Distribution of prime numbers and Riemann hypothesis

Dante Servi

Abstract

The prime numbers have a distribution that is only apparently random, with this article I will demonstrate that the distribution derives from the combination of the sequences of the various prime numbers, giving a demonstration that I define as graphic. I trust that this demonstration will prove the validity or otherwise of Riemann's hypothesis (I believe in validity).

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In mid-June I learned of the "Millennium Prize" announced by the Clay Mathematics Institute, in particular for the Riemann hypothesis.

I am not a mathematician even if I like geometry too, lately I have dedicated myself with passion to polygonal spirals.
The sum up for grabs invited me to check the topic in question, I love the simplicity and at least the apparent one of the "Riemann zeta function" I liked.
Searching the internet for articles that could help me, I found approaches that are not within my current reach, we are talking about complex numbers that I don't know how to manage.

The declared connection between Riemann's hypothesis and the distribution of prime numbers showed me the way I could go.

Now I am in a position to demonstrate what I said in the abstract.

I will demonstrate how prime numbers are distributed; even if the demonstration concerns only the initial part, I believe there can be no doubts about the validity for the total of prime numbers.
It will be the global mathematical community that determines whether or not this demonstration is proof of the validity of the Riemann hypothesis.

Having found the key to the problem, the solution may seem trivial, but getting there is never easy.

In order to define the graphic demonstration that I propose, I had to travel several other routes first, in addition to Riemann's zeta function, also had to enter the Sieve of Eratosthenes, the functions of Euler, and to make the subject even more exciting knowing how many others great mathematicians have dealt with it.

What I will illustrate resembles and seems to be derived from the Sieve of Eratosthenes which as I said was in my thoughts, but my goal was never to limit myself to finding prime numbers but to find out what their distribution was.

I think an application I made was also useful, which in addition to finding the prime numbers takes into account how the other numbers are discarded.

For example, testing the numbers from 2 to 800,000 we find:

63,951 prime numbers and 154 divisors (which are then the first 154)

The divisors (2), (3), (5), ... we distribute the numbers to be discarded in the following way:

(2) 399.999, (3) 133.332, (5) 53.332, (7) 30.475, (11) 16.623, (13) 12.786, (17) 9.024, ... the last one is (887) which is the divisor of 1 number (786.769 its square).

It can also be noted that alone (2) and (3) discard 2/3 of all numbers.

I believe that precisely these results led me to develop the sequences of some prime numbers graphically starting from (2), opening the way to their subsequent combination.

The demonstration of how they are distributed is precisely based on the combination of their sequences in succession.

At first I developed the sequences of the first "prime numbers", then I wanted to see how they interact with each other.

Being important that vertical alignment was respected, I found the right editor in the "Notepad" of Windows.

I define the sequences as graphs because I have decided not to use the increasing values of the numbers but to replace them with graphical symbols (X) and (-) which mark the difference well and have the advantage of always occupying only one box.

In order to have the possibility if necessary to read the value of any box (or however you prefer to call it), I have put a few lines of progressive numbers on the sequences (for: units, tens, hundreds and thousands), which indicate the value of the boxes vertically.

I chose (X) for the occupied boxes and (-) for the free boxes.

To clarify the content of each line, I put some identifiers in the head:

For the infinite sequence of a single prime number, for example the (2) I write:

[S2]   X- ...

For the infinite sequence resulting from the combination of two or more sequences of prime numbers, for example up to (3) I write:

[Sc<=3]   XXX-X- ...

For all the combined sequences I only indicate the prime number with the highest value and are to be considered obtained by combining all the sequences starting from [S2] and up to the indicated prime number.

Basically, starting from [S2] which discards all even numbers and leaves all odd numbers available, at each sequence that I combine with the previous one I go to occupy a certain number of free squares and then I go to discard the odd numbers of value correspondent, but what matters I am going to show in an increasingly defined way the distribution of prime numbers.

The result of the combinations is a new sequence that respects a precise order, has a basis of calculable length and until a new sequence of higher value is added (combined), it repeats endlessly.

[S2] has a basic sequence of length L = 2, [S3] has a basic sequence of length L = 3, [S5] has a basic sequence of length L = 5, ...

It is noted that for single basic sequences the length is equal to the value of the prime number that generates it.

The combined base sequences in turn have a length that can be calculated as follows:

L = Length of the previous base sequence * Prime number of the added sequence

[Sc<=3] resulting from the combination of [S2] and [S3] has a base sequence of length:

L = 2 * 3 = 6

[Sc<=5] resulting from the combination of [Sc<=3] and [S5] has a base sequence of length:

L = 6 * 5 = 30

[Sc<=7] resulting from the combination of [Sc<=5] and [S7] has a base sequence of length:

L = 30 * 7 = 210

[Sc<=11] resulting from the combination of [Sc<=7] and [S11] has a base sequence of length:

L = 210 * 11 = 2.310

[Sc<=13] resulting from the combination of [Sc<=11] and [S13] has a base sequence of length:

L = 2.310 * 13 = 30.030

[Sc<=17] resulting from the combination of [Sc<=13] and [S17] has a base sequence of length:

L = 30.030 * 17 = 510.510

[Sc<=19] resulting from the combination of [Sc<=17] and [S19] has a base sequence of length:

L = 510.510 * 19 = 9.699.690

[Sc<=23] resulting from the combination of [Sc<=19] and [S23] has a base sequence of length:

L = 9.699.690 * 23 = 223.092.870

[Sc<=29] resulting from the combination of [Sc<=23] and [S29] has a base sequence of length:

L = 223.092.870 * 29 = 6.469.693.230

…

Continuing with the following prime numbers, the basic sequence is inexorably destined to lengthen, I take the liberty of assuring that the indicated rules do not change even if, as we shall see, I limited myself to checking up to [Sc<= 11].

The fact remains that starting from [S2] each new sequence modifies the previous one according to its precise cycle, each added sequence goes to occupy the free squares of its competence creating the new sequence, but only this can do.

On the contrary, the <u>non-prime</u> numbers do not bring any changes since they do not find any free boxes, although not highlighted I believe that this also results from the demonstration.

I therefore affirm that although the following graphic demonstration is limited to the first sequences, there can be no doubt that any subsequent added sequence may generate a different behavior.

In the combined sequences it will be noted that the prime number of the added sequence immediately finds its free box and therefore occupies it, but will no longer find a free box (therefore it will not be influential) until the box corresponding to the value of its square.

I have assigned a separate numbering to the sheets dedicated to the graphic demonstration (Tab. ... / ...), and they begin by presenting the sequences from [Sc<= 3] to [Sc<= 11], then I continue showing how these sequences were obtained.

At the end for further confirmation, I show the result of a sequence made this time with numbers and limited to 131.

Although changing the orientation of the sheet from vertical to horizontal, only the first sequences (obviously limited to a qualifying part) can occupy a single line, so I split them over several lines.
Not being able to continue indefinitely, when I think I have passed the qualifying part I interrupt them, for example for the first group where the longest sequence is [Sc<= 7] L = 210 I interrupt at 300, consequently [Sc<= 7] will be whole only up to 211 (210 + 1 due to the start from 2), the part to reach 300 will be only the first part of its repetition.

To provide as far as possible a less fragmented presentation of the sequences, I added a last sheet that I called "Billboard A1" which is precisely in A1 format and has smaller characters.
In PDF format it is readable as the previous ones, in order to be readable the print must take into account the format.

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Before the graphic demonstration I propose the original text in my language, Italian.
The English translation was made with the help of the translator provided by Google.

Titolo: Distribuzione dei numeri primi ed ipotesi di Riemann.
Nome dell'autore: Dante Servi
Abstract: I numeri primi hanno una distribuzione solo in apparenza casuale, con questo articolo dimostrerò che la distribuzione deriva dalla combinazione delle sequenze dei vari numeri primi, dandone una dimostrazione che definisco grafica. Confido che questa dimostrazione dia la prova della validità o meno dell'ipotesi di Riemann (io credo nella validità).

Verso la metà di giugno sono venuto a conoscenza del "Premio del Millennio" bandito dal Clay Mathematics Institute, in particolare per l'ipotesi di Riemann.

Io non sono un matematico anche se mi piace come anche la geometria, ultimamente mi sono dedicato con passione alle spirali poligonali.
La somma messa in palio mi ha invitato a verificare l'argomento in oggetto, io amo la semplicità e quella almeno apparente della "funzione zeta di Riemann" mi è piaciuta.
Cercando su internet articoli che mi potessero aiutare, ho trovato approcci non alla mia attuale portata, si parla di numeri complessi che non so come gestire.

Il collegamento dichiarato tra l'ipotesi di Riemann e la distribuzione dei numeri primi mi ha indicato la strada che potevo percorrere.

Ora mi ritengo nella condizione di dimostrare quanto ho affermato nell'abstract.

Dimostrerò come sono distribuiti i numeri primi; anche se la dimostrazione riguarda solo la parte iniziale ritengo non ci possano essere dubbi sulla validità per il totale dei numeri primi.
Sarà la comunità matematica globale a stabilire se questa dimostrazione rappresenta o meno una prova di validità dell'ipotesi di Riemann.

Trovata la chiave del problema, la soluzione può sembrare banale ma arrivarci non è mai facile.

Per definire la dimostrazione grafica che propongo ho dovuto prima percorrere diverse altre strade, nella mia testa erano entrati oltre alla funzione zeta di Riemann anche il Crivello di Eratostene, le funzioni di Eulero, ed a rendere ancora più appassionante l'argomento il sapere quanti altri grandi matematici se ne sono occupati.

Quello che illustrerò assomiglia e sembra essere derivato dal Crivello di Eratostene che come ho detto era nei miei pensieri, ma il mio obbiettivo non è mai stato di limitarmi a trovare i numeri primi ma scoprire quale fosse la loro distribuzione.

Credo mi sia stata anche utile una applicazione che ho realizzato, la quale oltre a trovare i numeri primi tiene conto di come vengono scartati gli altri numeri.

Ad esempio testando i numeri da 2 a 800.000 si trovano:

63.951 numeri primi e 154 divisori (che poi sono i primi 154)

I divisori (2), (3), (5), … si distribuiscono i numeri da scartare nel seguente modo:

(2) 399.999, (3) 133.332, (5) 53.332, (7) 30.475, (11) 16.623, (13) 12.786, (17) 9.024, ... l'ultimo è (887) che risulta il divisore di 1 numero (786.769 il suo quadrato).

Si può anche notare che da soli il (2) ed il (3) scartano 2/3 di tutti i numeri.

Credo che proprio questi risultati mi hanno portato a sviluppare graficamente le sequenze di alcuni numeri primi a partire dal (2), aprendo la strada alla successiva loro combinazione.

La dimostrazione di come sono distribuiti è proprio basata sulla combinazione in successione delle loro sequenze.

In un primo momento ho sviluppato le sequenze dei primi “numeri primi”, poi ho voluto vedere in che modo interagiscono tra di loro.

Essendo importante che fosse rispettato l’allineamento verticale, ho trovato in “Notepad” di Windows l’editor adatto.

Le sequenze le definisco grafiche in quanto ho ritenuto di non utilizzare i valori crescenti dei numeri ma di sostituirli con dei simboli grafici (X) e (-) che marcano bene la differenza ed hanno il vantaggio di occupare sempre una sola casella.

Per avere comunque la possibilità di leggere se necessario il valore di una qualsiasi casella (o comunque si preferisca chiamarla), ho messo sopra le sequenze alcune righe di numeri progressivi (per: unità, decine, centinaia e migliaia), che indicano in verticale il valore delle caselle.

Ho scelto (X) per le caselle occupate e (-) per quelle libere.

Per chiarire il contenuto di ogni riga, in testa ho messo degli identificativi:

Per la sequenza infinita di un solo numero primo, ad esempio il (2) scrivo:

[S2]   X- ...

Per la sequenza infinita risultante dalla combinazione di due o più sequenze di numeri primi, ad esempio fino a (3) scrivo:

[Sc<=3]   XXX-X- ...

Per tutte le sequenze combinate indico solo il numero primo di valore più alto e sono da intendersi ottenute combinando in successione tutte le sequenze a partire da [S2] e fino al numero primo indicato.

In sostanza, partendo da [S2] che scarta tutti i numeri pari e lascia a disposizione tutti i numeri dispari, ad ogni sequenza che combino con la precedente vado ad occupare un certo numero di caselle libere e quindi vado a scartare i numeri dispari di valore corrispondente, ma <u>quello che conta</u> vado a mostrare in modo sempre più definito la distribuzione dei numeri primi.

Il risultato delle combinazioni è una nuova sequenza che rispetta un preciso ordine, <u>ha una base di lunghezza calcolabile</u> e finché non viene aggiunta (combinata) una nuova sequenza di valore superiore, si ripete all'infinito.

[S2] ha una sequenza base di lunghezza L=2, [S3] ha una sequenza base di lunghezza L=3, [S5] ha una sequenza base di lunghezza L=5, ...

Si nota che per le sequenze base singole la lunghezza è uguale al valore del numero primo che la genera.

Le sequenze base combinate hanno a loro volta una lunghezza calcolabile nel seguente modo:

L= Lunghezza della sequenza base precedente * Numero primo della sequenza aggiunta

[Sc<=3] risultante dalla combinazione di [S2] ed [S3] ha una sequenza base di lunghezza:

L = 2 * 3 = 6

[Sc<=5] risultante dalla combinazione di [Sc<=3] ed [S5] ha una sequenza base di lunghezza:

L = 6 * 5 = 30

[Sc<=7] risultante dalla combinazione di [Sc<=5] ed [S7] ha una sequenza base di lunghezza:

L = 30 * 7 = 210

[Sc<=11] risultante dalla combinazione di [Sc<=7] ed [S11] ha una sequenza base di lunghezza:

L = 210 * 11 = 2.310

[Sc<=13] risultante dalla combinazione di [Sc<=11] ed [S13] ha una sequenza base di lunghezza:

L = 2.310 * 13 = 30.030

[Sc<=17] risultante dalla combinazione di [Sc<=13] ed [S17] ha una sequenza base di lunghezza:

L = 30.030 * 17 = 510.510

[Sc<=19] risultante dalla combinazione di [Sc<=17] ed [S19] ha una sequenza base di lunghezza:

L = 510.510 * 19 = 9.699.690

[Sc<=23] risultante dalla combinazione di [Sc<=19] ed [S23] ha una sequenza base di lunghezza:

L = 9.699.690 * 23 = 223.092.870

[Sc<=29] risultante dalla combinazione di [Sc<=23] ed [S29] ha una sequenza base di lunghezza:

L = 223.092.870 * 29 = 6.469.693.230

...

Proseguendo con i successivi numeri primi la sequenza base è destinata inesorabilmente ad allungarsi, mi permetto di dare per certo che la regole indicate non cambiano anche se come vedremo mi sono limitato a verificare fino ad [Sc<=11].
Rimane il fatto che partendo da [S2] ogni nuova sequenza modifica la precedente secondo il suo preciso ciclo, ogni sequenza aggiunta va ad occupare le caselle libere di sua competenza creando la nuova sequenza, ma solo questo può fare.

Al contrario i numeri <u>non primi</u> non portano alcuna modifica non trovando nessuna casella libera, pur non evidenziato ritengo che anche questo risulti dalla dimostrazione.

Affermo dunque che pur essendo la seguente dimostrazione grafica limitata alle prime sequenze, non ci possa essere il dubbio che una qualsiasi successiva sequenza aggiunta possa generare un comportamento diverso.

Nelle sequenze combinate si potrà notare che il numero primo della sequenza aggiunta trova subito la sua casella libera e quindi la occupa, ma non troverà più una casella libera (quindi risulterà non influente) fino alla casella corrispondente al valore del suo quadrato.

Ai fogli dedicati alla dimostrazione grafica ho assegnato una numerazione a parte (Tab. …/…), ed iniziano presentando le sequenze da [Sc<=3] a [Sc<=11], poi proseguo mostrando come queste sequenze sono state ottenute.

Alla fine per ulteriore conferma, mostro il risultato di una sequenza realizzata questa volta con i numeri e limitata a 131.

Pur cambiando orientamento del foglio da verticale ad orizzontale, solo le prime sequenze (ovviamente limitate ad una parte qualificante) possono occupare una sola riga, quindi le ho divise su più righe.
Non potendo continuare all'infinito, quando ritengo di aver superato la parte qualificante le interrompo, ad esempio per il primo gruppo dove la sequenza più lunga è [Sc<=7] L = 210 interrompo a 300, di conseguenza [Sc<=7] sarà intera solo fino a 211 (210 + 1 dovuto alla partenza da 2), la parte per arrivare a 300 sarà solo la prima parte della sua ripetizione.

Per fornire per quanto possibile, una presentazione meno frammentata delle sequenze, ho aggiunto un ultimo foglio che ho chiamato "Billboard A1" il quale è appunto in formato A1 ed ha caratteri più piccoli.
In formato PDF è leggibile come i precedenti, la stampa per essere leggibile dovrà tenere conto del formato.

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Here are the combined sequences, [Sc<=7] and [Sc<=11] I had to break them into lines of 100.

```
[Sc<=3]  XXX-X- (L=2*3=6)

[Sc<=5]  XXXXX-XXX-X-XXX-X-XXX-XXXXX-X- (L=6*5=30)

[Sc<=7]  XXXXXXXXX-X-XXX-X-XXX-XXXXX-X-XXXXX-XXX-X-XXX-XXXXX-XXXXX-X-XXXXX-XXX-X-XXXXX-XXX-XXXXX-XXXXXXX-XXX-
         X-XXX-X-XXX-XXXXXXX-XXXXX-XXX-XXXXX-X-XXX-XXXXX-X-XXXXX-XXXXX-XXX-X-XXX-XXXXX-X-XXXXX-XXX-X-XXX-X-XX
         XXXXXXX-X- (L=30*7=210)

[Sc<=11] XXXXXXXXXXX-XXX-X-XXX-XXXXX-X-XXXXX-XXX-X-XXX-XXXXX-XXXXX-X-XXXXX-XXX-X-XXXXX-XXX-XXXXX-XXXXXXX-XXX-
         X-XXX-X-XXX-XXXXXXXXXXXXX-XXX-XXXXX-X-XXXXXXXXX-X-XXXXX-XXXXX-XXX-X-XXX-XXXXX-X-XXXXXXXXX-X-XXX-X-XX
         XXXXXXXXX-XXXXXXXXX-X-XXX-X-XXX-XXXXX-X-XXXXX-XXX-XXXXX-XXXXX-XXXXX-X-XXXXX-XXX-X-XXXXX-XXX-XXXXX-XX
         XXXXX-XXX-X-XXX-XXXXX-XXXXXXX-XXXXX-XXXXXXXXX-X-XXX-XXXXX-X-XXXXX-XXXXX-XXX-X-XXX-XXXXX-X-XXXXX-XXX-
         X-XXXXX-XXXXXXXXX-X-XXXXXXXXX-X-XXX-X-XXX-XXXXX-XXXXXXX-XXX-X-XXX-XXXXXXXXXXX-X-XXXXX-XXX-X-XXXXX-XX
         X-XXXXX-XXXXXXXXXXX-X-XXX-X-XXX-XXXXXXX-XXXXX-XXX-XXXXX-X-XXX-XXXXX-X-XXXXX-XXXXXXXXX-X-XXX-XXXXX-X-
         XXXXX-XXX-X-XXX-X-XXXXXXXXX-X-XXXXXXXXX-X-XXX-XXXXX-XXXXX-X-XXXXX-XXXXX-XXX-XXXXX-XXXXX-X-XXXXX-XXX-
         X-XXXXX-XXX-XXXXX-XXXXXXX-XXX-X-XXXXX-XXX-XXXXXXX-XXXXX-XXX-XXXXX-X-XXX-XXXXX-XXXXXXX-XXXXX-XXX-X-XX
         XXXXXXX-X-XXXXX-XXX-X-XXX-X-XXXXXXXXX-X-XXXXXXXXX-X-XXX-X-XXX-XXXXXXX-XXXXX-XXX-X-XXX-XXXXX-XXXXX-X-
         XXXXX-XXX-XXXXXXX-XXX-XXXXX-XXXXXXX-XXX-X-XXX-X-XXX-XXXXXXX-XXXXX-XXX-XXXXX-XXXXX-XXXXX-X-XXXXX-XXXX
         X-XXX-X-XXX-XXXXX-X-XXXXX-XXX-X-XXX-X-XXXXXXXXX-X-XXXXXXXXX-X-XXXXX-XXX-XXXXX-X-XXXXX-XXX-X-XXX-XXXX
         X-XXXXX-XXXXXXX-XXX-X-XXXXX-XXXXXXXXX-XXXXXXX-XXX-X-XXX-X-XXX-XXXXXXX-XXXXXXXXX-XXXXX-X-XXX-XXXXXXX-
         XXXXX-XXXXX-XXX-X-XXX-XXXXX-X-XXXXX-XXX-XXXXX-X-XXXXXXXXX-X-XXXXXXXXX-X-XXX-X-XXX-XXXXX-X-XXXXX-XXX-
         X-XXX-XXXXX-XXXXX-X-XXXXX-XXXXX-XXXXX-XXX-XXXXX-XXXXXXX-XXX-X-XXX-X-XXX-XXXXXXX-XXXXX-XXX-XXXXXXX-XX
         X-XXXXX-X-XXXXX-XXXXX-XXX-X-XXX-XXXXX-XXXXXXX-XXX-X-XXX-X-XXXXXXXXX-X-XXXXXXXXX-X-XXX-X-XXX-XXXXX-X-
         XXXXXXXXX-X-XXX-XXXXX-XXXXXXX-XXXXX-XXX-X-XXXXX-XXX-XXXXX-XXXXXXX-XXX-XXXXX-X-XXX-XXXXXXX-XXXXX-XXX-
         XXXXX-X-XXX-XXXXX-X-XXXXX-XXXXX-XXX-XXXXX-XXXXX-X-XXXXX-XXXXX-XXX-X-XXXXXXXXX-X-XXXXXXXXX-X-XXX-X-XX
         X-XXXXX-X-XXXXX-XXX-X-XXXXXXXXX-XXXXX-X-XXXXX-XXX-X-XXXXX-XXX-XXXXX-XXXXXXX-XXX-X-XXX-X-XXXXXXXXXXX-
         XXXXX-XXX-XXXXX-X-XXX-XXXXX-X-XXXXXXXXXXX-XXX-X-XXX-XXXXXXX-XXXXX-XXX-X-XXX-X-XXXXXXXXX-X-XXXXXXXXX-
         XXXXX-X-XXX-XXXXX-X-XXXXX-XXX-X-XXX-XXXXX-XXXXX-X-XXXXX-XXX-X-XXXXXXXXX-XXXXX-XXXXXXX-XXXXX-XXX-X-XX
         X-XXXXXXX-XXXXX-XXX-XXXXX-X-XXX-XXXXX-X-XXXXX-XXXXX-XXXXX-XXX-XXXXX-X-XXXXX-XXX-X-XXX-X-XXXXXXXXX-XX
         XXXXXXXXX-X-XXX-X-XXXXXXXXX-X-XXXXX-XXX-X-XXX-XXXXX-XXXXX-X-XXXXXXXXX-X-XXXXX-XXX-XXXXXXXXXXXXX-XXX-
         X-XXX-X-XXX-XXXXXXX-XXXXX-XXX-XXXXX-X-XXX-XXXXX-X-XXXXX-XXXXX-XXX-X-XXX-XXXXX-X-XXXXX-XXX-X-XXX-XXXX
         XXXXXXX-X- (L=210*11=2.310)
```

```
And here's how have been obtained.
----------------------------------
                                                                                                            1
                  1         2         3         4         5         6         7         8         9         0
          234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890

[S2]      X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X
[S3]       X--X--X--X--X--X--X--X--X--X--X--X--X--X--X--X--X--X--X--X--X--X--X--X--X--X--X--X--X--X--X--X--X-
[Sc<=3]   XXX-X-XXX-X-XXX-X-XXX-X-XXX-X-XXX-X-XXX-X-XXX-X-XXX-X-XXX-X-XXX-X-XXX-X-XXX-X-XXX-X-XXX-X-XXX-X-XXX
[S5]         X----X----X----X----X----X----X----X----X----X----X----X----X----X----X----X----X----X----X----X
[Sc<=5]   XXXXX-XXX-X-XXX-X-XXX-XXXXX-X-XXXXX-XXX-X-XXX-X-XXX-XXXXX-X-XXXXX-XXX-X-XXX-X-XXX-XXXXX-X-XXXXX-XXX
[S7]           X------X------X------X------X------X------X------X------X------X------X------X------X------X--
[Sc<=7]   XXXXXXXXX-X-XXX-X-XXX-XXXXX-X-XXXXX-XXX-X-XXX-XXXXX-XXXXX-X-XXXXX-XXX-X-XXXXX-XXX-XXXXX-XXXXXXX-XXX

         1         1         1         1         1         1         1         1         1         1         2
         0         1         2         3         4         5         6         7         8         9         0
         1234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890

[S2]     -X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X
[S3]     -X--X--X--X--X--X--X--X--X--X--X--X--X--X--X--X--X--X--X--X--X--X--X--X--X--X--X--X--X--X--X--X--X--
[Sc<=3]  -X-XXX-X-XXX-X-XXX-X-XXX-X-XXX-X-XXX-X-XXX-X-XXX-X-XXX-X-XXX-X-XXX-X-XXX-X-XXX-X-XXX-X-XXX-X-XXX-X-X
[S5]     ----X----X----X----X----X----X----X----X----X----X----X----X----X----X----X----X----X----X----X----X
[Sc<=5]  -X-XXX-X-XXX-XXXXX-X-XXXXX-XXX-X-XXX-X-XXX-XXXXX-X-XXXXX-XXX-X-XXX-X-XXX-XXXXX-X-XXXXX-XXX-X-XXX-X-X
[S7]     ----X------X------X------X------X------X------X------X------X------X------X------X------X------X----
[Sc<=7]  -X-XXX-X-XXX-XXXXXXX-XXXXX-XXX-XXXXX-X-XXX-XXXXX-X-XXXXX-XXXXX-XXX-X-XXX-XXXXX-X-XXXXX-XXX-X-XXX-X-X

         2         2         2         2         2         2         2         2         2         2         3
         0         1         2         3         4         5         6         7         8         9         0
         1234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890

[S2]     -X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X
[S3]     X--X--X--X--X--X--X--X--X--X--X--X--X--X--X--X--X--X--X--X--X--X--X--X--X--X--X--X--X--X--X--X--X--X
[Sc<=3]  XX-X-XXX-X-XXX-X-XXX-X-XXX-X-XXX-X-XXX-X-XXX-X-XXX-X-XXX-X-XXX-X-XXX-X-XXX-X-XXX-X-XXX-X-XXX-X-XXX-X
[S5]     ----X----X----X----X----X----X----X----X----X----X----X----X----X----X----X----X----X----X----X----X
[Sc<=5]  XX-XXXXX-X-XXXXX-XXX-X-XXX-X-XXX-XXXXX-X-XXXXX-XXX-X-XXX-X-XXX-XXXXX-X-XXXXX-XXX-X-XXX-X-XXX-XXXXX-X
[S7]     --X------X------X------X------X------X------X------X------X------X------X------X------X------X------
[Sc<=7]  XXXXXXXX-X-XXXXXXXXX-X-XXX-X-XXX-XXXXX-X-XXXXX-XXX-X-XXX-XXXXX-XXXXX-X-XXXXX-XXX-X-XXXXX-XXX-XXXXX-X
          Finish --><-- Start again
```

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```
                                                                                                              1
                    1         2         3         4         5         6         7         8         9         0
            234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890

[Sc<=7]     XXXXXXXXX-X-XXX-X-XXX-XXXXX-X-XXXXX-XXX-X-XXX-XXXXX-XXXXX-X-XXXXX-XXX-X-XXXXX-XXX-XXXXX-XXXXXXX-XXX
[S11]                X----------X----------X----------X----------X----------X----------X----------X----------X-
[Sc<=11]    XXXXXXXXXXX-XXX-X-XXX-XXXXX-X-XXXXX-XXX-X-XXX-XXXXX-XXXXX-X-XXXXX-XXX-X-XXXXX-XXX-XXXXX-XXXXXXX-XXX

           1        1         1         1         1         1         1         1         1         1         2
           0        1         2         3         4         5         6         7         8         9         0
           1234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890

[Sc<=7]    -X-XXX-X-XXX-XXXXXXX-XXXXX-XXX-XXXXX-X-XXX-XXXXX-X-XXXXX-XXXXX-XXX-X-XXX-XXXXX-X-XXXXX-XXX-X-XXX-X-X
[S11]      ---------X----------X----------X----------X----------X----------X----------X----------X----------X--
[Sc<=11]   -X-XXX-X-XXX-XXXXXXXXXXXXX-XXX-XXXXX-X-XXXXXXXXX-X-XXXXX-XXXXX-XXX-X-XXX-XXXXX-X-XXXXXXXXX-X-XXX-X-X

           2        2         2         2         2         2         2         2         2         2         3
           0        1         2         3         4         5         6         7         8         9         0
           1234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890

[Sc<=7]    XXXXXXXX-X-XXXXXXXXX-X-XXX-X-XXX-XXXXX-X-XXXXX-XXX-X-XXX-XXXXX-XXXXX-X-XXXXX-XXX-X-XXXXX-XXX-XXXXX-X
[S11]      --------X----------X----------X----------X----------X----------X----------X----------X----------X---
[Sc<=11]   XXXXXXXXXX-XXXXXXXXX-X-XXX-X-XXX-XXXXX-X-XXXXX-XXX-XXXXX-XXXXX-XXXXX-X-XXXXX-XXX-X-XXXXX-XXX-XXXXX-X

           3        3         3         3         3         3         3         3         3         3         4
           0        1         2         3         4         5         6         7         8         9         0
           1234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890

[Sc<=7]    XXXXXX-XXX-X-XXX-X-XXX-XXXXXXX-XXXXX-XXX-XXXXX-X-XXX-XXXXX-X-XXXXX-XXXXX-XXX-X-XXX-XXXXX-X-XXXXX-XXX
[S11]      -------X----------X----------X----------X----------X----------X----------X----------X----------X----
[Sc<=11]   XXXXXX-XXX-X-XXX-XXXXX-XXXXXXX-XXXXX-XXXXXXXXX-X-XXX-XXXXX-X-XXXXX-XXXXX-XXX-X-XXX-XXXXX-X-XXXXX-XXX

           4        4         4         4         4         4         4         4         4         4         5
           0        1         2         3         4         5         6         7         8         9         0
           1234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890

[Sc<=7]    -X-XXX-X-XXXXXXXXX-X-XXXXXXXXX-X-XXX-X-XXX-XXXXX-X-XXXXX-XXX-X-XXX-XXXXX-XXXXX-X-XXXXX-XXX-X-XXXXX-X
[S11]      ------X----------X----------X----------X----------X----------X----------X----------X----------X-----
[Sc<=11]   -X-XXXXX-XXXXXXXXX-X-XXXXXXXXX-X-XXX-X-XXX-XXXXX-XXXXXXX-XXX-X-XXX-XXXXXXXXXXX-X-XXXXX-XXX-X-XXXXX-X
```

```
         5        5         5         5         5         5         5         5         5         5         6
         0        1         2         3         4         5         6         7         8         9         0
         1234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890

[Sc<=7]  XX-XXXXX-XXXXXXX-XXX-X-XXX-X-XXX-XXXXXXX-XXXXX-XXX-XXXXX-X-XXX-XXXXX-X-XXXXX-XXXXX-XXX-X-XXX-XXXXX-X
[S11]    -----X----------X----------X----------X----------X----------X----------X----------X----------X------
[Sc<=11] XX-XXXXX-XXXXXXXXXXX-X-XXX-X-XXX-XXXXXXX-XXXXX-XXX-XXXXX-X-XXX-XXXXX-X-XXXXX-XXXXXXXXX-X-XXX-XXXXX-X

         6        6         6         6         6         6         6         6         6         6         7
         0        1         2         3         4         5         6         7         8         9         0
         1234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890

[Sc<=7]  -XXXXX-XXX-X-XXX-X-XXXXXXXXX-X-XXXXXXXXX-X-XXX-X-XXX-XXXXX-X-XXXXX-XXX-X-XXX-XXXXX-XXXXX-X-XXXXX-XXX
[S11]    ----X----------X----------X----------X----------X----------X----------X----------X----------X-------
[Sc<=11] -XXXXX-XXX-X-XXX-X-XXXXXXXXX-X-XXXXXXXXX-X-XXX-XXXXX-XXXXX-X-XXXXX-XXXXX-XXX-XXXXX-XXXXX-X-XXXXX-XXX

         7        7         7         7         7         7         7         7         7         7         8
         0        1         2         3         4         5         6         7         8         9         0
         1234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890

[Sc<=7]  -X-XXXXX-XXX-XXXXX-XXXXXXX-XXX-X-XXX-X-XXX-XXXXXXX-XXXXX-XXX-XXXXX-X-XXX-XXXXX-X-XXXXX-XXXXX-XXX-X-X
[S11]    ---X----------X----------X----------X----------X----------X----------X----------X----------X--------
[Sc<=11] -X-XXXXX-XXX-XXXXX-XXXXXXX-XXX-X-XXXXX-XXX-XXXXXXX-XXXXX-XXX-XXXXX-X-XXX-XXXXX-XXXXXXX-XXXXX-XXX-X-X

         8        8         8         8         8         8         8         8         8         8         9
         0        1         2         3         4         5         6         7         8         9         0
         1234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890

[Sc<=7]  XX-XXXXX-X-XXXXX-XXX-X-XXX-X-XXXXXXXXX-X-XXXXXXXXX-X-XXX-X-XXX-XXXXX-X-XXXXX-XXX-X-XXX-XXXXX-XXXXX-X
[S11]    --X----------X----------X----------X----------X----------X----------X----------X----------X---------
[Sc<=11] XXXXXXXX-X-XXXXX-XXX-X-XXX-X-XXXXXXXXX-X-XXXXXXXXX-X-XXX-X-XXX-XXXXXXX-XXXXX-XXX-X-XXX-XXXXX-XXXXX-X

                                                                                                            1
         9        9         9         9         9         9         9         9         9         9         0
         0        1         2         3         4         5         6         7         8         9         0
         1234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890

[Sc<=7]  -XXXXX-XXX-X-XXXXX-XXX-XXXXX-XXXXXXX-XXX-X-XXX-X-XXX-XXXXXXX-XXXXX-XXX-XXXXX-X-XXX-XXXXX-X-XXXXX-XXX
[S11]    -X----------X----------X----------X----------X----------X----------X----------X----------X----------
[Sc<=11] -XXXXX-XXX-XXXXXXX-XXX-XXXXX-XXXXXXX-XXX-X-XXX-X-XXX-XXXXXXX-XXXXX-XXX-XXXXX-XXXXX-XXXXX-X-XXXXX-XXX
```

```
         1        1         1         1         1         1         1         1         1         1         1
         0        0         0         0         0         0         0         0         0         0         1
         0        1         2         3         4         5         6         7         8         9         0
         1234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890

[Sc<=7]  XX-XXX-X-XXX-XXXXX-X-XXXXX-XXX-X-XXX-X-XXXXXXXXX-X-XXXXXXXXX-X-XXX-X-XXX-XXXXX-X-XXXXX-XXX-X-XXX-XXX
[S11]    X----------X----------X----------X----------X----------X----------X----------X----------X----------X
[Sc<=11] XX-XXX-X-XXX-XXXXX-X-XXXXX-XXX-X-XXX-X-XXXXXXXXX-X-XXXXXXXXX-X-XXXXX-XXX-XXXXX-X-XXXXX-XXX-X-XXX-XXX

         1        1         1         1         1         1         1         1         1         1         1
         1        1         1         1         1         1         1         1         1         1         2
         0        1         2         3         4         5         6         7         8         9         0
         1234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890

[Sc<=7]  XX-XXXXX-X-XXXXX-XXX-X-XXXXX-XXX-XXXXX-XXXXXXX-XXX-X-XXX-X-XXX-XXXXXXX-XXXXX-XXX-XXXXX-X-XXX-XXXXX-X
[S11]    ----------X----------X----------X----------X----------X----------X----------X----------X----------X-
[Sc<=11] XX-XXXXX-XXXXXXX-XXX-X-XXXXX-XXXXXXXXX-XXXXXXX-XXX-X-XXX-X-XXX-XXXXXXX-XXXXXXXXX-XXXXX-X-XXX-XXXXXXX

         1        1         1         1         1         1         1         1         1         1         1
         2        2         2         2         2         2         2         2         2         2         3
         0        1         2         3         4         5         6         7         8         9         0
         1234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890

[Sc<=7]  -XXXXX-XXXXX-XXX-X-XXX-XXXXX-X-XXXXX-XXX-X-XXX-X-XXXXXXXXX-X-XXXXXXXXX-X-XXX-X-XXX-XXXXX-X-XXXXX-XXX
[S11]    ---------X----------X----------X----------X----------X----------X----------X----------X----------X--
[Sc<=11] -XXXXX-XXXXX-XXX-X-XXX-XXXXX-X-XXXXX-XXX-XXXXX-X-XXXXXXXXX-X-XXXXXXXXX-X-XXX-X-XXX-XXXXX-X-XXXXX-XXX

         1        1         1         1         1         1         1         1         1         1         1
         3        3         3         3         3         3         3         3         3         3         4
         0        1         2         3         4         5         6         7         8         9         0
         1234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890

[Sc<=7]  -X-XXX-XXXXX-XXXXX-X-XXXXX-XXX-X-XXXXX-XXX-XXXXX-XXXXXXX-XXX-X-XXX-X-XXX-XXXXXXX-XXXXX-XXX-XXXXX-X-X
[S11]    --------X----------X----------X----------X----------X----------X----------X----------X----------X---
[Sc<=11] -X-XXX-XXXXX-XXXXX-X-XXXXX-XXXXX-XXXXX-XXX-XXXXX-XXXXXXX-XXX-X-XXX-X-XXX-XXXXXXX-XXXXX-XXX-XXXXXXX-X
```

```
         1         1         1         1         1         1         1         1         1         1        1
         4         4         4         4         4         4         4         4         4         4        5
         0         1         2         3         4         5         6         7         8         9        0
         1234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890

[Sc<=7]  XX-XXXXX-X-XXXXX-XXXXX-XXX-X-XXX-XXXXX-X-XXXXX-XXX-X-XXX-X-XXXXXXXXX-X-XXXXXXXXX-X-XXX-X-XXX-XXXXX-X
[S11]    -------X----------X----------X----------X----------X----------X----------X----------X----------X----
[Sc<=11] XX-XXXXX-X-XXXXX-XXXXX-XXX-X-XXX-XXXXX-XXXXXXX-XXX-X-XXX-X-XXXXXXXXX-X-XXXXXXXXX-X-XXX-X-XXX-XXXXX-X

         1         1         1         1         1         1         1         1         1         1        1
         5         5         5         5         5         5         5         5         5         5        6
         0         1         2         3         4         5         6         7         8         9        0
         1234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890

[Sc<=7]  -XXXXX-XXX-X-XXX-XXXXX-XXXXX-X-XXXXX-XXX-X-XXXXX-XXX-XXXXX-XXXXXXX-XXX-X-XXX-X-XXX-XXXXXXX-XXXXX-XXX
[S11]    ------X----------X----------X----------X----------X----------X----------X----------X----------X-----
[Sc<=11] -XXXXXXXXX-X-XXX-XXXXX-XXXXXXX-XXXXX-XXX-X-XXXXX-XXX-XXXXX-XXXXXXX-XXX-XXXXX-X-XXX-XXXXXXX-XXXXX-XXX

         1         1         1         1         1         1         1         1         1         1        1
         6         6         6         6         6         6         6         6         6         6        7
         0         1         2         3         4         5         6         7         8         9        0
         1234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890

[Sc<=7]  -XXXXX-X-XXX-XXXXX-X-XXXXX-XXXXX-XXX-X-XXX-XXXXX-X-XXXXX-XXX-X-XXX-X-XXXXXXXXX-X-XXXXXXXXX-X-XXX-X-X
[S11]    -----X----------X----------X----------X----------X----------X----------X----------X----------X------
[Sc<=11] -XXXXX-X-XXX-XXXXX-X-XXXXX-XXXXX-XXX-XXXXX-XXXXX-X-XXXXX-XXXXX-XXX-X-XXXXXXXXX-X-XXXXXXXXX-X-XXX-X-X

         1         1         1         1         1         1         1         1         1         1        1
         7         7         7         7         7         7         7         7         7         7        8
         0         1         2         3         4         5         6         7         8         9        0
         1234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890

[Sc<=7]  XX-XXXXX-X-XXXXX-XXX-X-XXX-XXXXX-XXXXX-X-XXXXX-XXX-X-XXXXX-XXX-XXXXX-XXXXXXX-XXX-X-XXX-X-XXX-XXXXXXX
[S11]    ----X----------X----------X----------X----------X----------X----------X----------X----------X-------
[Sc<=11] XX-XXXXX-X-XXXXX-XXX-X-XXXXXXXXX-XXXXX-X-XXXXX-XXX-X-XXXXX-XXX-XXXXX-XXXXXXX-XXX-X-XXX-X-XXXXXXXXXXX
```

```
         1        1         1         1         1         1         1         1         1         1         1
         8        8         8         8         8         8         8         8         8         8         9
         0        1         2         3         4         5         6         7         8         9         0
         1234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890

[Sc<=7]  -XXXXX-XXX-XXXXX-X-XXX-XXXXX-X-XXXXX-XXXXX-XXX-X-XXX-XXXXX-X-XXXXX-XXX-X-XXX-X-XXXXXXXXX-X-XXXXXXXXX
[S11]    ---X----------X----------X----------X----------X----------X----------X----------X----------X--------
[Sc<=11] -XXXXX-XXX-XXXXX-X-XXX-XXXXX-X-XXXXXXXXXXX-XXX-X-XXX-XXXXXXX-XXXXX-XXX-X-XXX-X-XXXXXXXXX-X-XXXXXXXXX

         1        1         1         1         1         1         1         1         1         1         2
         9        9         9         9         9         9         9         9         9         9         0
         0        1         2         3         4         5         6         7         8         9         0
         1234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890

[Sc<=7]  -X-XXX-X-XXX-XXXXX-X-XXXXX-XXX-X-XXX-XXXXX-XXXXX-X-XXXXX-XXX-X-XXXXX-XXX-XXXXX-XXXXXXX-XXX-X-XXX-X-X
[S11]    --X----------X----------X----------X----------X----------X----------X----------X----------X---------
[Sc<=11] -XXXXX-X-XXX-XXXXX-X-XXXXX-XXX-X-XXX-XXXXX-XXXXX-X-XXXXX-XXX-X-XXXXXXXXX-XXXXX-XXXXXXX-XXXXX-XXX-X-X

         2        2         2         2         2         2         2         2         2         2         2
         0        0         0         0         0         0         0         0         0         0         1
         0        1         2         3         4         5         6         7         8         9         0
         1234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890

[Sc<=7]  XX-XXXXXXX-XXXXX-XXX-XXXXX-X-XXX-XXXXX-X-XXXXX-XXXXX-XXX-X-XXX-XXXXX-X-XXXXX-XXX-X-XXX-X-XXXXXXXXX-X
[S11]    -X----------X----------X----------X----------X----------X----------X----------X----------X----------
[Sc<=11] XX-XXXXXXX-XXXXX-XXX-XXXXX-X-XXX-XXXXX-X-XXXXX-XXXXX-XXXXX-XXX-XXXXX-X-XXXXX-XXX-X-XXX-X-XXXXXXXXX-X

         2        2         2         2         2         2         2         2         2         2         2
         1        1         1         1         1         1         1         1         1         1         2
         0        1         2         3         4         5         6         7         8         9         0
         1234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890

[Sc<=7]  -XXXXXXXXX-X-XXX-X-XXX-XXXXX-X-XXXXX-XXX-X-XXX-XXXXX-XXXXX-X-XXXXX-XXX-X-XXXXX-XXX-XXXXX-XXXXXXX-XXX
[S11]    X----------X----------X----------X----------X----------X----------X----------X----------X----------X
[Sc<=11] XXXXXXXXXX-X-XXX-X-XXXXXXXXX-X-XXXXX-XXX-X-XXX-XXXXX-XXXXX-X-XXXXXXXXX-X-XXXXX-XXX-XXXXXXXXXXXXX-XXX
```

```
         2        2         2         2         2         2         2         2         2         2         2
         2        2         2         2         2         2         2         2         2         2         3
         0        1         2         3         4         5         6         7         8         9         0
         1234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890

[Sc<=7]  -X-XXX-X-XXX-XXXXXXX-XXXXX-XXX-XXXXX-X-XXX-XXXXX-X-XXXXX-XXXXX-XXX-X-XXX-XXXXX-X-XXXXX-XXX-X-XXX-X-X
[S11]    ----------X----------X----------X----------X----------X----------X----------X----------X----------X-
[Sc<=11] -X-XXX-X-XXX-XXXXXXX-XXXXX-XXX-XXXXX-X-XXX-XXXXX-X-XXXXX-XXXXX-XXX-X-XXX-XXXXX-X-XXXXX-XXX-X-XXX-XXX

         2        2         2         2         2         2         2         2         2         2         2
         3        3         3         3         3         3         3         3         3         3         4
         0        1         2         3         4         5         6         7         8         9         0
         1234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890

[Sc<=7]  XXXXXXXX-X-XXXXXXXXX-X-XXX-X-XXX-XXXXX-X-XXXXX-XXX-X-XXX-XXXXX-XXXXX-X-XXXXX-XXX-X-XXXXX-XXX-XXXXX-X
[S11]    ---------X----------X----------X----------X----------X----------X----------X----------X---------X---
[Sc<=11] XXXXXXXX-X-XXXXXXXXXXX-XXX-X-XXX-XXXXX-X-XXXXX-XXX-X-XXX-XXXXX-XXXXX-X-XXXXX-XXX-X-XXXXX-XXX-XXXXX-X
          Finish --><-- Start again
```

Example with numbers; using the sequence [Sc<=3] starting from 5 which immediately occupies its place.
Starting from 5 [Sc<=3] it changes to: -X-XXX without actually changing.
The sequence [Sc<=3] is made here by adding to the previous number, regardless of whether it is discarded or not, alternately and succeeding infinitely the numbers 2 and 4.
This only wants to be a further confirmation showing how the sequence [Sc<=3] (which by itself discards 2/3 of the numbers) continues on its way even when other sequences intervene to give it a hand.

Obviously the numbers not discarded are all prime numbers.

Italian.
Esempio con i numeri; utilizzando la sequenza [Sc<=3] a partire da 5 il quale occupa subito il suo posto.
Partendo da 5 [Sc<=3] si modifica in: -X-XXX senza in realtà cambiare.
La sequenza [Sc<=3] viene qua realizzata sommando al numero precedente, indipendentemente che sia scartato o meno, alternativamente e (riuscendo) fino all'infinito i numeri 2 e 4.
Questa vuole solo essere una ulteriore conferma mostrando come la sequenza [Sc<=3] (che comunque da sola scarta 2/3 dei numeri) continua per la sua strada anche quando intervengono altre sequenze a darle una mano.

Evidentemente i numeri non scartati sono tutti numeri primi.

```
   2
   3
   5
-------
  +2=7
  +4=11
  +2=13
  +4=17
  +2=19
  +4=23
  +6=29  (6 <-- +2 =25 +4) -- 25 is discarded from the sequence [S5].
  +2=31
  +6=37  (6 <-- +4 =35 +2) -- 35 is discarded from the sequence [S5].
  +4=41
  +2=43
  +4=47
  +6=53  (6 <-- +2 =49 +4) -- 49 is discarded from the sequence [S7].
  +6=59  (6 <-- +2 =55 +4) -- 55 is discarded from the sequence [S5].
  +2=61
  +6=67  (6 <-- +4 =65 +2) -- 65 is discarded from the sequence [S5].
  +4=71
  +2=73
  +6=79  (6 <-- +4 =77 +2) -- 77 is discarded from the sequence [S7].
  +4=83
  +6=89  (6 <-- +2 =85 +4) -- 85 is discarded from the sequence [S5].
  +8=97  (8 <-- +2 =91 +4 =95 +2) -- 91 and 95 discarded from the sequences [S7] e [S5].
  +4=101
  +2=103
  +4=107
  +2=109
  +4=113
+14=127 (14 <-- +2 =115 +4 =119 +2 =121 +4 =125 +2) -- 115, 119, 121, and 125 discarded from the sequences
  +4=131                                                                   [S5], [S7], [S11] and [S5].
```

Tab.9/9

BILLBOARD A1

```
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
```

Here are the combined sequences, [Sc<=7] and [Sc<=11] I had to break them into lines of 100.

```
[Sc<=3]    XXX-X- (L=2*3=6)

[Sc<=5]    XXXXX-XXX-X-XXX-X-XXX-XXXXX-X- (L=6*5=30)

[Sc<=7]    XXXXXXXXX-X-XXX-X-XXX-XXXXX-X-XXXXX-XXX-X-XXX-XXXXX-XXXXX-X-XXXXX-XXX-X-XXXXX-XXX-XXXXX-XXXXXXX-XXX-X-XXX-X-XXX-XXXXXXX-XXXXX-XXX-XXXXX-X-XXX-XXXXX-X-XXXXX-XXXXX-XXX-X-XXX-XXXXX-X-XXXXX-XXX-X-XXX-X-XXXXXXXXX-X- (L=30*7=210)

[Sc<=11]   XXXXXXXXXXX-XXX-X-XXX-XXXXX-X-XXXXX-XXX-X-XXX-XXXXX-XXXXX-X-XXXXX-XXX-X-XXXXX-XXX-XXXXX-XXXXXXX-XXX-X-XXX-X-XXX-XXXXXXXXXXXXX-XXX-XXXXX-X-XXXXXXXXX-X-XXXXX-XXXXX-XXX-X-XXX-XXXXX-X-XXXXXXXXX-X-XXX-X-XXXXXXXXXXX-XXXXXXXXX-X-XXX-X-XXX-XXXXX-X-X[illegible]
          -XXXXX-XXX-X-XXX-X-XXXXXXXXX-X-XXXXXXXXX-X-XXX-XXXXX-XXXXX-X-XXXXX-XXXXX-XXX-XXXXX-XXXXX-X-XXX-XXXXX-XXXXX-X-XXXXX-XXX-XXXXXXX-XXXXX-XXX-X-XXXXX-XXX-XXXXXXX-XXXXX-XXX-X-XXX-XXXXXXX-XXXXX-XXX-X-XXXXXXXXX-X-XXXXX-XXX-X-XXXXXXXXX-X-[illegible]
          -XXXXX-XXXXX-XXX-X-XXX-XXXXX-X-XXXXX-XXX-XXXXX-X-XXXXXXXXX-X-XXXXXXXXX-X-XXX-X-XXX-XXXXX-X-XXX-X-XXX-XXXXX-XXXXX-X-XXXXX-XXXXX-XXXXX-XXX-XXXXXXX-XXX-X-XXX-X-XXX-XXXXXXX-XXXXX-XXX-XXXXXXX-XXX-XXXXX-XXXXX-XXX-X-XXXXX-XXXXX-XXX-XXXXX-XXX[illegible]
          -XXXXX-XXX-XXXXX-X-XXX-XXXXX-X-XXXXXXXXXXX-XXX-X-XXX-XXXXXXX-XXXXX-XXX-X-XXX-X-XXXXXXXXX-X-XXXXXXXXX-XXXXX-X-XXX-XXXXX-X-XXXXX-XXX-X-XXX-XXXXX-XXXXX-X-XXXXX-XXX-X-XXXXXXXXX-XXXXXXX-XXX-X-XXX-XXXXXXX-XXXXX-XXX-XXXXX-X-XXX-XXXXX-X-[illegible] (L=210*11=2.310)
```

And here's how have been obtained.

```
           1 2 3 4 5 6 7 8 9 1 1 1 1 1 1 1 1 1 1 2 2 2 2 2 ... 6 [ruler, illegible]
           2345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890[illegible]

[S2]       X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-[illegible]
[S3]        X--X--X--X--X--X--X--X--X--X--X--X--X--X--X--X--X--X--X--X--X--X--X--X--X--X--X--X--X--X--X--X--X--X--X--X--X--X--X--X--X--X--X--[illegible]
[Sc<=3]    XXX-X-XXX-X-XXX-X-XXX-X-XXX-X-XXX-X-XXX-X-XXX-X-XXX-X-XXX-X-XXX-X-XXX-X-XXX-X-XXX-X-XXX-X-XXX-X-XXX-X-XXX-X-XXX-X-XXX-X-XXX-X-[illegible]
[S5]          X----X----X----X----X----X----X----X----X----X----X----X----X----X----X----X----X----X----X----X----X----X----X----X----X----X----[illegible]
[Sc<=5]    XXXXX-XXX-X-XXX-X-XXX-XXXXX-X-XXXXX-XXX-X-XXX-X-XXX-XXXXX-X-XXXXX-XXX-X-XXX-X-XXX-XXXXX-X-XXXXX-XXX-X-XXX-X-XXX-XXXXX-X-[illegible]
[S7]       [illegible]
[Sc<=7]    [illegible]
                                                       Finish --><-- Start again                                  Finish --><-- Start again
```

[Sc<=11] I divided it into four parts.

From 2 to 600 ---

```
[ruler, illegible]
[Sc<=7]    [illegible]
[S11]      [illegible]
[Sc<=11]   [illegible]
```

From 601 to 1200 ---

```
[ruler, illegible]
[Sc<=7]    [illegible]
[S11]      [illegible]
[Sc<=11]   [illegible]
```

From 1201 to 1800 ---

```
[ruler, illegible]
[Sc<=7]    [illegible]
[S11]      ---------X----------X----------X----------X----------X----------X----------X----------X----------X----------X----------X----------X----------X--[illegible]
[Sc<=11]   -XXXXX-XXXXX-XXX-X-XXX-XXXXX-X-XXXXX-XXX-XXXXX-X-XXXXXXXXX-X-XXXXXXXXX-X-XXX-X-XXX-XXXXX-X-XXXXX-XXX-X-XXX-XXXXX-XXXXX-X-XXXXX-XXXXX-XXXXX-XXX-XX[illegible]
```

From 1801 to 2400 ---

```
           1    1    1    1    1    1    1    1    1    1    1    1    1    1   [illegible]
           8    8    8    8    8    8    8    8    8    9    9    9    9    9   [illegible]
           1    2    3    4    5    6    7    8    9    0    1    2    3    4   [illegible]
           12345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345[illegible]

[Sc<=7]    -XXXXX-XXX-XXXXX-X-XXX-XXXXX-X-XXXXX-XXXXX-XXX-X-XXX-XXXXX-X-XXXXX-XXX-X-XXX-X-XXXXXXXXX-X-XXXXXXXXX-X-XXX-X-XXX-XXXXX-X-XXXXX-XXX-X-XXX-XXXXX-XX[illegible]
[S11]      ---X----------X----------X----------X----------X----------X----------X----------X----------X----------X----------X----------X----------X-------[illegible]
[Sc<=11]   -XXXXX-XXX-XXXXX-X-XXX-XXXXX-X-XXXXXXXXXXX-XXX-X-XXX-XXXXXXX-XXXXX-XXX-X-XXX-X-XXXXXXXXX-X-XXXXXXXXX-XXXXX-X-XXX-XXXXX-X-XXXXX-XXX-X-XXX-XXXXX-XX[illegible]
                                                                                                               Finish --><-- Start again
```

===

Example with numbers; using the sequence [Sc<=3] starting from 5 which immediately occupies its place.
Starting from 5 [Sc<=3] it changes to: -X-XXX without actually changing.
The sequence [Sc<=3] is made here by adding to the previous number, regardless of whether it is discarded or not, alternately and succeeding infinitely the numbers 2 and 4.
This only wants to be a further confirmation showing how the sequence [Sc<=3] (which by itself discards 2/3 of the numbers) continues on its way even when other sequences intervene to give it a hand.

Obviously the numbers not discarded are all prime numbers.

Italian.
Esempio con i numeri; utilizzando la sequenza [Sc<=3] a partire da 5 il quale occupa subito il suo posto.
Partendo da 5 [Sc<=3] si modifica in: -X-XXX senza in realtà cambiare.
La sequenza [Sc<=3] viene qua realizzata sommando al numero precedente, indipendentemente che sia scartato o meno, alternativamente e (riuscendo) fino all'infinito i numeri 2 e 4.
Questa vuole solo essere una ulteriore conferma mostrando come la sequenza [Sc<=3] (che comunque da sola scarta 2/3 dei numeri) continua per la sua strada anche quando intervengono altre sequenze a darle una mano.

Evidentemente i numeri non scartati sono tutti numeri primi.

```
  2
  3
  5
-------
 +2=7
 +4=11
 +2=13
 +4=17
 +2=19
 +4=23
 +6=29  (6 <-- +2 =25 +4) -- 25 is discarded from the sequence [S5].
 +2=31
 +6=37  (6 <-- +4 =35 +2) -- 35 is discarded from the sequence [S5].
 +4=41
 +2=43
 +4=47
 +6=53  (6 <-- +2 =49 +4) -- 49 is discarded from the sequence [S7].
 +6=59  (6 <-- +2 =55 +4) -- 55 is discarded from the sequence [S5].
 +2=61
 +6=67  (6 <-- +4 =65 +2) -- 65 is discarded from the sequence [S5].
 +4=71
 +2=73
 +6=79  (6 <-- +4 =77 +2) -- 77 is discarded from the sequence [S7].
 +4=83
 +6=89  (6 <-- +2 =85 +4) -- 85 is discarded from the sequence [S5].
 +8=97  (8 <-- +2 =91 +4 =95 +2) -- 91 and 95 discarded from the sequences [S7] e [S5].
 +4=101
 +2=103
 +4=107
 +2=109
 +4=113
+14=127 (14 <-- +2 =115 +4 =119 +2 =121 +4 =125 +2) -- 115, 119, 121, and 125 discarded from the sequences [S5], [S7], [S11] and [S5].
 +4=131
```

===