

# 100 Days of DevOps — Day 81-Debugging Python Code

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Welcome to Day 81 of 100 Days of DevOps, Focus for today is Debugging Python Code

Logging is a great way to debug our code, normal way to do that is to add a print() in your code but Python provides logging module which help us to debug what happens in our code and in which order. In order to enable logging to add the below entry in your code

```
import logging
# This is setup code to enable logging in Python
logging.basicConfig(level=logging.DEBUG, format='%(asctime)s -%(levelname)s - %(message)s')
```

To illustrate logging let's take a simple example where I am going to add the first five number

```
>>> 1+2+3+4+5
15
Now let's do it with the help of Python Code
sum = 1
for i in range(1,6):
    sum = sum + i
print(sum)
```

Output is 16 which is wrong it should be 15 so there is some sort of bug in this code

```
16
```

After enable logging

```
import logging
logging.basicConfig(level=logging.DEBUG, format='%(asctime)s -%(levelname)s - %(message)s')
logging.debug("Start of Program")
sum = 1
for i in range(1,6):
    logging.debug("Value of i is (%s)" % (i))
    sum = sum + i
    logging.debug("Value of i is (%s), Value of sum is (%s)" % (i,sum))
print(sum)
logging.debug("End of Program")
```

The output looks like this, as you can see here even at first iteration for i = 1 sum =2 which is wrong so sum declaration is wrong and it should be set to zero(sum=0)

```
2017-04-17 16:51:20,810 -DEBUG - Start of Program
2017-04-17 16:51:20,810 -DEBUG - Value of i is (1)
2017-04-17 16:51:20,810 -DEBUG - Value of i is (1), Value of sum is (2)
2017-04-17 16:51:20,811 -DEBUG - Value of i is (2)
2017-04-17 16:51:20,811 -DEBUG - Value of i is (2), Value of sum is (4)
2017-04-17 16:51:20,811 -DEBUG - Value of i is (3)
2017-04-17 16:51:20,811 -DEBUG - Value of i is (3), Value of sum is (7)
2017-04-17 16:51:20,811 -DEBUG - Value of i is (4)
2017-04-17 16:51:20,811 -DEBUG - Value of i is (4), Value of sum is (11)
2017-04-17 16:51:20,811 -DEBUG - Value of i is (5)
2017-04-17 16:51:20,811 -DEBUG - Value of i is (5), Value of sum is (16)
2017-04-17 16:51:20,811 -DEBUG - End of Program
```

So the program should look like

```
sum = 0
for i in range(1,6):
    sum = sum + i
print(sum)
```

Output

```
15
```

In order to disable logging, we need to add this at the start of the program

```
logging.disable(logging.CRITICAL)
```

Doing this is much easier when comparing with adding a print statement and the reason for that it's difficult to remove print when we are done with debugging (by mistake we might remove the print which outputting the program output)

There are five log levels going from lowest to highest

debug	lowest
info	
warning	
error	
critical	highest

```
#Different logging level
>>> logging.DEBUG
10
>>> logging.INFO
20
>>> logging.WARNING
30
>>> logging.ERROR
40
>>> logging.CRITICAL
50
```

Instead of logging all these messages to console we can redirect it to a file using filename directive

```
logging.basicConfig(filename='debugfile', level=logging.DEBUG,
format='%(asctime)s -%(levelname)s - %(message)s')
cat debugfile
2017-04-17 21:57:20,101 -DEBUG - Start of Program
2017-04-17 21:57:20,101 -DEBUG - Value of i is (1)
2017-04-17 21:57:20,101 -DEBUG - Value of i is (1), Value of sum is (1)
2017-04-17 21:57:20,101 -DEBUG - Value of i is (2)
2017-04-17 21:57:20,101 -DEBUG - Value of i is (2), Value of sum is (3)
2017-04-17 21:57:20,101 -DEBUG - Value of i is (3)
2017-04-17 21:57:20,101 -DEBUG - Value of i is (3), Value of sum is (6)
2017-04-17 21:57:20,101 -DEBUG - Value of i is (4)
2017-04-17 21:57:20,101 -DEBUG - Value of i is (4), Value of sum is (10)
2017-04-17 21:57:20,101 -DEBUG - Value of i is (5)
2017-04-17 21:57:20,101 -DEBUG - Value of i is (5), Value of sum is (15)
2017-04-17 21:57:20,101 -DEBUG - End of Program
```

## Python Debugger(pdb)

Advantage of pdb is it allows a program to pause execution and give user a chance to run the code and inspect the variable and step through code

Let look at this simple program, it's similar to what illustrated with logging example

```
import pdb
val = [1,2,3,4,5]
for i in val:
    sum = 0
    sum = sum + i
print(sum)
```

The output of this program is wrong it's supposed to be 15

```
5
```

So let's try to debug it via pdb

```
import pdb
val = [1,2,3,4,5]
for i in val:
    sum = 0
    sum = sum + i
    pdb.set_trace()
print(sum)
```

Under pdb

To get the list of command supported by pdb(type h → help)

```
(Pdb) h
Documented commands (type help <topic>):
=====
EOF      c      d      h      list   q      rv      undisplay
a        c!     debug help   ll      quit   s      unt
alias    clear disable ignore  ll      quit   s      unt
args     commands display interact n      restart step up
b        condition down j      next   return tbreak w
break    cont  enable jump  p      retval u      whatis
bt       continue exit   l      pp      run    unalias where

Miscellaneous help topics:
=====
exec  pdb
```

Coming back to our problem

```
-> for i in val:
(Pdb) i # Checking the value of the i
1
(Pdb) sum # Checking the value of the sum
1
(Pdb) c #c is the abbreviation of continue
-> for i in val:
(Pdb) i
2
(Pdb) sum
2
(Pdb)
```

So here we found out that the value of sum is not incrementing

To fix this problem we declared sum outside the loop

```
import pdb
val = [1,2,3,4,5]
sum = 0
for i in val:
    sum = sum + i
print(sum)
```

Now the output is equal to

```
15
```

Looking forward from you guys to join this journey and spend a minimum an hour every day for the next 100 days on DevOps work and post your progress using any of the below medium.

- Twitter: [@100daysofdevops](#) OR [@lakhera2015](#)
- Facebook: <https://www.facebook.com/groups/795382630808645/>
- Medium: <https://medium.com/@devopslearning>
- Slack: <https://devops-myworld.slack.com/messages/CF41EFG49/>
- GitHub Link:<https://github.com/100daysofdevops>

## Reference

100 Days of DevOps — Day 0

D-day is just one day away and finally, this is a continuation of the post(I posted a month earlier)

medium.com

100 Days of DevOps — Day 80-Python Unit Testing(Pytest)

Welcome to Day 80 of 100 Days of DevOps, Focus for today is Python Unit Testing(Pytest)

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16

1

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16

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