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6 Things I Wish I Knew Earlier About Python Numbers

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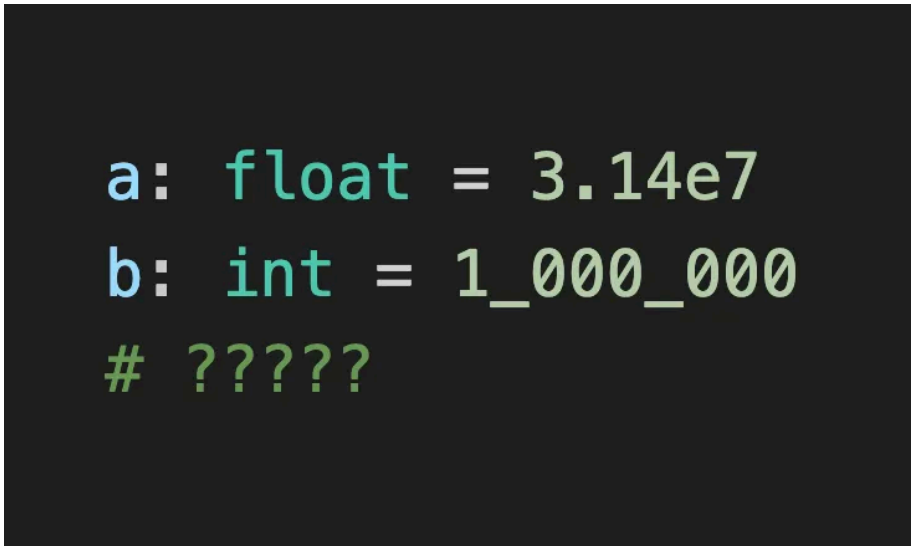
Published in Level Up Coding · 4 min read · Jun 26, 2024



1) We can write numbers using Scientific Notation

In science class, we could write 125000 as 1.25 x 10^5. We can too in Python

```
x: float = 1.25e5

print(x) # 125000.0
```

```
y: float = 3.45e-4

print(y) # 0.000345
```

- `1.25e5` means 1.25 * 10 ^ 5 (which is 100000)

- `3.45e-4` means 3.45 * 10 ^ -4 (which is 0.0001)

With this, we can easily type out very large and very small numbers without having to ensure that we've typed the correct number of zeros.

2) We can insert underscores in our numbers

so that we can *group* zeros together to make our number easier to read

```
x: int = 1_000_000_000

print(x) # 1000000000
```

^ here, we put one `_` between every 3 zeros so that we can tell at first glance that this is 1 billion.

```
y: int = 1_0_0_00_000

print(y) # 10000000
```

^ note that it is *not compulsory* to have 3 zeros per group. We can have as many zeros per group as we want, but I just stick with 3 because it's the easiest to read.

3) We can round() to negative decimal places

when we `round()` a number to -2 decimal places, we round our number to the nearest 100.

```
x: int = 123456

print(round(x, -2)) # 123500
```

when we `round()` a number to -3 decimal places, we round our number to the nearest 1000.

```
x: int = 123456

print(round(x, -3)) # 123000
```

when we `round()` a number to -4 decimal places, we round our number to the nearest 10000.

```
x: int = 123456

print(round(x, -4)) # 120000
```

4) We can use divmod() to perform // and % concurrently

```
a, b = divmod(57, 10)

print(a) # 5
print(b) # 7
```

The built-in `divmod(a, b)` function takes in 2 integers `a` and `b`, and returns a tuple containing `(quotient, remainder)`

- 57 divided by 10 is 5 (quotient), with a remainder of 7
- when we do `a // b`, we get the *quotient*
- when we do `a % b`, we get the *remainder*

The `divmod` function allows us to do this concurrently, thus saving us one line of code whenever we need to do `//` and `%` at the same time.

5) Positive and negative infinity

When we do `float('inf')`, we actually get positive infinity.

```
x: float = float('inf')

print(x) # inf
```

And when we do `float('-inf')`, we get negative infinity.

```
y: float = float('-inf')

print(y) # -inf
```

Positive infinity is larger than all other numbers, while negative infinity is smalle rthan all other numbers.

```
x: float = float('inf')

print(x > 1)          # True
print(x > 1_000_000)  # True
print(x > 3.14e100)   # True
```

```
y: float = float('-inf')

print(y < -1)          # True
print(y < -1_000_000)  # True
print(y < -1e1000)     # True
```

We can use positive of negative infinity if we ever need a number that is larger/smaller than all other numbers

6) The built-in decimal module

Python has a built-in `decimal` module that we can simply import, and it provides functionality to deal with decimal numbers

```
from decimal import Decimal

a: Decimal = Decimal(1) / Decimal(3)

print(a) # 0.33333333333333333333333333333
```

But why would we use this over normal `float` numbers?

- `float` numbers are approximate
- `float` numbers might have floating point inaccuracy
- `Decimals` are designed to be more precise

```
a: float = 2.0
b: float = 2.000000000000000000000001

print(a == b) # True
```

^ above a certain point, floating point inaccuracy kicks in, which might be problematic for tiny numbers.

7) (bonus) Complex numbers

Remember in math class where we had to deal with this weird concept known as complex numbers? We can do this in Python too.

```
a: complex = complex(5, 7)

print(a)        # (5+7j)
print(type(a))  # <class 'complex'>
```

^ here, `5 + 7j` means *5 + 7i (real 5 + imaginary 7)*

```
a: complex = complex(5, 7)

print(a.real)  # 5.0
print(a.imag)  # 7.0
```

^ we can use the `.real` and `.imag` to extract the real and imaginary components of our imaginary number.

```
import cmath
```

^ we can import the built-in `cmath` module to perform various complex number operations (which I won't go into detail here)

I've never used this at work before (why would I lol), but this was an interesting fact to know anyway.

Complimentary Python Joke

> What's the scariest data type?
>
> BOO-lean

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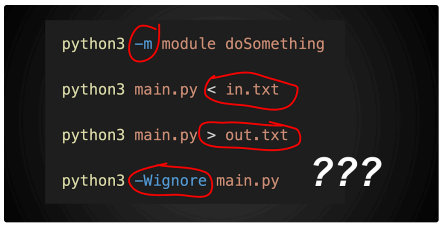

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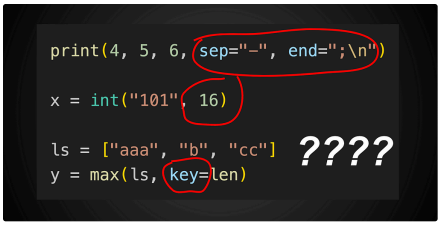

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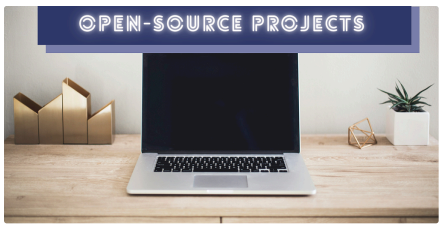

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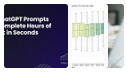

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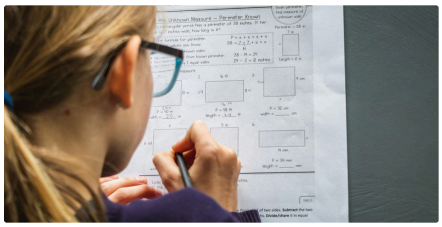

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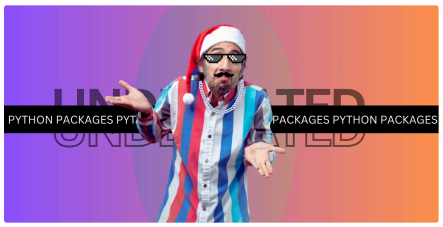

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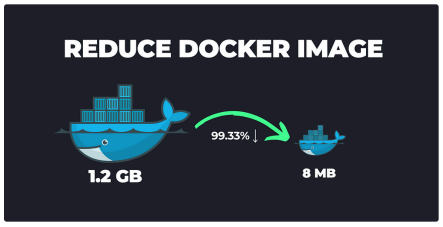

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