, {3, 64}, {-3, 65}, {65, 66},
{-65, 67}, {1, 68}, {-1, 69}, {69, 70}, {-69, 71}, {71, 72}, {-71, 73}, {1, 74}, {-1, 75},
{5, 76}, {-5, 77}, {77, 78}, {-77, 79}, {1, 80}, {-1, 81}, {81, 82}, {-81, 83}, {3, 84},
{-3, 85}, {1, 86}, {-1, 87}, {87, 88}, {-87, 89}, {5, 90}, {-5, 91}, {1, 92}, {-1, 93},
{3, 94}, {-3, 95}, {95, 96}, {-95, 97}, {1, 98}, {-1, 99}, {99, 100}, {-99, 101}, {101, 102},

```

{-101, 103}, {1, 104}, {-1, 105}, {105, 106}, {-105, 107}, {107, 108}, {-107, 109}, {1, 110},
 {-1, 111}, {111, 112}, {-111, 113}, {3, 114}, {-3, 115}, {1, 116}, {-1, 117}, {5, 118},
 {-5, 119}, {9, 120}, {-9, 121}, {1, 122}, {-1, 123}, {3, 124}, {-3, 125}, {125, 126},
 {-125, 127}, {1, 128}, {-1, 129}, {129, 130}, {-129, 131}, {5, 132}, {-5, 133}, {1, 134},
 {-1, 135}, {135, 136}, {-135, 137}, {137, 138}, {-137, 139}, {1, 140}, {-1, 141}, {9, 142},
 {-9, 143}, {3, 144}, {-3, 145}, {1, 146}, {-1, 147}, {147, 148}, {-147, 149}, {149, 150},
 {-149, 151}, {1, 152}, {-1, 153}, {3, 154}, {-3, 155}, {155, 156}, {-155, 157}, {1, 158},
 {-1, 159}, {5, 160}, {-5, 161}, {161, 162}, {-161, 163}, {1, 164}, {-1, 165}, {165, 166},
 {-165, 167}, {11, 168}, {-11, 169}, {1, 170}, {-1, 171}, {171, 172}, {-171, 173}, {3, 174},
 {-3, 175}, {1, 176}, {-1, 177}, {177, 178}, {-177, 179}, {179, 180}, {-179, 181}, {1, 182},
 {-1, 183}, {3, 184}, {-3, 185}, {9, 186}, {-9, 187}, {1, 188}, {-1, 189}, {189, 190},
 {-189, 191}, {191, 192}, {-191, 193}, {1, 194}, {-1, 195}, {195, 196}, {-195, 197},
 {197, 198}, {-197, 199}, {1, 200}, {-1, 201}, {5, 202}, {-5, 203}, {3, 204}, {-3, 205},
 {1, 206}, {-1, 207}, {9, 208}, {-9, 209}, {209, 210}, {-209, 211}, {1, 212}, {-1, 213},
 {3, 214}, {-3, 215}, {5, 216}, {-5, 217}, {1, 218}, {-1, 219}, {11, 220}, {-11, 221},
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 {-227, 229}, {1, 230}, {-1, 231}, {231, 232}, {-231, 233}, {3, 234}, {-3, 235}, {1, 236},
 {-1, 237}, {237, 238}, {-237, 239}, {239, 240}, {-239, 241}, {1, 242}, {-1, 243}, {3, 244},
 {-3, 245}, {11, 246}, {-11, 247}, {1, 248}, {-1, 249}, {249, 250}, {-249, 251}, {9, 252},
 {-9, 253}, {1, 254}, {-1, 255}, {255, 256}, {-255, 257}, {5, 258}, {-5, 259}, {1, 260},
 {-1, 261}, {261, 262}, {-261, 263}, {3, 264}, {-3, 265}, {1, 266}, {-1, 267}, {267, 268},
 {-267, 269}, {269, 270}, {-269, 271}, {1, 272}, {-1, 273}, {3, 274}, {-3, 275}, {275, 276},
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 {-1, 285}, {5, 286}, {-5, 287}, {15, 288}, {-15, 289}, {1, 290}, {-1, 291}, {291, 292},
 {-291, 293}, {3, 294}, {-3, 295}, {1, 296}, {-1, 297}, {11, 298}, {-11, 299}, {5, 300},
 {-5, 301}, {1, 302}, {-1, 303}, {3, 304}, {-3, 305}, {305, 306}, {-305, 307}, {1, 308},
 {-1, 309}, {309, 310}, {-309, 311}, {311, 312}, {-311, 313}, {1, 314}, {-1, 315}, {315, 316},
 {-315, 317}, {9, 318}, {-9, 319}, {1, 320}, {-1, 321}, {15, 322}, {-15, 323}, {3, 324},
 {-3, 325}, {1, 326}, {-1, 327}, {5, 328}, {-5, 329}, {329, 330}, {-329, 331}, {1, 332},
 {-1, 333}, {3, 334}, {-3, 335}, {335, 336}, {-335, 337}, {1, 338}, {-1, 339}, {9, 340},
 {-9, 341}, {5, 342}, {-5, 343}, {1, 344}, {-1, 345}, {345, 346}, {-345, 347}, {347, 348},
 {-347, 349}, {1, 350}, {-1, 351}, {351, 352}, {-351, 353}, {3, 354}, {-3, 355}, {1, 356},
 {-1, 357}, {357, 358}, {-357, 359}, {17, 360}, {-17, 361}, {1, 362}, {-1, 363}, {3, 364},
 {-3, 365}, {365, 366}, {-365, 367}, {1, 368}, {-1, 369}, {5, 370}, {-5, 371}, {371, 372},
 {-371, 373}, {1, 374}, {-1, 375}, {11, 376}, {-11, 377}, {377, 378}, {-377, 379}, {1, 380},
 {-1, 381}, {381, 382}, {-381, 383}, {3, 384}, {-3, 385}, {1, 386}, {-1, 387}, {387, 388},
 {-387, 389}, {15, 390}, {-15, 391}, {1, 392}, {-1, 393}, {3, 394}, {-3, 395}, {395, 396},
 {-395, 397}, {1, 398}, {-1, 399}, {399, 400}, {-399, 401}, {11, 402}, {-11, 403}, {1, 404},
 {-1, 405}, {9, 406}, {-9, 407}, {407, 408}, {-407, 409}, {1, 410}, {-1, 411}, {5, 412},
 {-5, 413}, {3, 414}, {-3, 415}, {1, 416}, {-1, 417}, {417, 418}, {-417, 419}, {419, 420},
 {-419, 421}, {1, 422}, {-1, 423}, {3, 424}, {-3, 425}, {5, 426}, {-5, 427}, {1, 428},
 {-1, 429}, {429, 430}, {-429, 431}, {431, 432}, {-431, 433}, {1, 434}, {-1, 435}, {17, 436},
 {-17, 437}, {437, 438}, {-437, 439}, {1, 440}, {-1, 441}, {441, 442}, {-441, 443},
 {3, 444}, {-3, 445}, {1, 446}, {-1, 447}, {447, 448}, {-447, 449}, {9, 450}, {-9, 451},
 {1, 452}, {-1, 453}, {3, 454}, {-3, 455}, {455, 456}, {-455, 457}, {1, 458}, {-1, 459},
 {459, 460}, {-459, 461}, {461, 462}, {-461, 463}, {1, 464}, {-1, 465}, {465, 466},
 {-465, 467}, {5, 468}, {-5, 469}, {1, 470}, {-1, 471}, {9, 472}, {-9, 473}, {3, 474},
 {-3, 475}, {1, 476}, {-1, 477}, {477, 478}, {-477, 479}, {11, 480}, {-11, 481}, {1, 482},
 {-1, 483}, {3, 484}, {-3, 485}, {485, 486}, {-485, 487}, {1, 488}, {-1, 489}, {489, 490},
 {-489, 491}, {15, 492}, {-15, 493}, {1, 494}, {-1, 495}, {5, 496}, {-5, 497}, {497, 498}

To confirm what stated about prime numbers we extract the first item from every subsequence of u_2 :

```
In[19]= First/@u2
Prime/@Range[94]
```

```
Out[19]= u2
```

```
Out[20]= {2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73, 79, 83, 89,
97, 101, 103, 107, 109, 113, 127, 131, 137, 139, 149, 151, 157, 163, 167, 173, 179, 181,
191, 193, 197, 199, 211, 223, 227, 229, 233, 239, 241, 251, 257, 263, 269, 271, 277, 281,
283, 293, 307, 311, 313, 317, 331, 337, 347, 349, 353, 359, 367, 373, 379, 383, 389,
397, 401, 409, 419, 421, 431, 433, 439, 443, 449, 457, 461, 463, 467, 479, 487, 491}
```

We can see that all and only the primes are present and for the odd primes all the couples are $(-p+2,p)$

```
In[21]= u3=couplesn[t3,2]
z=Flatten[u3,1]
```

```
Out[21]= {{1, 2}}, {{-1, 3}}, {3, 4}}, {{-4, 5}}, {6, 6}}, {{-5, 7}}, {1, 8}}, {0, 9}}, {8, 10}},
{{-10, 11}}, {12, 12}}, {{-8, 13}}, {-3, 14}}, {0, 15}}, {15, 16}},
{{-16, 17}}, {18, 18}}, {{-16, 19}}, {1, 20}}, {5, 21}}, {14, 22}},
{{-22, 23}}, {4, 24}}, {6, 25}}, {-8, 26}}, {2, 27}}, {24, 28}}, {{-26, 29}}, {28, 30}},
{{-29, 31}}, {6, 32}}, {7, 33}}, {-13, 34}}, {-1, 35}}, {36, 36}},
{{-20, 37}}, {-7, 38}}, {-7, 39}}, {38, 40}},
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Main Results

*Each subsequence length corresponds to a gap between primes in each sequence.

*With minrad each subsequence has other properties:

+every first item of a subsequence is equal to last item of the preceding subsequence but with changed sign

+excluding first and last item of a subsequence, other items are in couples $(n, -n)$

+minrad values can be calculated easily for many values in the interval centered on a given number, so you can reconstruct the subsequence and hence the position of the prime numbers at the extremes of the interval