

Het vinden van alle natuurlijke getallen met behulp van drie wiskundige operatoren

How many shortest-length paths are there to get from your house to the doughnut shop?

4 up's
7 right's

$\binom{11}{7} = \binom{11}{4} = 330$ paths

$\binom{n}{k} = \frac{n!}{(n-k)!k!}$

$e^{i\pi} + 1 = 0$

P	Q	R	P ∨ Q	P ∨ R	(P ∨ Q) ∧ (P ∨ R)
T	T	T	T	T	T
T	T	F	T	T	T
T	F	T	T	T	T
T	F	F	T	F	F
F	T	T	T	T	T
F	T	F	T	F	F
F	F	T	F	T	F
F	F	F	F	F	F

7, 11, 15, 19, 23...

$a_1 - a_0 = 4$
 $a_2 - a_1 = 4$
 $a_3 - a_2 = 4$
 \vdots
 $a_n - a_{n-1} = 4$
 $a_n - a_0 = 4n$
 $a_n = a_0 + 4n$

Find $7 + 12 + 17 + 22 + \dots + 342$.

$S_n = 7 + 12 + 17 + 22 + \dots + 342$
 $+ S_n = 342 + 337 + 332 + 327 + \dots + 7$
 $2S_n = 349 + 349 + 349 + 349 + \dots + 349$
 $2S_n = 349 \cdot 68$
 $S_n = \frac{349 \cdot 68}{2}$
 $S_n = 11866$

Original:
 $\exists x \forall y (x \geq 2y \rightarrow x > y + 1)$
 Converse:
 $\exists x \forall y (x > y + 1 \rightarrow x \geq 2y)$
 Negation:
 $\neg [\exists x \forall y (\neg(x \geq 2y) \vee x > y + 1)]$
 $\forall x \exists y (x \geq 2y \wedge x \leq y + 1)$
 Contrapositive:
 $\exists x \forall y (x \leq y + 1 \rightarrow x < 2y)$

$v - e + f = 2$

P.I.E. Example:

$6! - \left[\binom{6}{1}5! - \binom{6}{2}4! + \binom{6}{3}3! - \binom{6}{4}2! + \binom{6}{5}1! - 1 \right]$

There are six dogs to give 13 tacos. Use a 'stars and bars' diagram to illustrate the first and sixth dog get 3 tacos, the second dog gets none, the third dog gets 5 and the fourth dog gets one.

☆☆☆||☆☆☆☆☆|☆||☆☆☆☆|

$A = \{2, 4, 10, \text{flower}\}$

Onto

One-to-One

$(A \cup B \cup C) \cup (A \cap B \cap C)$

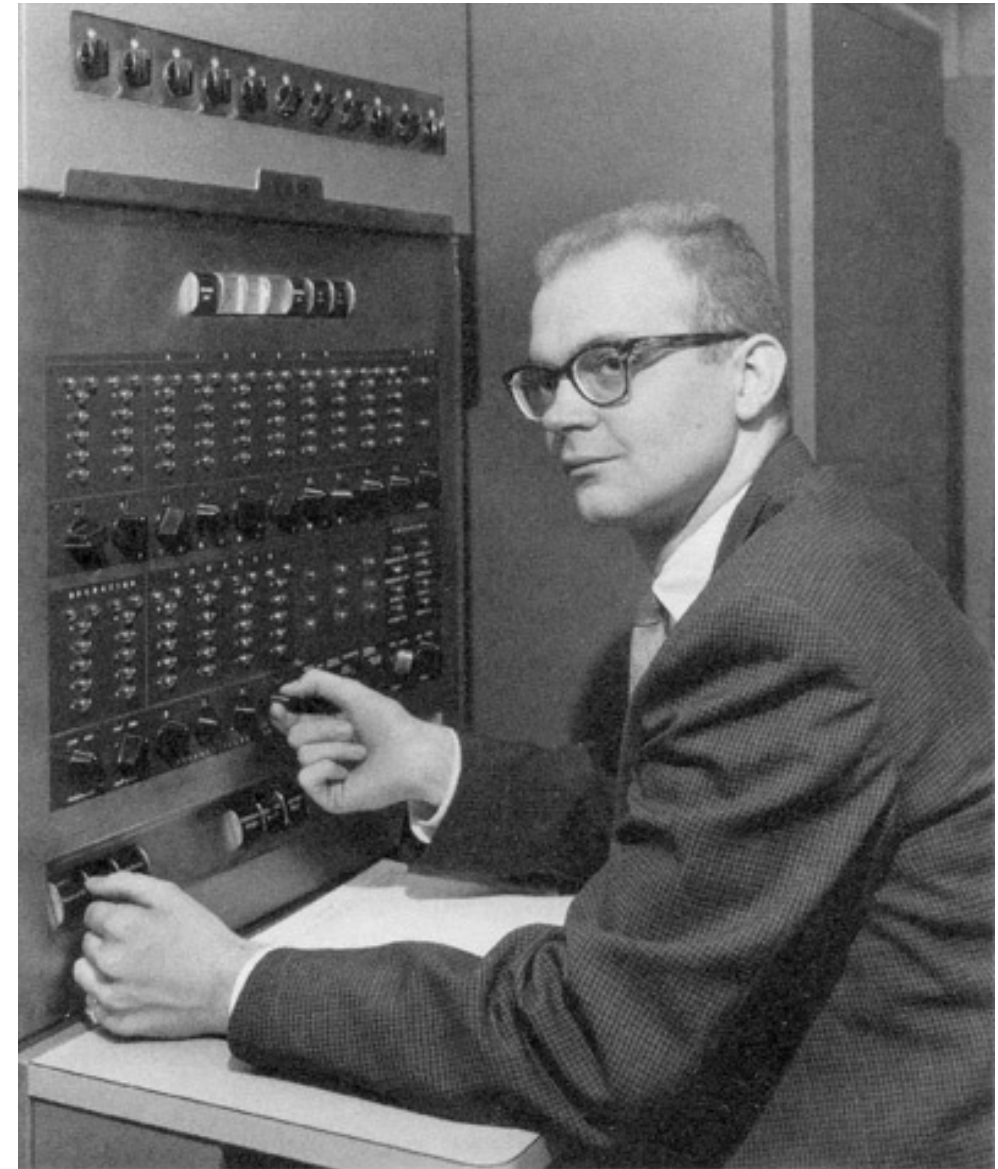
$K_{3,3}$

Do not worry about your difficulties in Mathematics. I can assure you mine are still greater.
 ~ Albert Einstein

De casus

Hypothese: Alle natuurlijke getallen kunnen berekend worden met behulp van drie wiskundige operatoren

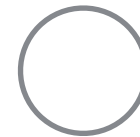
- Number Crunching
- Drie operatoren
- Startgetal 4
- 1 - 100, 1 - 10000
- toestandsruimte



Donald Knuth achter zijn eerste computer

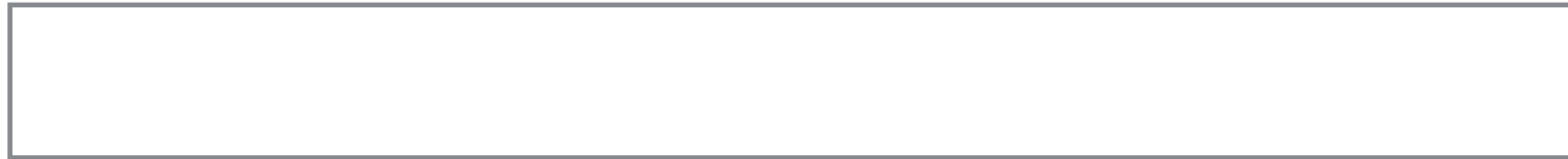
De methode

- Python
- Queue
- Tree
- Breadth-first
- Limiet



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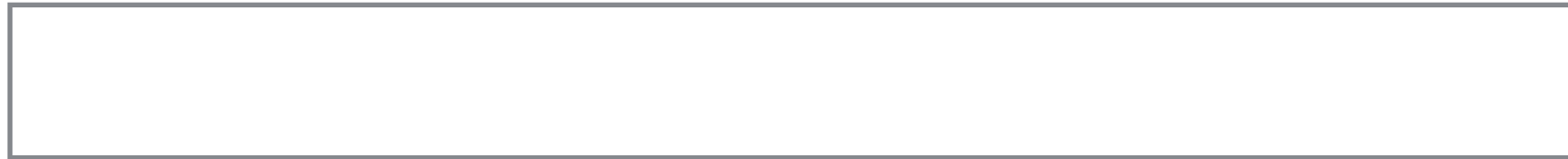
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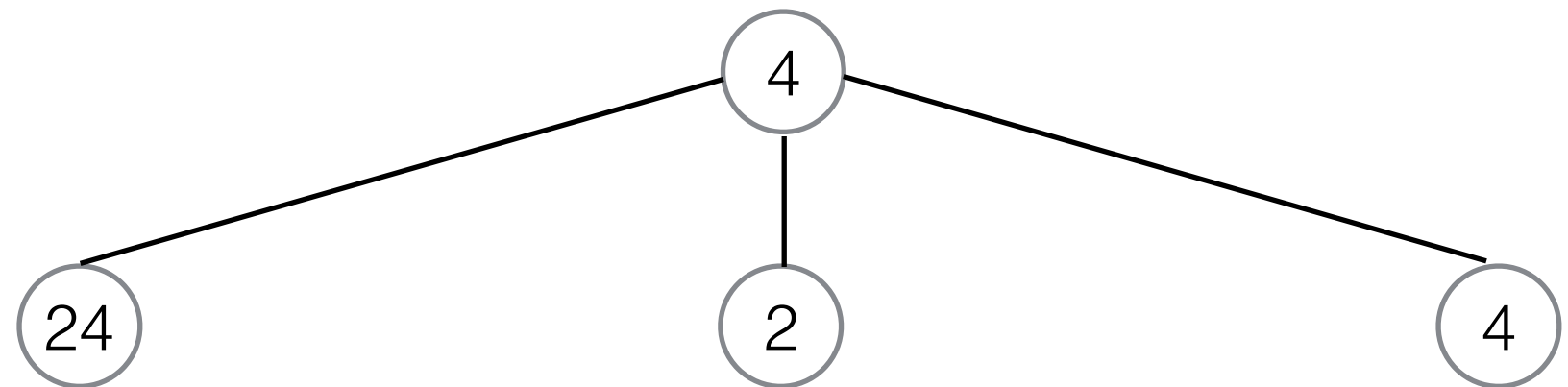
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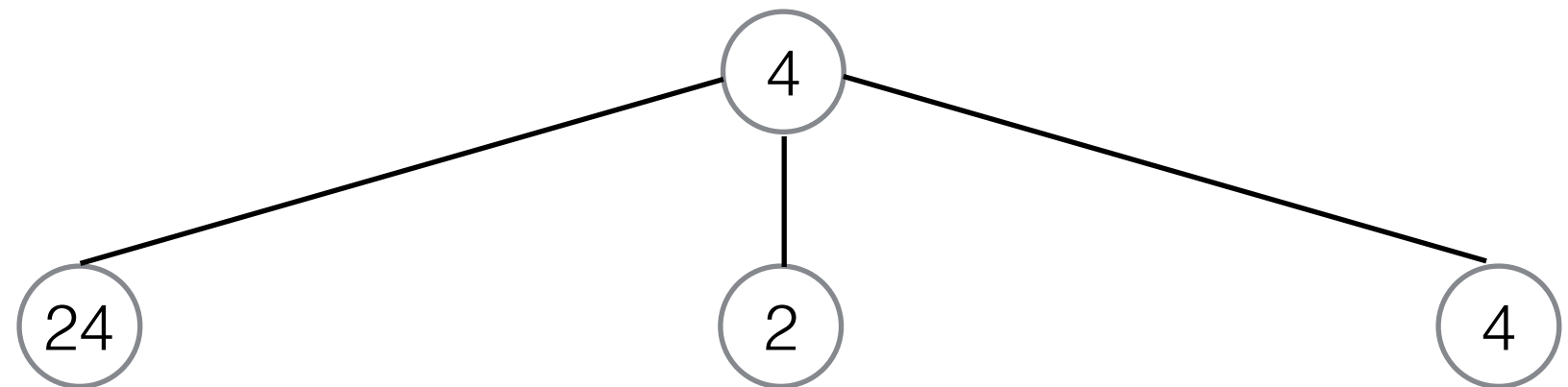
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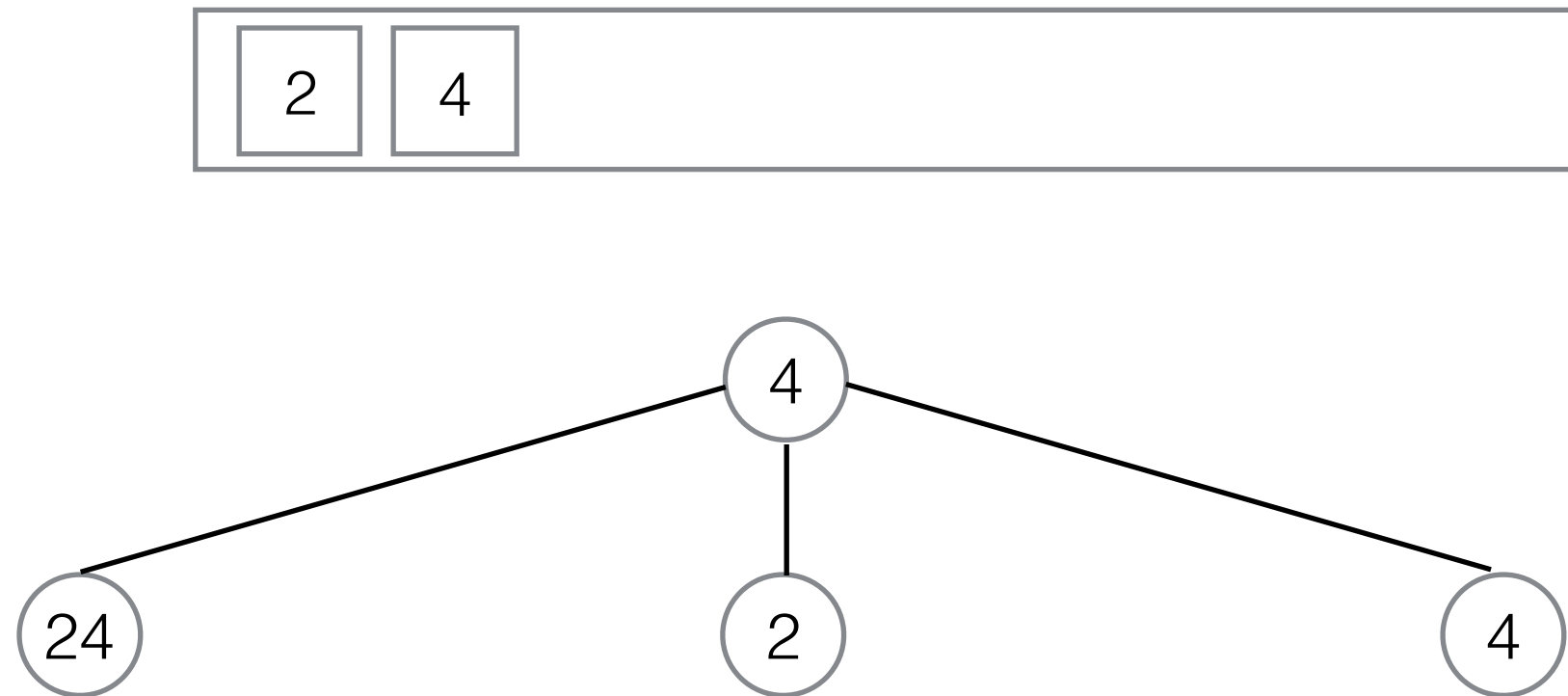
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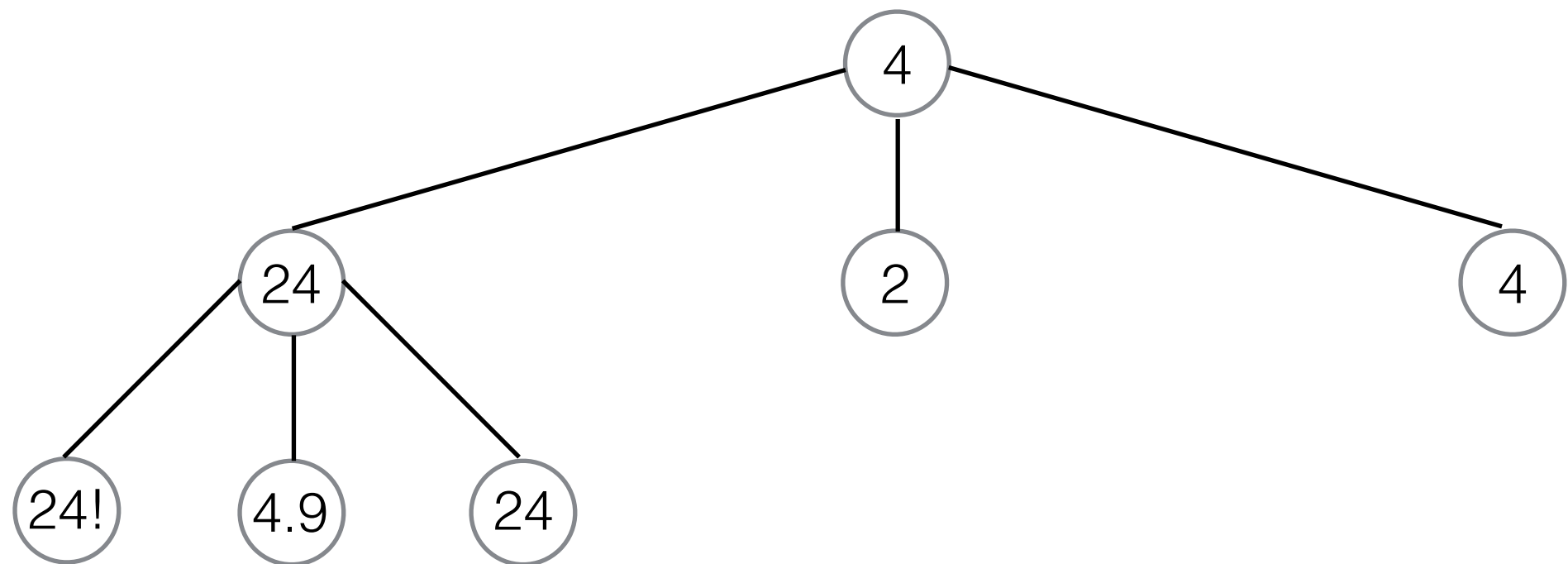
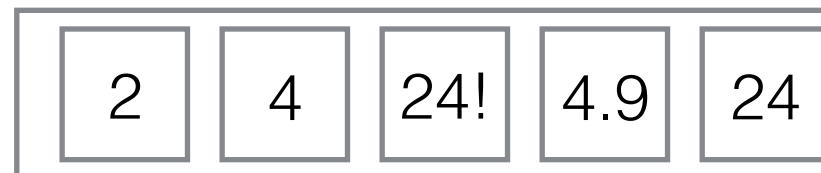
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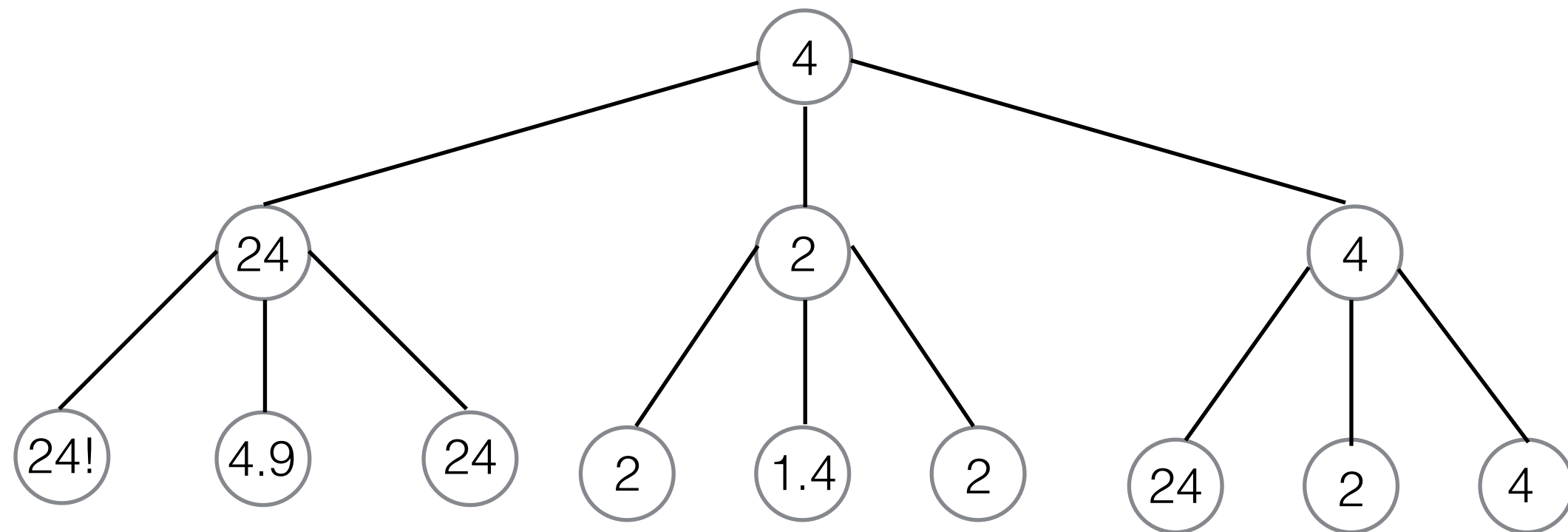
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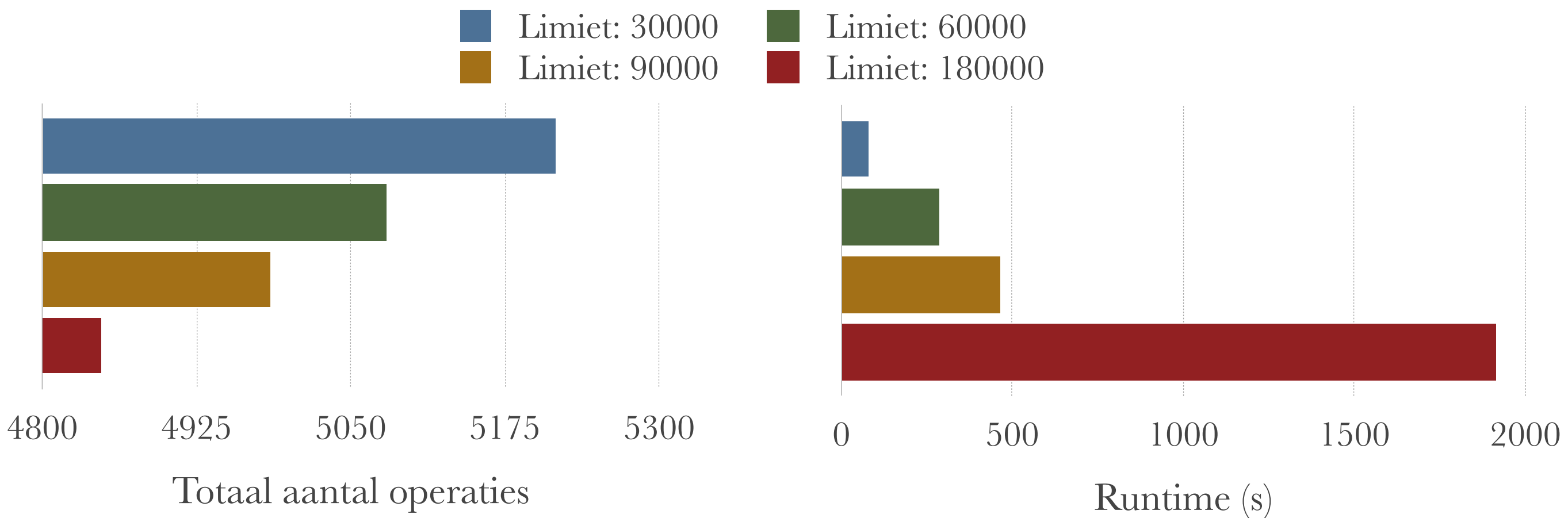


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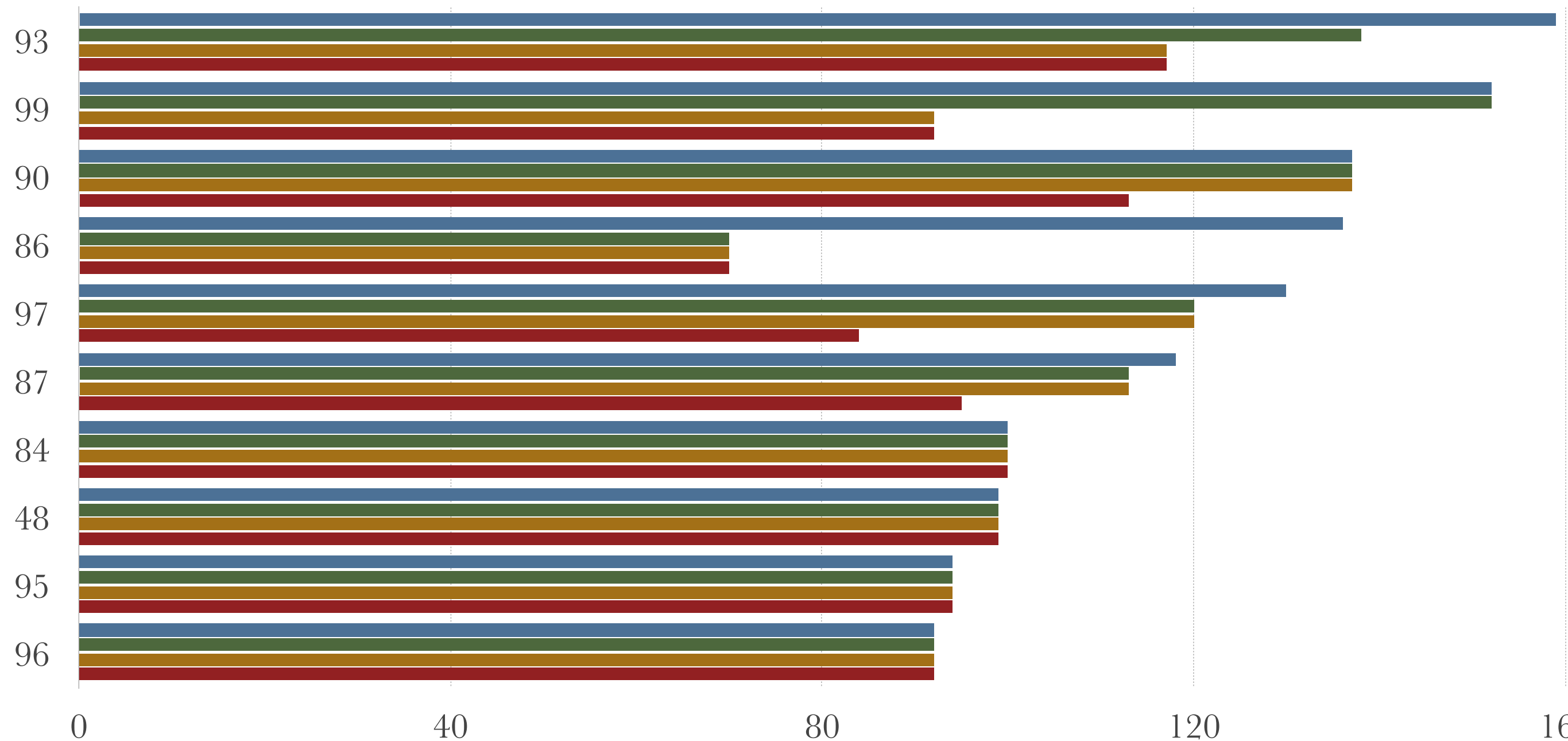
Het resultaat



Het aantal operaties en de runtime van de reeks van 1 - 100 getallen

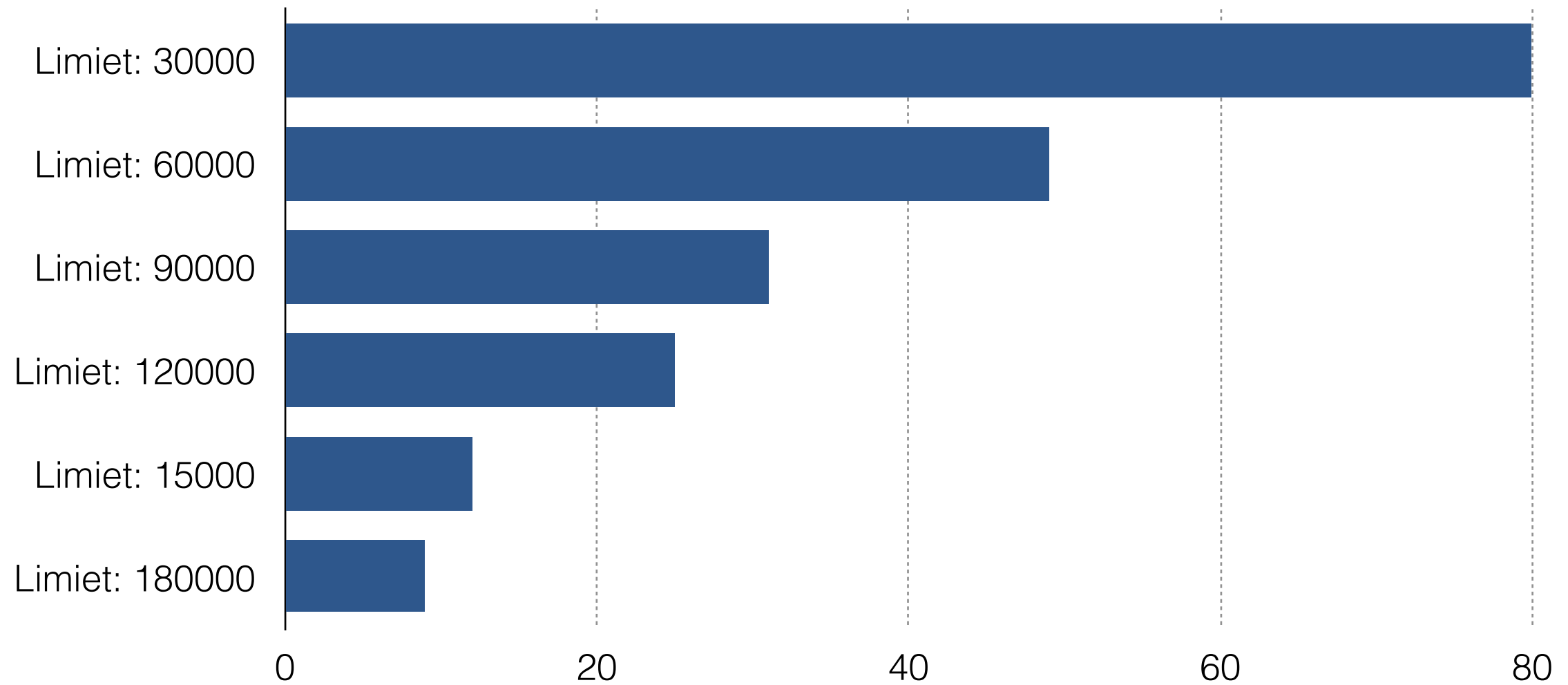
Het resultaat

■ Limiet: 30000 ■ Limiet: 60000 ■ Limiet: 90000 ■ Limiet: 180000



Het aantal operaties voor een aantal getallen uit de reeks van 1 - 100 met verschillende limieten op de faculteit

Het resultaat



Aantal getallen niet gevonden (van 1 - 400)

Conclusie

Het vinden van alle natuurlijke getallen met behulp van de drie wiskundige operatoren is in theorie mogelijk.