

Polar circularity recover original list

By Luis Felipe Massena Misiec

(* Lista de somas consecutivas fornecida *)

```
consecutiveSums = {1.000, 0.*10^-4, 0.*10^-4, 2.000, -2.000, 10.000, -10.000,  
  4.000, 4.000, -4.000, 4.000, 0.*10^-4, -8.000, 0.*10^-4,  
  6.000, -2.000, 0.*10^-4, 4.000, -4.000, 0.*10^-4,  
  -2.000, -2.000, 8.000, -6.000, 0.*10^-4, 4.000,  
  -4.000, 8.000, -6.000, 10.000, -6.000, -6.000,  
  14.000, -16.000, 4.000, -4.000, 8.000, 0.*10^-4,  
  -8.000, 22.000, -12.000, -10.000, 6.000, 2.000,  
  12.000, -12.000, 10.000, -14.000, 12.000, -10.000,  
  2.000, -2.000, -6.000, 4.000, 10.000, -10.000,  
  -4.000, 12.000, 4.000, -14.000, 0.*10^-4, 2.000};
```

(* Função para recuperar a lista original *)

```
recoverOriginal[consecutiveSums_] := Module[{n = Length[consecutiveSums], originalList},  
  originalList = Table[0, {n + 1}]; (* Cria uma lista para armazenar os valores recuperados *)  
  originalList[[1]] = consecutiveSums[[1]]; (* Define o primeiro elemento *)
```

(* Recupera os elementos originais usando as somas consecutivas *)

```
Do[  
  originalList[[i + 1]] = consecutiveSums[[i]] - originalList[[i]],  
  {i, 1, n - 1}  
];
```

originalList

```
];
```

(* Recupera a lista original a partir das somas consecutivas *)

```
recoveredOriginalList = recoverOriginal[consecutiveSums];
```

(* Exibe a lista original recuperada *)

recoveredOriginalList

Explicação do Código:

Lista de Somas: A lista

consecutiveSums

```
{1.,0.,0.,0.,2.,-4.,14.,-24.,28.,-24.,20.,-16.,16.,-24.,24.,-18.,16.,-16.,20.,-24.,24.,-26.,24.,-16.,10.,-10.,14.,-18.,26.,-32.,42.,-48.,42.,-28.,12.,-8.,4.,4.,-4.,-4.,26.,-38.,28.,-22.,24.,-12.,0.,10.,-24.,36.,-46.,48.,-50.,44.,-40.,50.,-60.,56.,-44.,48.,-62.,62.,0}
```

do Explicação (Código:de Lista Somas:A lista)

```
{1.,0.,0.,2.,-2.,10.,-10.,4.,4.,-4.,4.,0.,-8.,0.,6.,-2.,0.,4.,-4.,0.,-2.,-2.,8.,-6.,0.,4.,-4.,8.,-6.,10.,-6.,-6.,14.,-16.,4.,-4.,8.,0.,-8.,22.,-12.,-10.,6.,2.,12.,-12.,10.,-14.,12.,-10.,2.,-2.,-6.,4.,10.,-10.,-4.,12.,4.,-14.,0.,2.}
```

The next lines show a positive successful result :

(* Function to sum until two elements, storing intermediate steps with normalization *)

```
sumUntilTwoElementsWithNormalization[consecutiveSums_] := Module[{sums = consecutiveSums, steps = {}},
```

```
While[Length[sums] > 2,
```

```
AppendTo[steps, sums];
```

```
sums = Table[
```

```
Module[{sum = sums[[i]] + sums[[i + 1]]},
```

```
(* Normalize the sum to be within 1 or 2 digits *)
```

```
If[Abs[sum] >= 10, sum = Mod[sum, 10]];
```

```
sum
```

```
], {i, 1, Length[sums] - 1}];
```

```
];
```

```
{sums, steps}
```

```
];
```

(* Reverse the process to get original list with correct length *)

```

reverseSumUntilTwoElementsWithNormalization[finalSums_, steps_, originalLength_] :=
Module[{currentSums = finalSums, reversed = {}},

Do[

currentSums = Flatten[Table[

Module[{sum = steps[[i, j]], diff = currentSums[[j + 1]] - steps[[i, j]]},

(* De-normalize the sum if needed *)

If[Abs[diff] >= 10, diff = diff + 10];

sum

], {j, Length[currentSums] - 1}

]];

PrependTo[reversed, currentSums];

, {i, Length[steps], 1, -1}

];

(* Limit the reversed list to the original length *)

Take[Flatten[{First[steps], reversed}], originalLength]

];

```

(* Provide the consecutive sums list *)

```
consecutiveSums = {1, 0, 0, 2, -2, 10, -10,
```

```
4, 4, -4, 4, 0, -8, 0,
```

```
6, -2, 0, 4, -4, 0,
```

```
-2, -2, 8, -6, 0, 4,
```

```
-4, 8, -6, 10, -6, -6,
```

```
14, -16, 4, -4, 8, 0,
```

```
-8, 22, -12, -10, 6, 2,
```

```
12, -12, 10, -14, 12, -10,
```

```
2, -2, -6, 4, 10, -10,
```

```
-4, 12, 4, -14, 0, 2};
```

(* Execute the function to sum and store intermediate steps *)

```
result = sumUntilTwoElementsWithNormalization[consecutiveSums];
```

```
(* Extract final sums and steps *)
```

```
finalSums = First[result];
```

```
steps = Last[result];
```

```
(* Display the final sums *)
```

```
finalSums
```

```
(* Execute the function to reverse the process *)
```

```
originalSums = reverseSumUntilTwoElementsWithNormalization[finalSums, steps,  
Length[consecutiveSums]];
```

```
(* Display the original sums with the correct length *)
```

```
originalSums
```

```
{3, 6}
```

```
{1, 0, 0, 2, -2, 10, -10, 4, 4, -4, 4, 0, -8, 0, 6, -2, 0, 4, -4, 0, \  
-2, -2, 8, -6, 0, 4, -4, 8, -6, 10, -6, -6, 14, -16, 4, -4, 8, 0, -8, \  
22, -12, -10, 6, 2, 12, -12, 10, -14, 12, -10, 2, -2, -6, 4, 10, -10, \  
-4, 12, 4, -14, 0, 2}
```

```
n = 1002;(* Gerar a lista dos primeiros n números primos *)
```

```
n1=1000;
```

```
primos = Prime[Range[n1]];(* Calcular a diferença entre cada número primo e sua posição *)
```

```
diferencas = primos - Range[n1];(* Calcular a média das diferenças *)
```

```
a=Differences[%]
```

```
diferencas1 = primos - Range[n];(* Calcular a média das diferenças *)
```

```
a1=Differences[%]
```

```
(* Exemplo de diferenças (para fins ilustrativos) *)
```

```
differences = a; (* Substitua pelas suas diferenças reais *)
```

(* Inicializar uma lista para armazenar os números primos reconstruídos *)

```
reconstructedPrimes = diferencas;
```

(* Adicionar a posição correspondente para reconstruir os números primos originais *)

```
reconstructedPrimes = reconstructedPrimes + diferencas;
```

(* Exibir o resultado *)

```
reconstructedPrimes
```

```
Length[%]
```

```
ListLinePlot[a]
```

```
ListLinePlot[reconstructedPrimes]
```

```
Length[reconstructedPrimes]
```

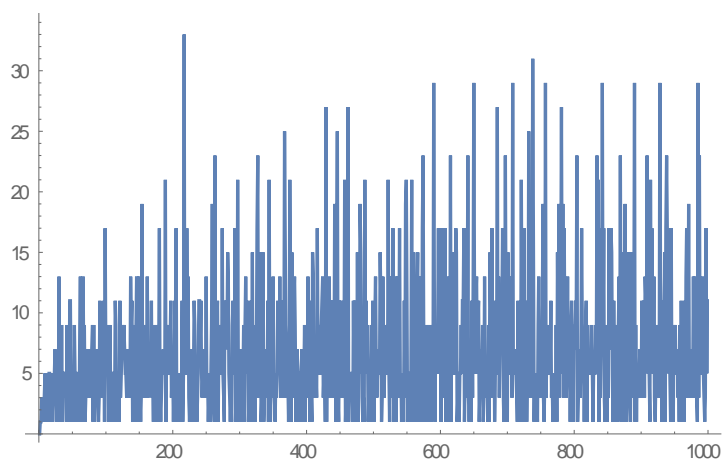
```
Length[diferencas]
```

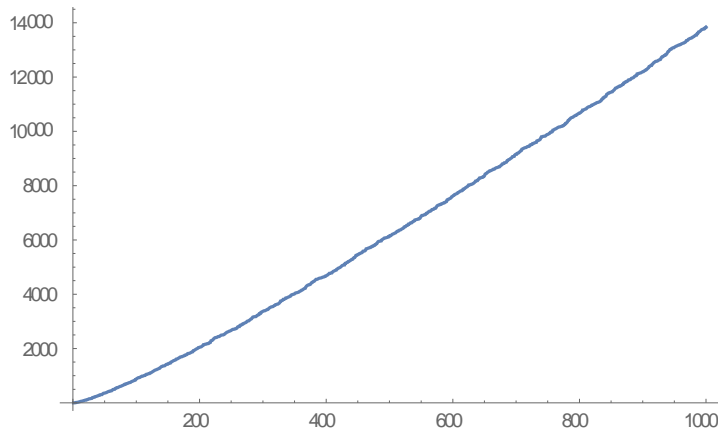
```
sa=(reconstructedPrimes/2)+1000
```

```
Position[%,7919]
```

```
as=Prime[Range[1000]]
```

```
as-as
```





sa={1001,1001,1002,1003,1006,1007,1010,1011,1014,1019,1020,1025,1028,1029,1032,1037,1042,1043,1048,1051,1052,1057,1060,1065,1072,1075,1076,1079,1080,1083,1096,1099,1104,1105,1114,1115,1120,1125,1128,1133,1138,1139,1148,1149,1152,1153,1164,1175,1178,1179,1182,1187,1188,1197,1202,1207,1212,1213,1218,1221,1222,1231,1244,1247,1248,1251,1264,1269,1278,1279,1282,1287,1294,1299,1304,1307,1312,1319,1322,1329,1338,1339,1348,1349,1354,1357,1362,1369,1372,1373,1376,1387,1394,1397,1404,1407,1412,1423,1424,1441,1446,1455,1460,1465,1466,1471,1480,1485,1490,1491,1496,1501,1504,1505,1516,1525,1526,1529,1534,1539,1540,1551,1554,1559,1566,1575,1582,1591,1598,1603,1608,1611,1618,1623,1626,1633,1636,1649,1658,1669,1670,1679,1680,1683,1684,1693,1706,1709,1710,1713,1726,1729,1730,1733,1752,1755,1762,1771,1778,1781,1786,1791,1804,1807,1812,1817,1824,1829,1840,1843,1848,1849,1858,1859,1864,1873,1874,1883,1884,1889,1906,1909,1910,1913,1918,1923,1930,1935,1940,1961,1962,1971,1978,1987,1992,1997,2004,2015,2018,2023,2028,2029,2034,2045,2054,2071,2072,2075,2080,2081,2086,2089,2090,2093,2104,2105,2110,2143,2148,2153,2160,2177,2186,2199,2202,2203,2206,2211,2218,2221,2222,2227,2238,2247,2248,2251,2252,2255,2260,2271,2282,2289,2300,2305,2308,2313,2320,2323,2330,2333,2346,2349,2354,2355,2358,2363,2364,2369,2378,2397,2402,2405,2406,2429,2432,2433,2442,2453,2454,2463,2470,2475,2480,2485,2502,2507,2510,2511,2522,2531,2542,2549,2564,2577,2582,2585,2586,2589,2590,2599,2610,2615,2620,2637,2638,2653,2654,2675,2680,2687,2692,2695,2696,2699,2706,2711,2720,2721,2730,2743,2752,2757,2768,2769,2772,2773,2782,2793,2794,2809,2810,2815,2818,2819,2828,2835,2852,2875,2878,2883,2890,2905,2906,2909,2916,2931,2932,2935,2942,2947,2952,2955,2966,2967,2988,2993,2994,2999,3002,3007,3020,3025,3028,3029,3034,3037,3042,3053,3058,3063,3076,3079,3084,3095,3102,3107,3110,3135,3152,3161,3168,3171,3176,3177,3182,3203,3214,3215,3230,3237,3240,3251,3264,3273,3274,3277,3284,3289,3294,3297,3298,3301,3306,3313,3316,3317,3322,3331,3332,3341,3348,3351,3364,3373,3384,3385,3390,3393,3394,3409,3422,3425,3430,3437,3442,3445,3462,3469,3478,3483,3488,3495,3504,3515,3528,3531,3536,3541,3542,3569,3570,3579,3586,3589,3602,3605,3612,3623,3628,3639,3642,3647,3666,3675,3676,3691,3716,3719,3720,3731,3736,3739,3750,3755,3762,3765,3772,3793,3794,3797,3798,3809,3836,3837,3842,3847,3852,3855,3860,3861,3872,3875,3886,3887,3896,3897,3912,3913,3928,3933,3952,3967,3974,3977,3978,3981,3982,4003,4010,4021,4026,4035,4036,4039,4044,4045,4050,4059,4060,4071,4080,4081,4090,4103,4108,4111,4116,4123,4128,4133,4148,4159,4160,4163,4176,4181,4184,4191,4200,4207,4212,4217,4238,4243,4244,4253,4266,4269,4274,4291,4292,4301,4314,4317,4318,4327,4340,4343,4350,4367,4370,4375,4376,4379,4384,4385,4396,4399,4418,4439,4450,4451,4454,4459,4464,4465,4470,4491,4492,4497,4512,4517,4528,4529,4534,4545,4560,4561,4564,4569,4582,4585,4586,4603,4626,4635,4640,4641,4650,4651,4660,4661,4670,4675,4676,4685,4686,46

95,4700,4707,4736,4745,4746,4755,4762,4767,4776,4793,4798,4809,4820,4821,4838,4843,4
846,4851,4856,4873,4874,4883,4896,4901,4904,4905,4908,4931,4932,4943,4948,4963,4970,
4975,4980,4997,5012,5013,5016,5021,5022,5027,5032,5041,5046,5057,5068,5085,5086,5091
,5094,5111,5118,5141,5144,5145,5148,5153,5154,5165,5168,5181,5210,5219,5224,5235,524
8,5253,5262,5273,5274,5277,5282,5289,5294,5303,5304,5307,5320,5325,5330,5333,5338,53
39,5348,5349,5364,5375,5382,5399,5402,5407,5418,5419,5424,5429,5434,5461,5466,5479,5
482,5489,5498,5505,5516,5533,5536,5537,5540,5563,5574,5579,5580,5595,5600,5605,5618,
5627,5640,5643,5672,5677,5682,5687,5694,5699,5702,5703,5714,5719,5722,5723,5728,5749
,5754,5755,5758,5775,5776,5779,5790,5791,5796,5799,5824,5829,5834,5837,5844,5853,588
4,5899,5900,5905,5908,5909,5912,5913,5922,5935,5940,5943,5950,5959,5964,5983,5986,59
87,5992,6021,6024,6031,6040,6045,6050,6057,6062,6073,6076,6081,6082,6087,6090,6095,6
096,6105,6106,6121,6126,6145,6148,6159,6172,6199,6204,6223,6226,6243,6250,6255,6258,
6263,6276,6281,6286,6295,6296,6305,6316,6323,6332,6333,6342,6349,6360,6369,6392,6393
,6396,6403,6408,6411,6418,6435,6444,6449,6454,6455,6460,6469,6480,6481,6490,6495,650
0,6505,6512,6517,6526,6531,6532,6537,6542,6547,6556,6563,6586,6591,6612,6613,6630,66
33,6640,6649,6678,6685,6702,6705,6706,6715,6720,6721,6726,6729,6746,6753,6764,6781,6
796,6801,6802,6813,6818,6827,6828,6837,6838,6843,6852,6865,6868,6891,6892,6907,6908,
6917,6918,6927,6946,6949,6950,6953,6960,6975,6980,6985,6986,6997,7012,7019,7022,7027
,7056,7057,7066,7067,7072,7075,7080,7085,7092,7097,7100,7111,7116,7123,7134,7137,715
0,7161,7170,7193,7198,7209,7214,7215,7236,7243,7260,7269,7274,7287,7290,7291,7296,73
05,7312,7317,7320,7325,7354,7367,7376,7377,7388,7397,7398,7413,7414,7431,7454,7471,7
476,7491,7508,7513,7514,7531,7534,7539,7540,7549,7556,7565,7570,7575,7582,7585,7590,
7591,7600,7601,7612,7615,7620,7625,7626,7637,7640,7653,7670,7673,7678,7697,7700,7707
,7712,7715,7722,7725,7738,7743,7746,7759,7770,7773,7774,7803,7806,7829,7834,7839,785
0,7861,7874,7879,7882,7883,7886,7903,7908,7919}

as-as={-999,-998,-997,-996,-995,-994,-993,-992,-991,-990,-989,-988,-987,-986,-985,-984,-983,-
982,-981,-980,-979,-978,-977,-976,-975,-974,-973,-972,-971,-970,-969,-968,-967,-966,-965,-
964,-963,-962,-961,-960,-959,-958,-957,-956,-955,-954,-953,-952,-951,-950,-949,-948,-947,-
946,-945,-944,-943,-942,-941,-940,-939,-938,-937,-936,-935,-934,-933,-932,-931,-930,-929,-
928,-927,-926,-925,-924,-923,-922,-921,-920,-919,-918,-917,-916,-915,-914,-913,-912,-911,-
910,-909,-908,-907,-906,-905,-904,-903,-902,-901,-900,-899,-898,-897,-896,-895,-894,-893,-
892,-891,-890,-889,-888,-887,-886,-885,-884,-883,-882,-881,-880,-879,-878,-877,-876,-875,-
874,-873,-872,-871,-870,-869,-868,-867,-866,-865,-864,-863,-862,-861,-860,-859,-858,-857,-
856,-855,-854,-853,-852,-851,-850,-849,-848,-847,-846,-845,-844,-843,-842,-841,-840,-839,-
838,-837,-836,-835,-834,-833,-832,-831,-830,-829,-828,-827,-826,-825,-824,-823,-822,-821,-
820,-819,-818,-817,-816,-815,-814,-813,-812,-811,-810,-809,-808,-807,-806,-805,-804,-803,-
802,-801,-800,-799,-798,-797,-796,-795,-794,-793,-792,-791,-790,-789,-788,-787,-786,-785,-
784,-783,-782,-781,-780,-779,-778,-777,-776,-775,-774,-773,-772,-771,-770,-769,-768,-767,-
766,-765,-764,-763,-762,-761,-760,-759,-758,-757,-756,-755,-754,-753,-752,-751,-750,-749,-
748,-747,-746,-745,-744,-743,-742,-741,-740,-739,-738,-737,-736,-735,-734,-733,-732,-731,-
730,-729,-728,-727,-726,-725,-724,-723,-722,-721,-720,-719,-718,-717,-716,-715,-714,-713,-
712,-711,-710,-709,-708,-707,-706,-705,-704,-703,-702,-701,-700,-699,-698,-697,-696,-695,-
694,-693,-692,-691,-690,-689,-688,-687,-686,-685,-684,-683,-682,-681,-680,-679,-678,-677,-
676,-675,-674,-673,-672,-671,-670,-669,-668,-667,-666,-665,-664,-663,-662,-661,-660,-659,-
658,-657,-656,-655,-654,-653,-652,-651,-650,-649,-648,-647,-646,-645,-644,-643,-642,-641,-
640,-639,-638,-637,-636,-635,-634,-633,-632,-631,-630,-629,-628,-627,-626,-625,-624,-623,-
622,-621,-620,-619,-618,-617,-616,-615,-614,-613,-612,-611,-610,-609,-608,-607,-606,-605,-

604,-603,-602,-601,-600,-599,-598,-597,-596,-595,-594,-593,-592,-591,-590,-589,-588,-587,-
586,-585,-584,-583,-582,-581,-580,-579,-578,-577,-576,-575,-574,-573,-572,-571,-570,-569,-
568,-567,-566,-565,-564,-563,-562,-561,-560,-559,-558,-557,-556,-555,-554,-553,-552,-551,-
550,-549,-548,-547,-546,-545,-544,-543,-542,-541,-540,-539,-538,-537,-536,-535,-534,-533,-
532,-531,-530,-529,-528,-527,-526,-525,-524,-523,-522,-521,-520,-519,-518,-517,-516,-515,-
514,-513,-512,-511,-510,-509,-508,-507,-506,-505,-504,-503,-502,-501,-500,-499,-498,-497,-
496,-495,-494,-493,-492,-491,-490,-489,-488,-487,-486,-485,-484,-483,-482,-481,-480,-479,-
478,-477,-476,-475,-474,-473,-472,-471,-470,-469,-468,-467,-466,-465,-464,-463,-462,-461,-
460,-459,-458,-457,-456,-455,-454,-453,-452,-451,-450,-449,-448,-447,-446,-445,-444,-443,-
442,-441,-440,-439,-438,-437,-436,-435,-434,-433,-432,-431,-430,-429,-428,-427,-426,-425,-
424,-423,-422,-421,-420,-419,-418,-417,-416,-415,-414,-413,-412,-411,-410,-409,-408,-407,-
406,-405,-404,-403,-402,-401,-400,-399,-398,-397,-396,-395,-394,-393,-392,-391,-390,-389,-
388,-387,-386,-385,-384,-383,-382,-381,-380,-379,-378,-377,-376,-375,-374,-373,-372,-371,-
370,-369,-368,-367,-366,-365,-364,-363,-362,-361,-360,-359,-358,-357,-356,-355,-354,-353,-
352,-351,-350,-349,-348,-347,-346,-345,-344,-343,-342,-341,-340,-339,-338,-337,-336,-335,-
334,-333,-332,-331,-330,-329,-328,-327,-326,-325,-324,-323,-322,-321,-320,-319,-318,-317,-
316,-315,-314,-313,-312,-311,-310,-309,-308,-307,-306,-305,-304,-303,-302,-301,-300,-299,-
298,-297,-296,-295,-294,-293,-292,-291,-290,-289,-288,-287,-286,-285,-284,-283,-282,-281,-
280,-279,-278,-277,-276,-275,-274,-273,-272,-271,-270,-269,-268,-267,-266,-265,-264,-263,-
262,-261,-260,-259,-258,-257,-256,-255,-254,-253,-252,-251,-250,-249,-248,-247,-246,-245,-
244,-243,-242,-241,-240,-239,-238,-237,-236,-235,-234,-233,-232,-231,-230,-229,-228,-227,-
226,-225,-224,-223,-222,-221,-220,-219,-218,-217,-216,-215,-214,-213,-212,-211,-210,-209,-
208,-207,-206,-205,-204,-203,-202,-201,-200,-199,-198,-197,-196,-195,-194,-193,-192,-191,-
190,-189,-188,-187,-186,-185,-184,-183,-182,-181,-180,-179,-178,-177,-176,-175,-174,-173,-
172,-171,-170,-169,-168,-167,-166,-165,-164,-163,-162,-161,-160,-159,-158,-157,-156,-155,-
154,-153,-152,-151,-150,-149,-148,-147,-146,-145,-144,-143,-142,-141,-140,-139,-138,-137,-
136,-135,-134,-133,-132,-131,-130,-129,-128,-127,-126,-125,-124,-123,-122,-121,-120,-119,-
118,-117,-116,-115,-114,-113,-112,-111,-110,-109,-108,-107,-106,-105,-104,-103,-102,-101,-
100,-99,-98,-97,-96,-95,-94,-93,-92,-91,-90,-89,-88,-87,-86,-85,-84,-83,-82,-81,-80,-79,-78,-77,-
76,-75,-74,-73,-72,-71,-70,-69,-68,-67,-66,-65,-64,-63,-62,-61,-60,-59,-58,-57,-56,-55,-54,-53,-
52,-51,-50,-49,-48,-47,-46,-45,-44,-43,-42,-41,-40,-39,-38,-37,-36,-35,-34,-33,-32,-31,-30,-29,-
28,-27,-26,-25,-24,-23,-22,-21,-20,-19,-18,-17,-16,-15,-14,-13,-12,-11,-10,-9,-8,-7,-6,-5,-4,-3,-2,-
1,0}

n = 1000;(* Gerar a lista dos primeiros n números primos *)

primos = Prime[Range[n]];(* Calcular a diferença entre cada número primo e sua posição *)

diferencas = primos - Range[n];(* Calcular a média das diferenças *)

a=Differences[%]

b=mediaDiferencas = Mean[diferencas]

N[%,9];(* Exibir o resultado *)

mediaDiferencas =Mean[a]

N[%,9]

c=a+b


```

cc=N[%,9]

as=diferencas+1000

sa=diferencas+1000+1

fg=Select[as,OddQ,(1000)]

gf=Select[sa,OddQ,(1000)]

hj=Union[fg,gf]

Length[%]

PrimeQ[as]

primos = Prime[Range[1000]]

n=Range[1000]

primos-as

as+n-1000

PrimeQ[%]

gh=Differences[c]

Length[gh]

a

Length[a]

as+n+1000

```

```

{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
,127,131,137,139,149,151,157,163,167,173,179,181,191,193,197,199,211,223,227,229,233,23
9,241,251,257,263,269,271,277,281,283,293,307,311,313,317,331,337,347,349,353,359,367,3
73,379,383,389,397,401,409,419,421,431,433,439,443,449,457,461,463,467,479,487,491,499,
503,509,521,523,541,547,557,563,569,571,577,587,593,599,601,607,613,617,619,631,641,64
3,647,653,659,661,673,677,683,691,701,709,719,727,733,739,743,751,757,761,769,773,787,7
97,809,811,821,823,827,829,839,853,857,859,863,877,881,883,887,907,911,919,929,937,941,
947,953,967,971,977,983,991,997,1009,1013,1019,1021,1031,1033,1039,1049,1051,1061,106
3,1069,1087,1091,1093,1097,1103,1109,1117,1123,1129,1151,1153,1163,1171,1181,1187,11
93,1201,1213,1217,1223,1229,1231,1237,1249,1259,1277,1279,1283,1289,1291,1297,1301,1
303,1307,1319,1321,1327,1361,1367,1373,1381,1399,1409,1423,1427,1429,1433,1439,1447,
1451,1453,1459,1471,1481,1483,1487,1489,1493,1499,1511,1523,1531,1543,1549,1553,1559
,1567,1571,1579,1583,1597,1601,1607,1609,1613,1619,1621,1627,1637,1657,1663,1667,166
9,1693,1697,1699,1709,1721,1723,1733,1741,1747,1753,1759,1777,1783,1787,1789,1801,18
11,1823,1831,1847,1861,1867,1871,1873,1877,1879,1889,1901,1907,1913,1931,1933,1949,1
951,1973,1979,1987,1993,1997,1999,2003,2011,2017,2027,2029,2039,2053,2063,2069,2081,
2083,2087,2089,2099,2111,2113,2129,2131,2137,2141,2143,2153,2161,2179,2203,2207,2213
,2221,2237,2239,2243,2251,2267,2269,2273,2281,2287,2293,2297,2309,2311,2333,2339,234
1,2347,2351,2357,2371,2377,2381,2383,2389,2393,2399,2411,2417,2423,2437,2441,2447,24
59,2467,2473,2477,2503,2521,2531,2539,2543,2549,2551,2557,2579,2591,2593,2609,2617,2

```

621,2633,2647,2657,2659,2663,2671,2677,2683,2687,2689,2693,2699,2707,2711,2713,2719,
2729,2731,2741,2749,2753,2767,2777,2789,2791,2797,2801,2803,2819,2833,2837,2843,2851
,2857,2861,2879,2887,2897,2903,2909,2917,2927,2939,2953,2957,2963,2969,2971,2999,300
1,3011,3019,3023,3037,3041,3049,3061,3067,3079,3083,3089,3109,3119,3121,3137,3163,31
67,3169,3181,3187,3191,3203,3209,3217,3221,3229,3251,3253,3257,3259,3271,3299,3301,3
307,3313,3319,3323,3329,3331,3343,3347,3359,3361,3371,3373,3389,3391,3407,3413,3433,
3449,3457,3461,3463,3467,3469,3491,3499,3511,3517,3527,3529,3533,3539,3541,3547,3557
,3559,3571,3581,3583,3593,3607,3613,3617,3623,3631,3637,3643,3659,3671,3673,3677,369
1,3697,3701,3709,3719,3727,3733,3739,3761,3767,3769,3779,3793,3797,3803,3821,3823,38
33,3847,3851,3853,3863,3877,3881,3889,3907,3911,3917,3919,3923,3929,3931,3943,3947,3
967,3989,4001,4003,4007,4013,4019,4021,4027,4049,4051,4057,4073,4079,4091,4093,4099,
4111,4127,4129,4133,4139,4153,4157,4159,4177,4201,4211,4217,4219,4229,4231,4241,4243
,4253,4259,4261,4271,4273,4283,4289,4297,4327,4337,4339,4349,4357,4363,4373,4391,439
7,4409,4421,4423,4441,4447,4451,4457,4463,4481,4483,4493,4507,4513,4517,4519,4523,45
47,4549,4561,4567,4583,4591,4597,4603,4621,4637,4639,4643,4649,4651,4657,4663,4673,4
679,4691,4703,4721,4723,4729,4733,4751,4759,4783,4787,4789,4793,4799,4801,4813,4817,
4831,4861,4871,4877,4889,4903,4909,4919,4931,4933,4937,4943,4951,4957,4967,4969,4973
,4987,4993,4999,5003,5009,5011,5021,5023,5039,5051,5059,5077,5081,5087,5099,5101,510
7,5113,5119,5147,5153,5167,5171,5179,5189,5197,5209,5227,5231,5233,5237,5261,5273,52
79,5281,5297,5303,5309,5323,5333,5347,5351,5381,5387,5393,5399,5407,5413,5417,5419,5
431,5437,5441,5443,5449,5471,5477,5479,5483,5501,5503,5507,5519,5521,5527,5531,5557,
5563,5569,5573,5581,5591,5623,5639,5641,5647,5651,5653,5657,5659,5669,5683,5689,5693
,5701,5711,5717,5737,5741,5743,5749,5779,5783,5791,5801,5807,5813,5821,5827,5839,584
3,5849,5851,5857,5861,5867,5869,5879,5881,5897,5903,5923,5927,5939,5953,5981,5987,60
07,6011,6029,6037,6043,6047,6053,6067,6073,6079,6089,6091,6101,6113,6121,6131,6133,6
143,6151,6163,6173,6197,6199,6203,6211,6217,6221,6229,6247,6257,6263,6269,6271,6277,
6287,6299,6301,6311,6317,6323,6329,6337,6343,6353,6359,6361,6367,6373,6379,6389,6397
,6421,6427,6449,6451,6469,6473,6481,6491,6521,6529,6547,6551,6553,6563,6569,6571,657
7,6581,6599,6607,6619,6637,6653,6659,6661,6673,6679,6689,6691,6701,6703,6709,6719,67
33,6737,6761,6763,6779,6781,6791,6793,6803,6823,6827,6829,6833,6841,6857,6863,6869,6
871,6883,6899,6907,6911,6917,6947,6949,6959,6961,6967,6971,6977,6983,6991,6997,7001,
7013,7019,7027,7039,7043,7057,7069,7079,7103,7109,7121,7127,7129,7151,7159,7177,7187
,7193,7207,7211,7213,7219,7229,7237,7243,7247,7253,7283,7297,7307,7309,7321,7331,733
3,7349,7351,7369,7393,7411,7417,7433,7451,7457,7459,7477,7481,7487,7489,7499,7507,75
17,7523,7529,7537,7541,7547,7549,7559,7561,7573,7577,7583,7589,7591,7603,7607,7621,7
639,7643,7649,7669,7673,7681,7687,7691,7699,7703,7717,7723,7727,7741,7753,7757,7759,
7789,7793,7817,7823,7829,7841,7853,7867,7873,7877,7879,7883,7901,7907,7919}

a={1,0,2,-2,2,-2,2,2,-4,4,-2,-2,2,2,0,-4,4,-2,-2,4,-2,2,2,-4,-2,2,-2,2,10,-10,2,-4,8,-
8,4,0,-2,2,0,-4,8,-8,2,-2,10,0,-8,-2,2,2,-4,8,-4,0,0,-4,4,-2,-2,8,4,-10,-2,2,10,-8,4,-
8,2,2,2,-2,0,-2,2,2,-4,4,2,-8,8,-8,4,-2,2,2,-4,-2,2,8,-4,-4,4,-4,2,6,-10,16,-12,4,-
4,0,-4,4,4,-4,0,-4,4,0,-2,-2,10,-2,-8,2,2,0,-4,10,-8,2,2,2,-2,2,-2,-2,0,-2,4,-2,-2,4,-
4,10,-4,2,-10,8,-8,2,-2,8,4,-10,-2,2,10,-10,-2,2,16,-16,4,2,-2,-4,2,0,8,-10,2,0,2,-
2,6,-8,2,-4,8,-8,4,4,-8,8,-8,4,12,-14,-2,2,2,0,2,-2,0,16,-20,8,-2,2,-4,0,2,4,-8,2,0,-
4,4,6,-2,8,-16,2,2,-4,4,-2,-2,2,8,-10,4,28,-28,0,2,10,-8,4,-10,-2,2,2,2,-4,-2,4,6,-
2,-8,2,-2,2,2,6,0,-4,4,-6,-2,2,2,-4,4,-4,10,-10,2,-4,2,2,-4,4,4,10,-14,-2,-2,22,-20,-
2,8,2,-10,8,-2,-2,0,0,12,-12,-2,-2,10,-2,2,-4,8,-2,-8,-2,-2,2,-2,8,2,-6,0,12,-16,14,-
14,20,-16,2,-2,-2,-2,2,4,-2,4,-8,8,4,-4,-4,6,-10,2,-2,8,2,-10,14,-14,4,-2,-2,8,-
2,10,6,-20,2,2,8,-14,2,4,8,-14,2,4,-2,0,-2,8,-10,20,-16,-4,4,-2,2,8,-8,-2,-2,4,-

2,2,6,-6,0,8,-10,2,6,-4,-2,-2,22,-8,-8,-2,-4,2,-4,4,16,-10,-10,14,-8,-4,8,2,-4,-
8,2,4,-2,0,-2,-2,2,2,2,-4,-2,4,4,-8,8,-2,-4,10,-4,2,-10,4,-2,-2,14,-2,-10,2,2,-2,-
2,14,-10,2,-4,0,2,2,2,2,-10,2,0,-4,26,-26,8,-2,-4,10,-10,4,4,-6,6,-8,2,14,-10,-
8,14,10,-22,-2,10,-6,-2,8,-6,2,-4,4,14,-20,2,-2,10,16,-26,4,0,0,-2,2,-4,10,-8,8,-
10,8,-8,14,-14,14,-10,14,-4,-8,-4,-2,2,-2,20,-14,4,-6,4,-8,2,2,-4,4,4,-8,10,-2,-
8,8,4,-8,-2,2,2,-2,0,10,-4,-10,2,10,-8,-2,4,2,-2,-2,0,16,-16,-4,8,4,-10,2,12,-
16,8,4,-10,-2,8,4,-10,4,10,-14,2,-4,2,2,-4,10,-8,16,2,-10,-10,2,2,0,-4,4,16,-
20,4,10,-10,6,-10,4,6,4,-14,2,2,8,-10,-2,16,6,-14,-4,-4,8,-8,8,-8,8,-4,-4,8,-8,8,-
4,2,22,-20,-8,8,-2,-2,4,8,-12,6,0,-10,16,-12,-2,2,0,12,-16,8,4,-8,-2,-2,2,20,-
22,10,-6,10,-8,-2,0,12,-2,-14,2,2,-4,4,0,4,-4,6,0,6,-16,4,-2,14,-10,16,-20,-2,2,2,-
4,10,-8,10,16,-20,-4,6,2,-8,4,2,-10,2,2,2,-2,4,-8,2,10,-8,0,-2,2,-4,8,-8,14,-4,-
4,10,-14,2,6,-10,4,0,0,22,-22,8,-10,4,2,-2,4,6,-14,-2,2,20,-12,-6,-4,14,-10,0,8,-
4,4,-10,26,-24,0,0,2,-2,-2,-2,10,-6,-2,-2,4,16,-16,-4,2,14,-16,2,8,-10,4,-2,22,-
20,0,-2,4,2,22,-16,-14,4,-2,-2,2,-2,8,4,-8,-2,4,2,-4,14,-16,-2,4,24,-26,4,2,-4,0,2,-
2,6,-8,2,-4,4,-2,2,-4,8,-8,14,-10,14,-16,8,2,14,-22,14,-16,14,-10,-2,-2,2,8,-8,0,4,-
8,8,2,-4,2,-8,8,-2,4,-2,14,-22,2,4,-2,-2,4,10,-8,-4,0,-4,4,4,2,-10,8,-4,0,0,2,-2,4,-
4,-4,4,0,0,4,-2,16,-18,16,-20,16,-14,4,2,20,-22,10,-14,-2,8,-4,-4,4,-2,14,-10,4,6,-
2,-10,-4,10,-6,4,-8,8,-8,4,4,4,-10,20,-22,14,-14,8,-8,8,10,-16,-2,2,4,8,-10,0,-
4,10,4,-8,-4,2,24,-28,8,-8,4,-2,2,0,2,-2,-2,8,-6,2,4,-8,10,-2,-2,14,-18,6,-6,-4,20,-
14,10,-8,-4,8,-10,-2,4,4,-2,-2,-2,2,24,-16,-4,-8,10,-2,-8,14,-14,16,6,-6,-12,10,2,-
12,-4,16,-14,2,-4,8,-2,2,-4,0,2,-4,2,-4,8,-8,10,-8,2,0,-4,10,-8,10,4,-14,2,14,-
16,4,-2,-2,4,-4,10,-8,-2,10,-2,-8,-2,28,-26,20,-18,0,6,0,2,-8,-2,-2,2,14,-12,6}
b={0,1,1,3,1,3,1,3,5,1,5,3,1,3,5,5,1,5,3,1,5,3,5,7,3,1,3,1,3,13,3,5,1,9,1,5,5,3,5,5,
1,9,1,3,1,11,11,3,1,3,5,1,9,5,5,5,1,5,3,1,9,13,3,1,3,13,5,9,1,3,5,7,5,5,3,5,7,3,7,9
,1,9,1,5,3,5,7,3,1,3,11,7,3,7,3,5,11,1,17,5,9,5,5,1,5,9,5,5,1,5,5,3,1,11,9,1,3,5,5,
1,11,3,5,7,9,7,9,7,5,5,3,7,5,3,7,3,13,9,11,1,9,1,3,1,9,13,3,1,3,13,3,1,3,19,3,7,9,
7,3,5,5,13,3,5,5,7,5,11,3,5,1,9,1,5,9,1,9,1,5,17,3,1,3,5,5,7,5,5,21,1,9,7,9,5,5,7,1
1,3,5,5,1,5,11,9,17,1,3,5,1,5,3,1,3,11,1,5,33,5,5,7,17,9,13,3,1,3,5,7,3,1,5,11,9,1
,3,1,3,5,11,11,7,11,5,3,5,7,3,7,3,13,3,5,1,3,5,1,5,9,19,5,3,1,23,3,1,9,11,1,9,7,5,
5,5,17,5,3,1,11,9,11,7,15,13,5,3,1,3,1,9,11,5,5,17,1,15,1,21,5,7,5,3,1,3,7,5,9,1,
9,13,9,5,11,1,3,1,9,11,1,15,1,5,3,1,9,7,17,23,3,5,7,15,1,3,7,15,1,3,7,5,5,3,11,1,
21,5,1,5,3,5,13,5,3,1,5,3,5,11,5,5,13,3,5,11,7,5,3,25,17,9,7,3,5,1,5,21,11,1,15,7
,3,11,13,9,1,3,7,5,5,3,1,3,5,7,3,1,5,9,1,9,7,3,13,9,11,1,5,3,1,15,13,3,5,7,5,3,17,
7,9,5,5,7,9,11,13,3,5,5,1,27,1,9,7,3,13,3,7,11,5,11,3,5,19,9,1,15,25,3,1,11,5,3,1
1,5,7,3,7,21,1,3,1,11,27,1,5,5,5,3,5,1,11,3,11,1,9,1,15,1,15,5,19,15,7,3,1,3,1,21
,7,11,5,9,1,3,5,1,5,9,1,11,9,1,9,13,5,3,5,7,5,5,15,11,1,3,13,5,3,7,9,7,5,5,21,5,1,
9,13,3,5,17,1,9,13,3,1,9,13,3,7,17,3,5,1,3,5,1,11,3,19,21,11,1,3,5,5,1,5,21,1,5,1
5,5,11,1,5,11,15,1,3,5,13,3,1,17,23,9,5,1,9,1,9,1,9,5,1,9,1,9,5,7,29,9,1,9,7,5,9,1
7,5,11,11,1,17,5,3,5,5,17,1,9,13,5,3,1,3,23,1,11,5,15,7,5,5,17,15,1,3,5,1,5,5,9,5
,11,11,17,1,5,3,17,7,23,3,1,3,5,1,11,3,13,29,9,5,11,13,5,9,11,1,3,5,7,5,9,1,3,13,
5,5,3,5,1,9,1,15,11,7,17,3,5,11,1,5,5,5,27,5,13,3,7,9,7,11,17,3,1,3,23,11,5,1,15,
5,5,13,9,13,3,29,5,5,5,7,5,3,1,11,5,3,1,5,21,5,1,3,17,1,3,11,1,5,3,25,5,5,3,7,9,3
1,15,1,5,3,1,3,1,9,13,5,3,7,9,5,19,3,1,5,29,3,7,9,5,5,7,5,11,3,5,1,5,3,5,1,9,1,15,
5,19,3,11,13,27,5,19,3,17,7,5,3,5,13,5,5,9,1,9,11,7,9,1,9,7,11,9,23,1,3,7,5,3,7,1
7,9,5,5,1,5,9,11,1,9,5,5,5,7,5,9,5,1,5,5,5,9,7,23,5,21,1,17,3,7,9,29,7,17,3,1,9,5,
1,5,3,17,7,11,17,15,5,1,11,5,9,1,9,1,5,9,13,3,23,1,15,1,9,1,9,19,3,1,3,7,15,5,5,1
,11,15,7,3,5,29,1,9,1,5,3,5,5,7,5,3,11,5,7,11,3,13,11,9,23,5,11,5,1,21,7,17,9,5,1
3,3,1,5,9,7,5,3,5,29,13,9,1,11,9,1,15,1,17,23,17,5,15,17,5,1,17,3,5,1,9,7,9,5,5,7
,3,5,1,9,1,11,3,5,5,1,11,3,13,17,3,5,19,3,7,5,3,7,3,13,5,3,13,11,3,1,29,3,23,5,5,
11,11,13,5,3,1,3,17,5}

$a+b=\{1,1,3,1,3,1,3,5,1,5,3,1,3,5,5,1,5,3,1,5,3,5,7,3,1,3,1,3,13,3,5,1,9,1,5,5,3,5,5,1,9,1,3,1,11,11,3,1,3,5,1,9,5,5,5,1,5,3,1,9,13,3,1,3,13,5,9,1,3,5,7,5,5,3,5,7,3,7,9,1,9,1,5,3,5,7,3,1,3,11,7,3,7,3,5,11,1,17,5,9,5,5,1,5,9,5,5,1,5,5,3,1,11,9,1,3,5,5,1,11,3,5,7,9,7,9,7,5,5,3,7,5,3,7,3,13,9,11,1,9,1,3,1,9,13,3,1,3,13,3,1,3,19,3,7,9,7,3,5,5,13,3,5,5,7,5,11,3,5,1,9,1,5,9,1,9,1,5,17,3,1,3,5,5,7,5,5,21,1,9,7,9,5,5,7,1,1,3,5,5,1,5,11,9,17,1,3,5,1,5,3,1,3,11,1,5,33,5,5,7,17,9,13,3,1,3,5,7,3,1,5,11,9,1,3,1,3,5,11,11,7,11,5,3,5,7,3,7,3,13,3,5,1,3,5,1,5,9,19,5,3,1,23,3,1,9,11,1,9,7,5,5,5,17,5,3,1,11,9,11,7,15,13,5,3,1,3,1,9,11,5,5,17,1,15,1,21,5,7,5,3,1,3,7,5,9,1,9,13,9,5,11,1,3,1,9,11,1,15,1,5,3,1,9,7,17,23,3,5,7,15,1,3,7,15,1,3,7,5,5,3,11,1,21,5,1,5,3,5,13,5,3,1,5,3,5,11,5,5,13,3,5,11,7,5,3,25,17,9,7,3,5,1,5,21,11,1,15,7,3,11,13,9,1,3,7,5,5,3,1,3,5,7,3,1,5,9,1,9,7,3,13,9,11,1,5,3,1,15,13,3,5,7,5,3,17,7,9,5,5,7,9,11,13,3,5,5,1,27,1,9,7,3,13,3,7,11,5,11,3,5,19,9,1,15,25,3,1,11,5,3,1,1,5,7,3,7,21,1,3,1,11,27,1,5,5,5,3,5,1,11,3,11,1,9,1,15,1,15,5,19,15,7,3,1,3,1,21,7,11,5,9,1,3,5,1,5,9,1,11,9,1,9,13,5,3,5,7,5,5,15,11,1,3,13,5,3,7,9,7,5,5,21,5,1,9,13,3,5,17,1,9,13,3,1,9,13,3,7,17,3,5,1,3,5,1,11,3,19,21,11,1,3,5,5,1,5,21,1,5,1,5,5,11,1,5,11,15,1,3,5,13,3,1,17,23,9,5,1,9,1,9,1,9,5,1,9,1,9,5,7,29,9,1,9,7,5,9,1,7,5,11,11,1,17,5,3,5,5,17,1,9,13,5,3,1,3,23,1,11,5,15,7,5,5,17,15,1,3,5,1,5,5,9,5,11,11,17,1,5,3,17,7,23,3,1,3,5,1,11,3,13,29,9,5,11,13,5,9,11,1,3,5,7,5,9,1,3,13,5,5,3,5,1,9,1,15,11,7,17,3,5,11,1,5,5,5,27,5,13,3,7,9,7,11,17,3,1,3,23,11,5,1,15,5,5,13,9,13,3,29,5,5,5,7,5,3,1,11,5,3,1,5,21,5,1,3,17,1,3,11,1,5,3,25,5,5,3,7,9,3,1,15,1,5,3,1,3,1,9,13,5,3,7,9,5,19,3,1,5,29,3,7,9,5,5,7,5,11,3,5,1,5,3,5,1,9,1,15,5,19,3,11,13,27,5,19,3,17,7,5,3,5,13,5,5,9,1,9,11,7,9,1,9,7,11,9,23,1,3,7,5,3,7,1,7,9,5,5,1,5,9,11,1,9,5,5,5,7,5,9,5,1,5,5,5,9,7,23,5,21,1,17,3,7,9,29,7,17,3,1,9,5,1,5,3,17,7,11,17,15,5,1,11,5,9,1,9,1,5,9,13,3,23,1,15,1,9,1,9,19,3,1,3,7,15,5,5,1,11,15,7,3,5,29,1,9,1,5,3,5,5,7,5,3,11,5,7,11,3,13,11,9,23,5,11,5,1,21,7,17,9,5,1,3,3,1,5,9,7,5,3,5,29,13,9,1,11,9,1,15,1,17,23,17,5,15,17,5,1,17,3,5,1,9,7,9,5,5,7,3,5,1,9,1,11,3,5,5,1,11,3,13,17,3,5,19,3,7,5,3,7,3,13,5,3,13,11,3,1,29,3,23,5,5,11,11,13,5,3,1,3,17,5,11\}$