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Python Debugger And `breakpoint()` Explained in 30 Seconds

Something EVERY Python programmer must know



Liu Zuo Lin · Following

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```
def magic(n):
    a = n + 1
    b = a * 10
    msg = f"number={b}"
    breakpoint()
    return msg
```

So how exactly does Python's built-in debugger help us?

It allows us to pause our program, and check what existing variables are

Why would we use this instead of the `print()` statement?

I mean you can, but does it not get annoying to rewrite so many `print()`'s?

The more complicated our program gets, the more useful `breakpoint()` becomes and the less useful `print()` becomes

Note — this is built into Python, and we don't need to install/import anything.

A simple basic fundamental example

We have a simple function, but let's pretend it's complicated.

```
def magic(n):
    var1 = n + 1
    var2 = var1 * 10
    msg = f"number={var2}"
    return msg
print(magic(4))      # number=50
```

And let's say after the line `msg = f"number={b}"`, we want to check the variables `a`, `b` and `msg`. We can add a breakpoint there.

```
def magic(n):
    var1 = n + 1
    var2 = var1 * 10
    msg = f"number={var2}"
    breakpoint()
    return msg
print(magic(4))
```

By adding a `breakpoint()` there:

- when we run our Python code like normal in terminal eg. `python test.py`, our program will pause at the breakpoint
- when our program pauses, the Python debugger appears in our terminal
- when the Python debugger appears, we see something like this

```
> /Users/lzl/Documents/repos/test/b.py(11)magic()
-> return msg
(Pdb)
```

- We see this `(Pdb)` thing, which means “Python Debugger”
- it is waiting for us to enter something
- now, we can enter the existing variables to check their values.

- let's enter `var1` and hit Enter to check its value

```
> /Users/lzl/Documents/repos/test/b.py(11)magic()
-> return msg
(Pdb) var1
5
(Pdb)
```

- Notice that 5 appears — correct as we pass in `magic(4)`, and `4+1` is 5
- Next, let's enter `var2` and hit Enter to check its value

```
> /Users/lzl/Documents/repos/test/b.py(11)magic()
-> return msg
(Pdb) var1
5
(Pdb) var2
50
(Pdb)
```

- Notice that 50 appears — correct as `5*10` is 50

Next, let's say that we're done inspecting our variables. And we want to continue with our program.

We can unpause our program by using a special Python debugger command `c` (meaning continue)

And if we enter `c` and hit Enter, our Python program continues, and we get our final output.

```
-> return msg
(Pdb) var1
5
(Pdb) var2
50
(Pdb) c
number=50
```

Note — `-> return msg` means that the line `return msg` is the next line that runs if we continue our program.

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- `c` (continue) — continue running the program until the end or the next breakpoint
- `h` (help) — prints all Python debugger commands
- `n` (next) — execute the *next line* and stop there

Python docs Read in full:

<https://docs.python.org/3/library/pdb.html#debugger-commands>

Try it out

```
def magic():
    fruit = "apple"
    breakpoint()
    fruit = "orange"
    fruit = "pear"
    breakpoint()
    fruit = "pineapple"
    return fruit
```

Run this code, and play around with the `c` and `n` commands before looking at the other commands.

Conclusion

Hopefully this was clear and easy to understand

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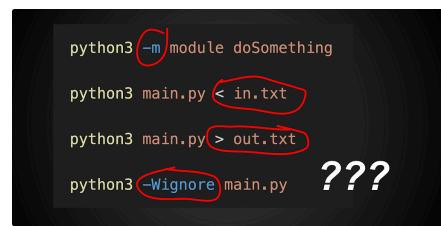
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print(4, 5, 6, sep="-", end="\n")
x = int("101", 16)
ls = ["aaa", "bb", "cc"] ???
y = max(ls, key=len)
```

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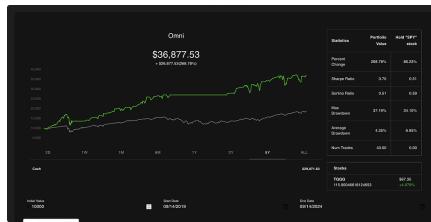
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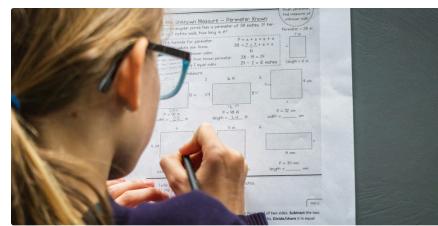
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