Using IDLE

Basic use of IDLE

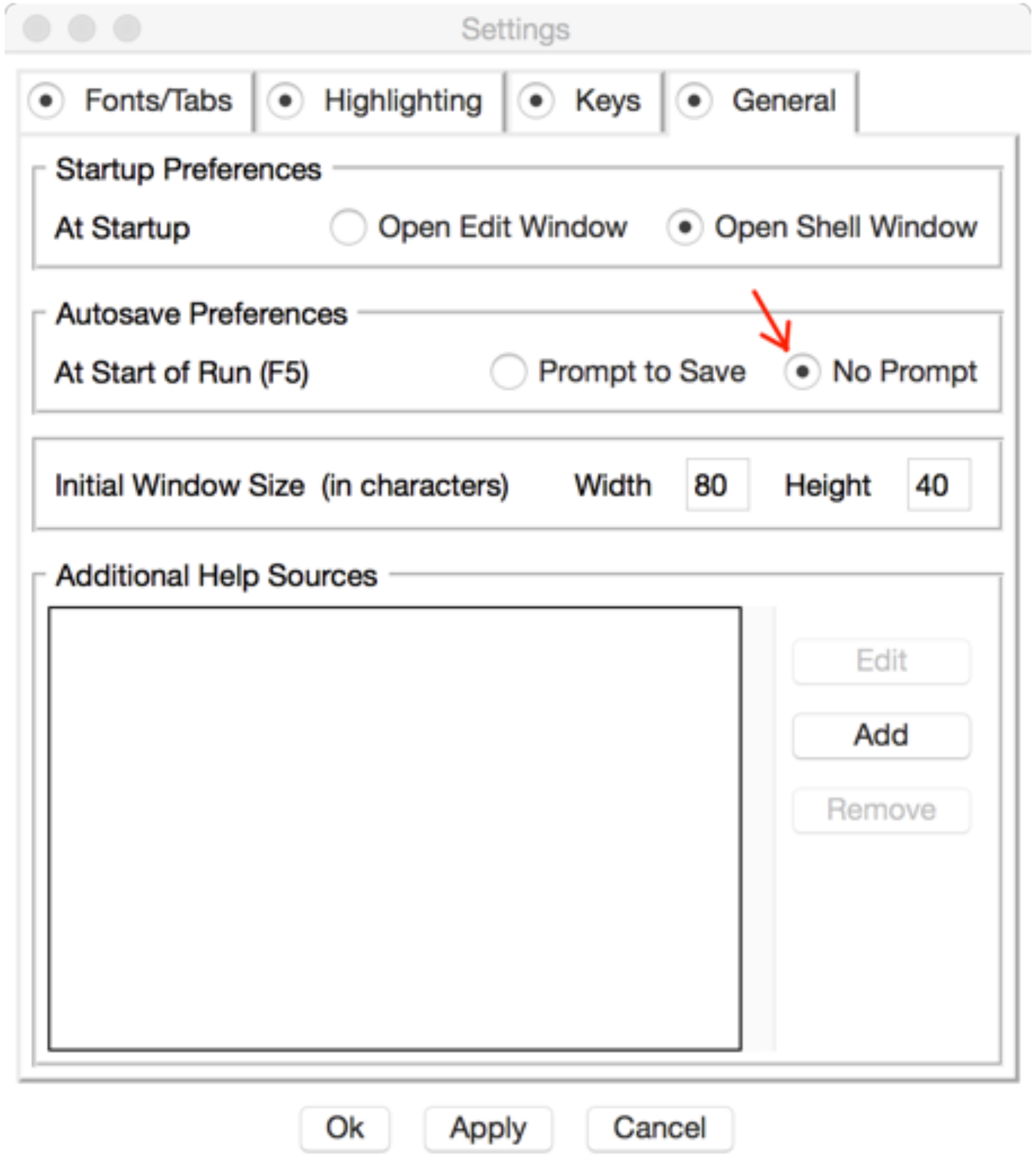
- Start IDLE
  - You can type simple expressions and code directly into the “shell” window that comes up
  - You can use the up-arrow to go back and repeat previous lines
  - This is convenient for trying things out, or to use as a calculator, but not good for writing entire programs
- Create a new program (with the **New File** menu item, *control-N*) or open an existing program (with the **Open...** menu item, *control-O*)
  - There is also a **Recent Files** menu item you can use
- Edit the program, then run it using **Run > Run Module**, or just hit the **F5** key
  - Notice that some of the menus are different from those in the shell window

Setting edit preferences

- The font you use can help or hinder your programming
  - It's important to distinguish `0` from `O`, `1` from `I` and `l` and `|` and `!`, `()` from `[]` and `{}`
    - Here are these same characters in Courier New: `0 O 1 I l | ! ( ) [ ] { }`
  - Also, it's helpful if punctuation marks are emphasized, especially `. , : ;`
  - My favorite font is Consolas; see `http://www.slant.co/topics/67/~what-are-the-best-programming-fonts` for some suggestions
- In programming, ***a tab is an actual character***, representing some undefined but settable number of spaces
  - By default, when you hit the tab key, IDLE puts in four spaces, not an actual tab
  - If you use ***any other editor*** for your programs, be sure to do the same!

Autosave

- When you edit a program and hit F5 to run it, IDLE asks you if you want to save first
  - I find this annoying


Settings

Fonts/Tabs | Highlighting | Keys | [✓ General]

Startup Preferences

At Startup: Open Edit Window [✓ Open Shell Window]

Autosave Preferences

At Start of Run (F5): Prompt to Save [✓ No Prompt]

Initial Window Size (in characters) Width 80 Height 40

Additional Help Sources

Stopping a runaway program

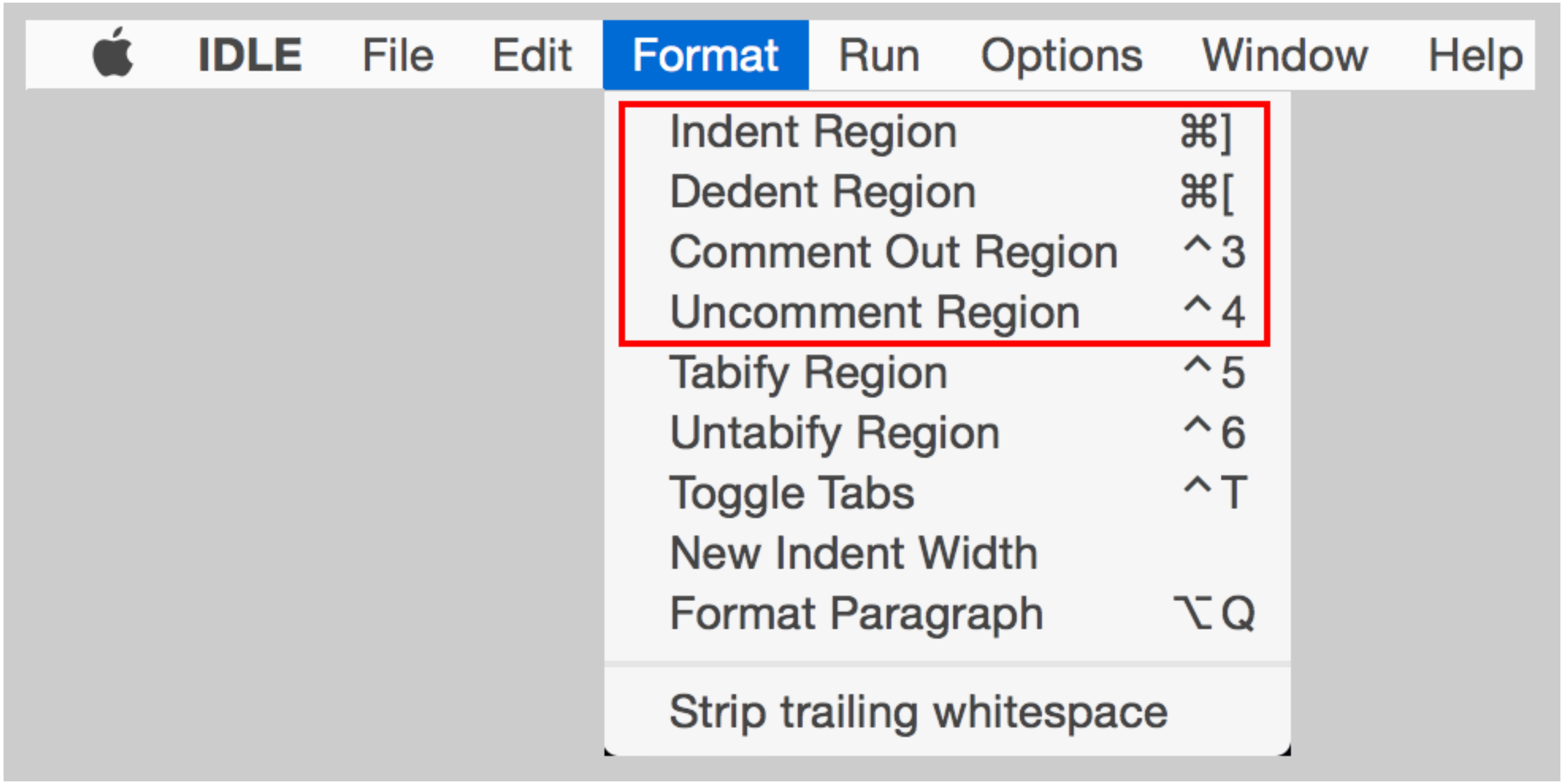
- A program error can sometimes lead to an ***infinite loop***, that is, code that can never stop

  -
    ```
    i = 1
    while i < 100:
        print(i, i * i)
    ```

  - The error here is that there is nothing in the loop to change the value of `i`, so it's always less than 100

- To stop a runaway program, go to **Shell > Restart Shell** or enter **control-F6**

Formatting commands



Line numbers

- In the editing window, the line number that your cursor is on is displayed in the bottom right-hand corner
    - This isn’t particularly convenient, but it’s what IDLE has
- In editing window, you can also choose:
  Edit > Go to line

Starting the debugger

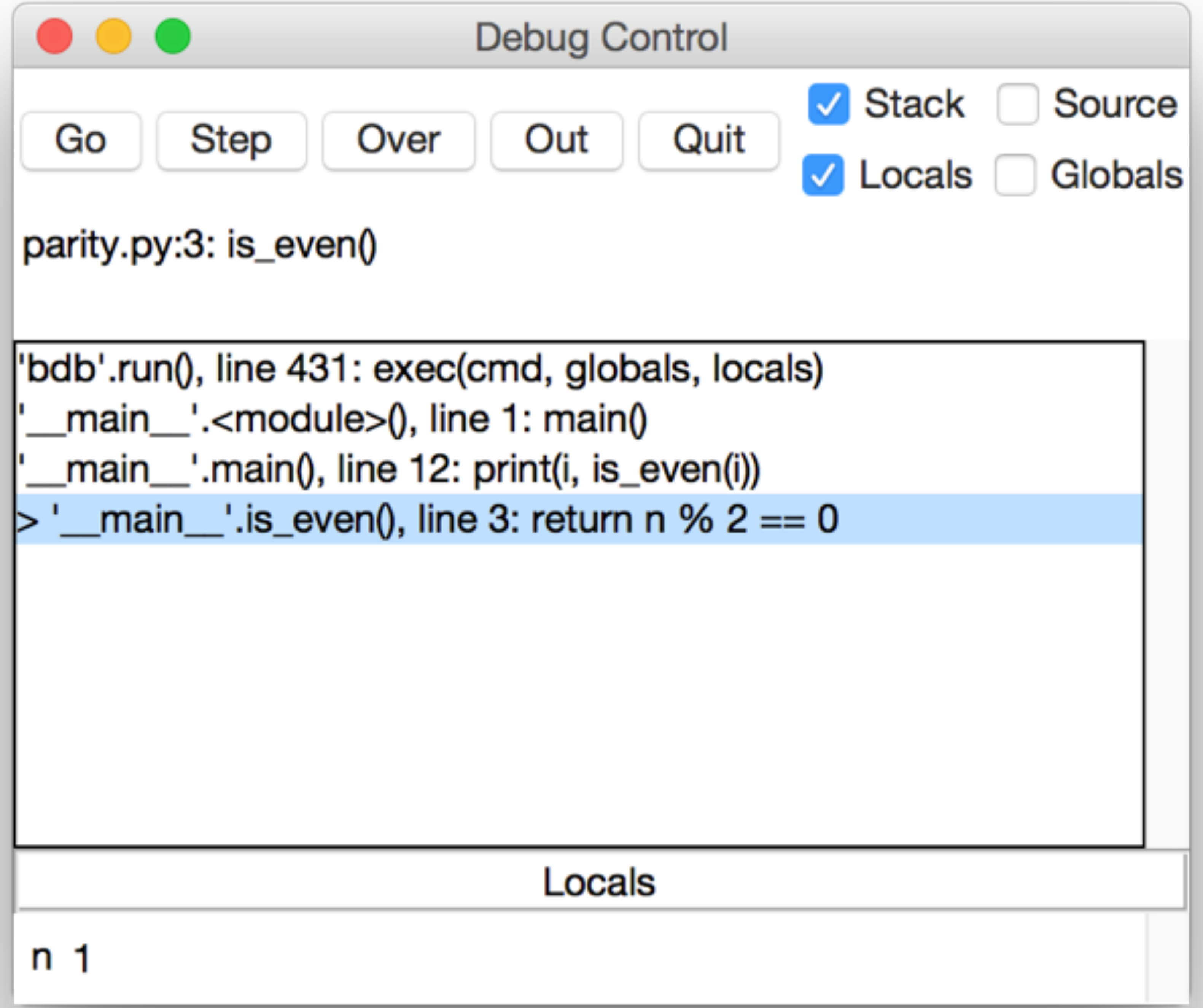
- The debugger allows you to step through your program, one statement at a time, to see what it is doing
- Load the program (with **F5**) but don't automatically run it
- From the **Debug** menu, choose **Debugger**
- Then, enter a function call (such as `main()`)
-
```
>>>
[DEBUG ON]
>>> main()
```

Running the debugger

```python
def is_even(n):
    """Test if the argument is even"""
    return n % 2 == 0

def main():
    for i in range(1, 6):
        print(i, is_even(i))
```

- Use the Debugger buttons
  - **Step**: Next statement
  - **Over**: Skip over the function call
  - **Out**: Skip out of current function
  - **Go**: Finish running



✓ Stack ☐ Source
✓ Locals ☐ Globals

```
parity.py:3: is_even()

'bdb'.run(), line 431: exec(cmd, globals, locals)
'__main__'.<module>(), line 1: main()
'__main__'.main(), line 12: print(i, is_even(i))
> '__main__'.is_even(), line 3: return n % 2 == 0

n 1
```

Help

- The IDLE **Help** menu provides:
  - **IDLE Help** -- Text only, possibly helpful if you need to figure out what a menu item does
  - **Python Docs** -- Links to a ***very*** useful online web page
    - **Library Reference** -- All the common methods you are likely to want to use
    - **Language Reference** -- Descriptions of the syntax and semantics of Python itself
  - **Turtle Demo** -- Examples of Python programs that use "Turtle graphics," which will not be covered in this course

The End

As soon as we started programming, we found to our surprise that it wasn't as easy to get programs right as we had thought. Debugging had to be discovered. I can remember the exact instant when I realized that a large part of my life from then on was going to be spent in finding mistakes in my own programs.

— Maurice Wilkes discovers debugging, 1949