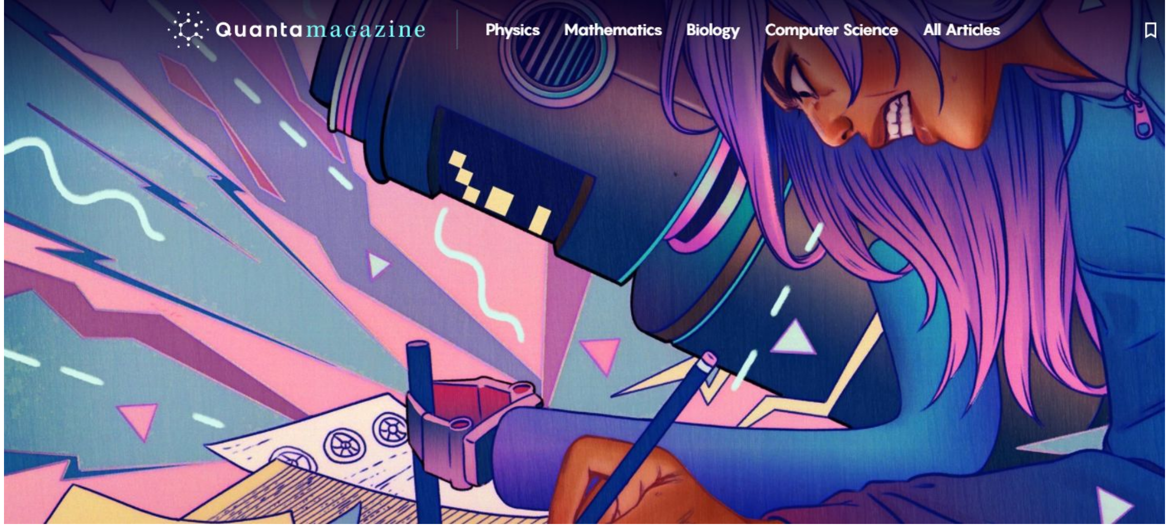
Aug 31 Slides



ARTIFICIAL INTELLIGENCE

How Close Are Computers to Automating Mathematical Reasoning?

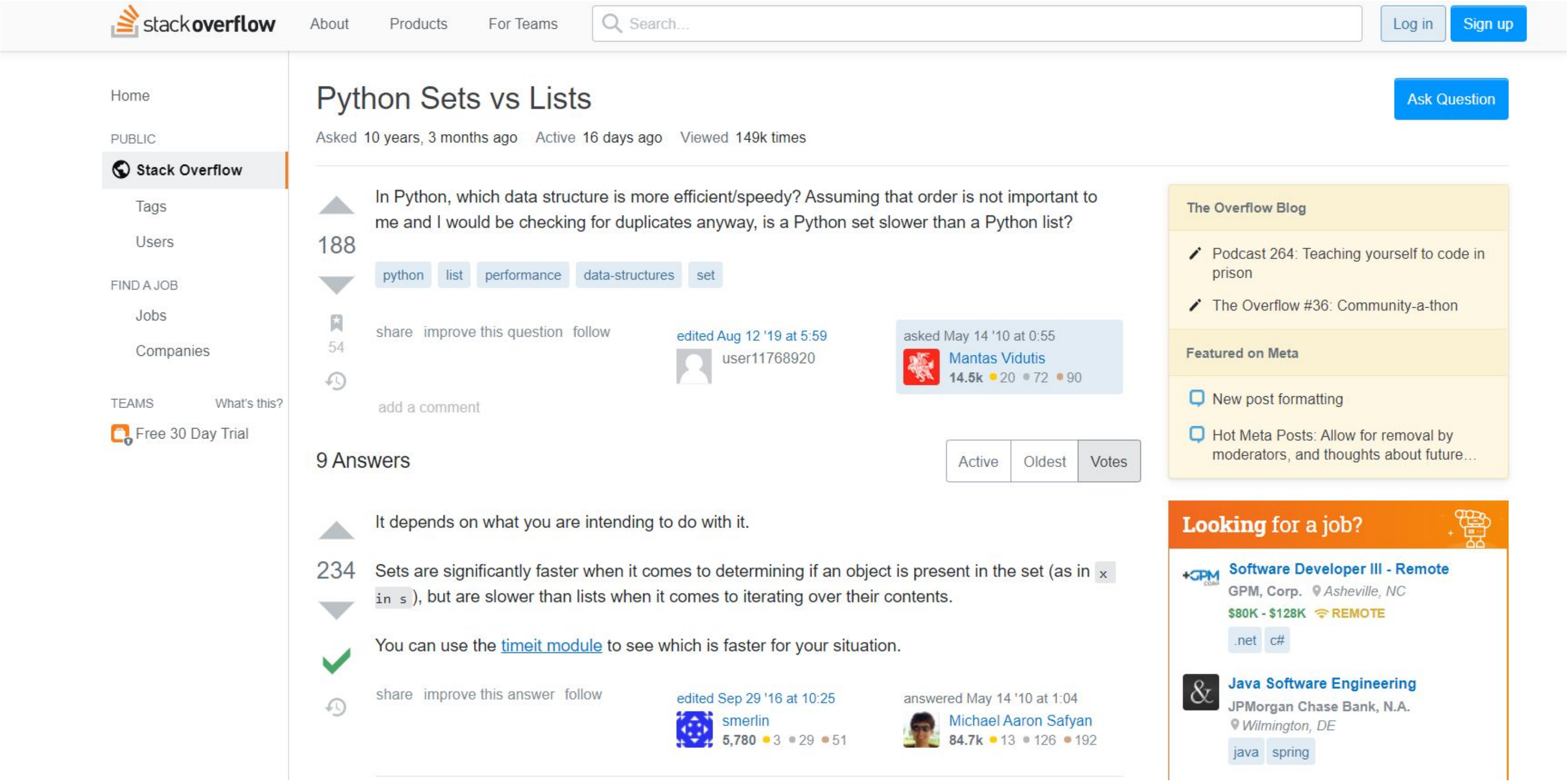
AI tools are shaping next-generation theorem provers, and with them the relationship between math and machine.

> Read article 2

— *By* STEPHEN ORNES

Sets

1.) Definition
2.) ∈
3.) ⊆, ⊂, ⊇, ⊃
4.) Set Cover
5.) ∪, ∩, \



Python Sets vs Lists

Asked 10 years, 3 months ago Active 16 days ago Viewed 149k times

188

In Python, which data structure is more efficient/speedy? Assuming that order is not important to me and I would be checking for duplicates anyway, is a Python set slower than a Python list?

python list performance data-structures set

54

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edited Aug 12 '19 at 5:59
user11768920

asked May 14 '10 at 0:55
Mantas Vidutis
14.5k ● 20 ● 72 ● 90

add a comment

9 Answers

234

It depends on what you are intending to do with it.

Sets are significantly faster when it comes to determining if an object is present in the set (as in `x in s`), but are slower than lists when it comes to iterating over their contents.

You can use the timeit module to see which is faster for your situation.

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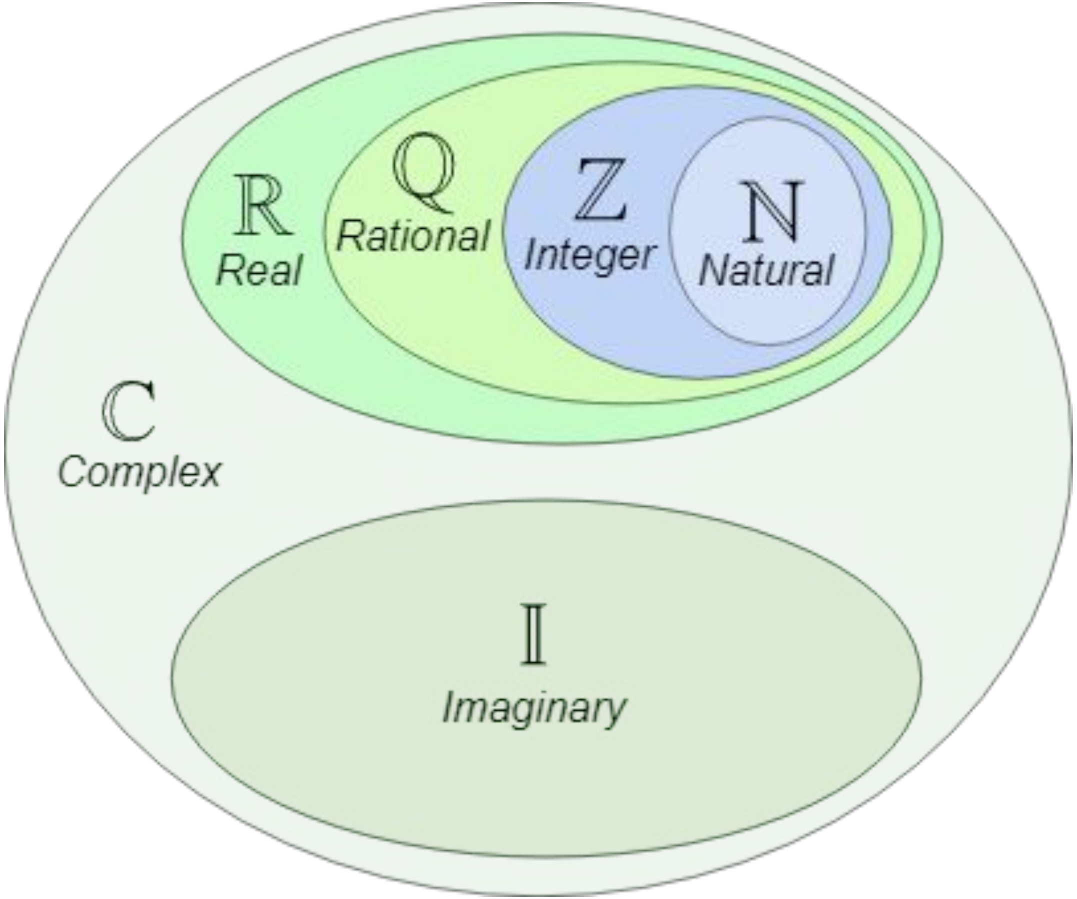
edited Sep 29 '16 at 10:25
smerlin
5,780 ● 3 ● 29 ● 51

answered May 14 '10 at 1:04
Michael Aaron Safyan
84.7k ● 13 ● 126 ● 192

https://www.cs.virginia.edu/luther/2102/F2020/sets.html

7.)



https://www.mathsisfun.com/sets/number-types.html

$$\in$$

“Element of”

$$\in$$

Python: “in”

Java: “contains”

Evaluates to true or false

Examples

$2 \in \{1, 2\}$ = __True___

$3 \in \{1, 2\}$ = __False__

Examples

$2 \in \{1, 2\}$ = ________

$3 \in \{1, 2\}$ = ________

$3 \notin \{1, 2\}$ = ___True___

Question

$\{2\} \in \{1, 2\}$ = ________

Question

$\{2\} \in \{ \{1\}, \{2\} \} \quad = \quad$ __________

2-min Breakout

Evaluate true or false with your breakout partners. *For each problem,* **have a different person start speaking/explaining first**

$\{2\} \in \{ \{1, 2\} \}$ = _________

$\{2\} \in \{ \{2\} \}$ = _________

$\{\{2\}\} \in \{ \{ \{2\} \} \}$ = _________

More Operators

$\in$ checks membership of an element

$\subseteq$, $\subset$, $\supseteq$, $\supset$ compares two sets

$\subseteq$	subset
$\supseteq$	superset
$\subset$	proper subset
$\supset$	proper superset

More Operators

Set A is a ***subset*** of set B

$A \subseteq B$

If & only if **all elements of A are also in B**

More Operators

Set A is a ***proper subset*** of set B

$A \subset B$

If & only if **$A \subseteq B$ and $A \neq B$**

More Operators

Set A is a ***proper subset*** of set B

$A \subset B$

If & only if **$A \subseteq B$ and $A \neq B$**

What are the ***<u>consequences</u>*** of this definition?

Break Outs -- 2 min

Given the three sets: **P = {1, 2, 3}, Q = {2, 3}, R = {1, 3, 4}**

Determine which symbol to insert in each blank so each expression evaluates to true:

P ___ Q = True

P ___ R = True

R ___ Q = True

P ___ P = True

$\subseteq$	subset
$\supseteq$	superset
$\subset$	proper subset
$\supset$	proper superse

Sidebar: Set Cover Problem

A very famous and useful problem in combinatorics and CS! One of the original problems to be proven **NP-Complete.**

One Example: Given a **"universe"** U (big set with everything else in the problem inside) and a set of sets, ***S***

$$U = \{1, 2, 3, 4, 5\}$$

$$S = \{ \{1, 2, 3\}, \{2, 4\}, \{3, 4\} \{4, 5\} \}$$

What is the *minimum number* of sets in S needed to cover everything in U?

∪, ∩, \

∪ **“union”**

∩ **“intersect”**

\ **“difference”**

$\cup$, $\cap$, $\setminus$

$\cup$	**“union”**
$\cap$	**“intersect”**
$\setminus$	**“difference”**