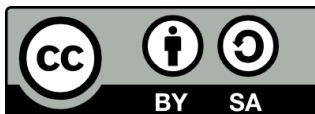




Sito Eratostenesa

Damian Kurpiewski





Opis

- Algorytm pozwala znaleźć wszystkie liczby pierwsze w zadanym zakresie od 1 do n
- Idea algorytmu opiera się na „skreślaniu” wielokrotności liczb pierwszych

Specyfikacja

Dane:

- n – liczba naturalna

Wynik:

- Lista liczb pierwszych z przedziału $[1, n]$

Algorytm

1. Stwórz listę liczb od 1 do n
2. Skreśl z listy liczbę 1
3. Od $i := 2$ do n , wykonuj:
 4. Jeżeli liczba i na liście nie jest skreślona, to:
 5. Wykreśl z listy wszystkie wielokrotności liczby i poczynając od $2 * i$
6. Wypisz z listy wszystkie nieskreślone wartości

The background consists of a dense field of 3D-rendered numbers (0-9) in various sizes and orientations, set against a blue gradient. The numbers are rendered in a light blue color, creating a sense of depth and movement.

Przykład

$$n = 50$$

Tworzymy listę liczb od 1 do 50

1 2 3 4 5 6 7 8 9 10

11 12 13 14 15 16 17 18 19 20

21 22 23 24 25 26 27 28 29 30

31 32 33 34 35 36 37 38 39 40

41 42 43 44 45 46 47 48 49 50

Wykreślamy z listy 1

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50

Zaczynamy od 2 – nie jest skreślona

1	<u>2</u>	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50

Wykreślamy kolejne wielokrotności 2 –
najpierw 4

1	<u>2</u>	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50

Teraz 6

1	<u>2</u>	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50

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1	<u>2</u>	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50

Potem 10...

1	<u>2</u>	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50

I tak dalej aż do 50

1	<u>2</u>	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50

Bierzemy kolejną nieskreśloną liczbę z listy

1	<u>2</u>	<u>3</u>	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50

I wykreślamy jej wielokrotności

1	<u>2</u>	<u>3</u>	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50

Operację powtarzamy – teraz dla 5

1	<u>2</u>	<u>3</u>	4	<u>5</u>	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50

Wykreślamy wielokrotności 5

1	<u>2</u>	<u>3</u>	4	<u>5</u>	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50

Algorytm kontynuujemy

1	<u>2</u>	<u>3</u>	4	<u>5</u>	6	<u>7</u>	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50

~~1~~ 2 3 4 5 6 7 8 9 ~~10~~
11 ~~12~~ 13 ~~14~~ ~~15~~ ~~16~~ 17 ~~18~~ 19 ~~20~~
~~21~~ ~~22~~ 23 ~~24~~ ~~25~~ ~~26~~ ~~27~~ ~~28~~ 29 ~~30~~
31 ~~32~~ ~~33~~ ~~34~~ ~~35~~ ~~36~~ 37 ~~38~~ ~~39~~ 40
41 ~~42~~ 43 ~~44~~ ~~45~~ ~~46~~ 47 ~~48~~ ~~49~~ 50

~~1~~ 2 3 4 5 6 7 8 9 ~~10~~
11 ~~12~~ 13 ~~14~~ ~~15~~ ~~16~~ 17 ~~18~~ 19 ~~20~~
~~21~~ ~~22~~ 23 ~~24~~ ~~25~~ ~~26~~ ~~27~~ ~~28~~ 29 ~~30~~
31 ~~32~~ ~~33~~ ~~34~~ ~~35~~ ~~36~~ 37 ~~38~~ ~~39~~ 40
41 ~~42~~ 43 ~~44~~ ~~45~~ ~~46~~ 47 ~~48~~ ~~49~~ ~~50~~

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11 ~~12~~ 13 ~~14~~ ~~15~~ ~~16~~ 17 ~~18~~ 19 ~~20~~
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31 ~~32~~ ~~33~~ ~~34~~ ~~35~~ ~~36~~ 37 ~~38~~ ~~39~~ 40
41 ~~42~~ 43 ~~44~~ ~~45~~ ~~46~~ 47 ~~48~~ ~~49~~ 50

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11 ~~12~~ 13 ~~14~~ ~~15~~ ~~16~~ 17 ~~18~~ 19 ~~20~~
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11 ~~12~~ 13 ~~14~~ ~~15~~ ~~16~~ 17 ~~18~~ 19 ~~20~~
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41 ~~42~~ 43 ~~44~~ ~~45~~ ~~46~~ 47 ~~48~~ ~~49~~ ~~50~~

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11 ~~12~~ 13 ~~14~~ ~~15~~ ~~16~~ 17 ~~18~~ 19 ~~20~~

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41 ~~42~~ 43 ~~44~~ ~~45~~ ~~46~~ 47 ~~48~~ ~~49~~ ~~50~~

Aż do przetworzenia wszystkich liczb

1	<u>2</u>	<u>3</u>	4	<u>5</u>	6	<u>7</u>	8	9	10
<u>11</u>	12	<u>13</u>	14	15	16	<u>17</u>	18	<u>19</u>	20
21	22	<u>23</u>	24	25	26	27	28	<u>29</u>	30
<u>31</u>	32	33	34	35	36	<u>37</u>	38	39	40
<u>41</u>	42	<u>43</u>	44	45	46	<u>47</u>	48	49	50

W wyniku otrzymujemy listę liczb pierwszych z przedziału od 1 do 50

2 3 5 7 11 13 17 19 23 29 31 37 41 43 47