Lab 08 Debugging

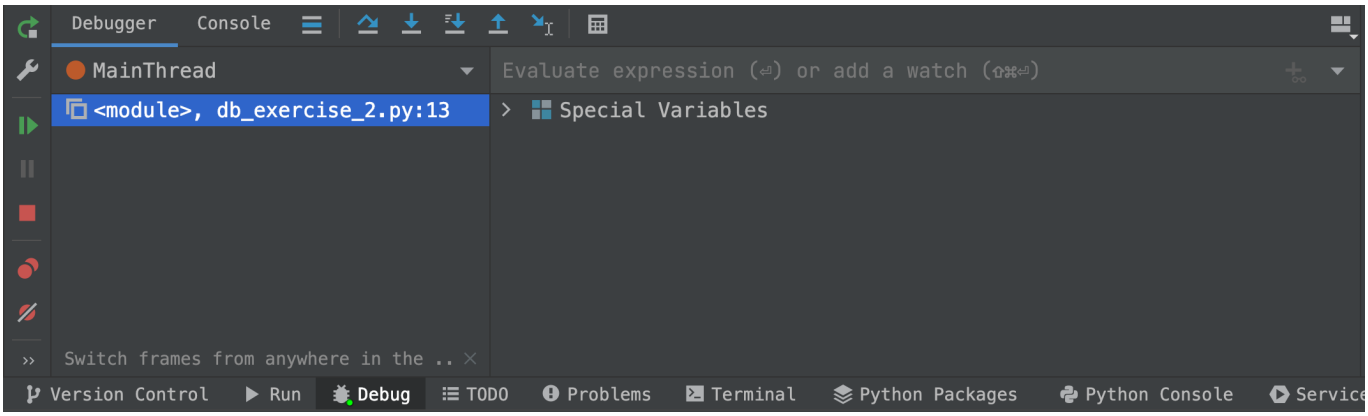
Setup

Download the git repository using the following command:

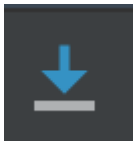
```
git clone https://gitlab.csc.tntech.edu/csc2310-fa22-
students/<%userid%>/<%userid%>-lab-08-debugging.git
```

replacing `%userid%` with your own TNTech issued userid.

The python debugger in PyCharm has two main windows: the stack area (left) and the variable display area (right)



The debugger has several basic features that support controlling the debugger, including:

- Resume: 
- Step Over: 
- Step Into: 

Step through function and changing the value of a variable

The first exercise demonstrates how the debugger can be used to step through a program. A key feature of debuggers is the use of breakpoints.

- Load `db_exercise_1.py` and create a run configuration
- Set a breakpoint on line 1
- Start the debugger by clicking the bug icon
- Step through the program to see the program display `hello alice`

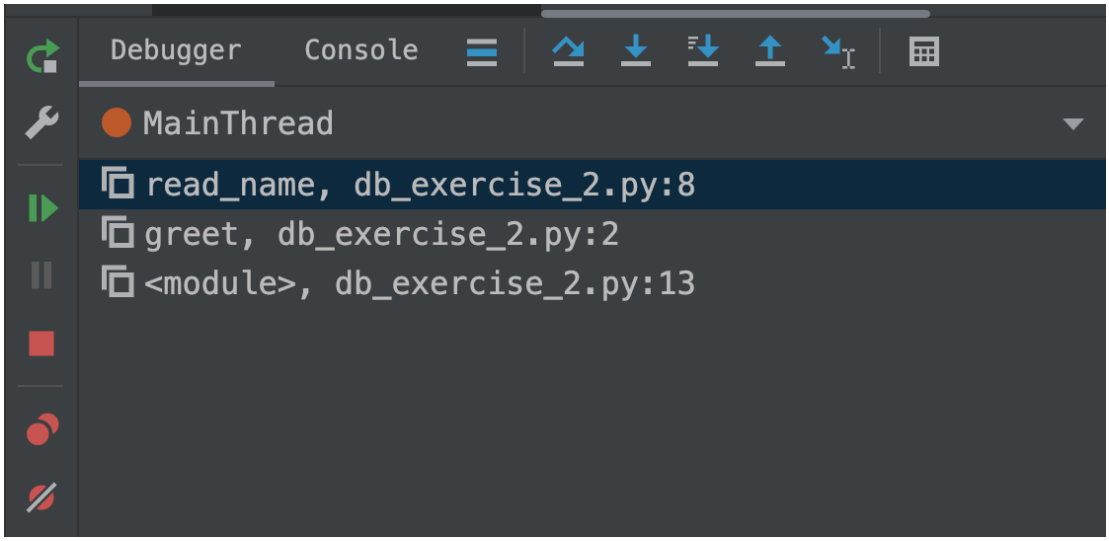
Using the same program, use the debugger to change the value of a variable in a program.

- Restart the program with a breakpoint on line 1
- Find the variable information for the `name` variable in the lower right-hand area of PyCharm
- Right-click the entry and select "Set Value"
- Set the value to `bob`
- Click `Resume`

Step into

The "Step Into" feature allows you to navigate into a called function. The debugger has a stack frame that allows you to see a trace of the methods called in the program.

- Load `db_exercise_2.py` and create a run configuration
- Set a breakpoint at Line 13
- Click the `Step Into` button; the program should enter the `greet` function
    - Continue by also using `Step Into` to enter the `read_name` method
    - Make note of the stack on the left-hand side of the debugging frame



    - The top of the stack should be `read_name` followed by `greet`
- Select `Step Over` and switch to the `Console` tab to enter a name
- Click `Resume`

Finding problems

The primary reason of using a debugger is to identify problems. This exercise demonstrates the power of the debugger in addressing code issues.

- Load `db_exercise_3.py` and create a run configuration; set the inputs for the program to `1` and `50`
- Inspect the code at Line 5. Based on this, what do you expect the output of the program to be?
- Run the program (rather than debugging) to observe the result
- Set a breakpoint at Line 9 and `Step Over` lines 9 and 10.
    - What are the values and types of the variables `a` and `b`?

- Restart the program with the same breakpoints
    - When you reach line 9, `Step Over` the line and then set the value to integer value 1
    - When you reach line 10, `Step Over` the line and then set the value to integer value 50
- Click `Resume` and repeat until the program produces 101 as the output
- Correct the program. Hint: `int(v)` converts variable `v` into an integer.

Finding more problems

`db_exercise_4.py` contains an error. Use the debugger to correct the program so that it executes in all cases, including the error case.

Turn-in

The files `db_exercise_3.py` and `db_exercise_4.py` must be corrected and pushed back to the repo.

```
git add .
git commit -m "Corrected code"
git push -u origin master
```

The lab is worth 20 points and is due 1 week after assigned.