DEBUGGING AND INDEFINITE LOOPS

CSSE 120—Rose Hulman Institute of Technology

Exam 1

- Questions?
- Solutions are posted in the Exam 1 folder on ANGEL

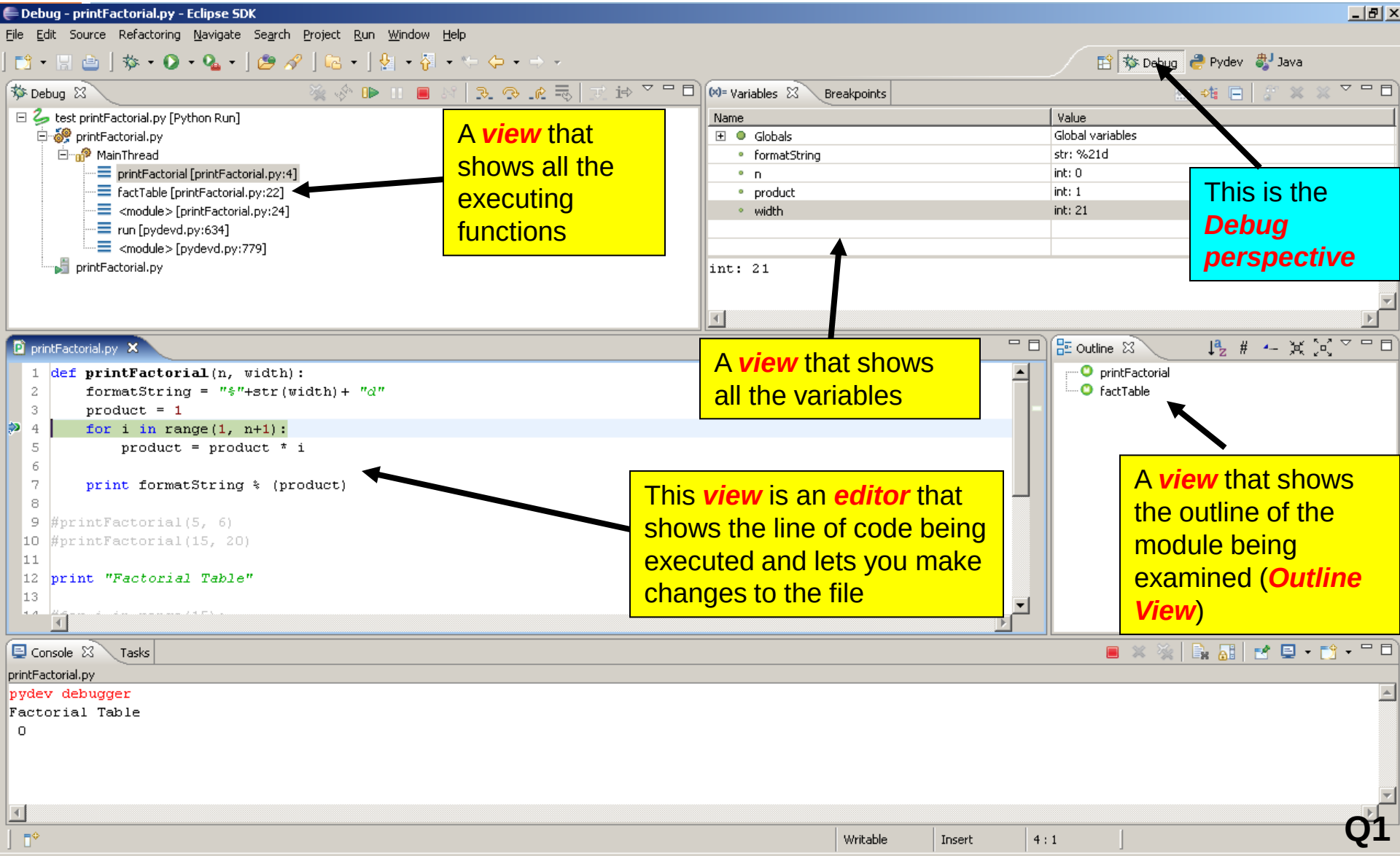
Debugging

- Debugging includes:
  - Discovering errors
  - Coming up with a hypothesis about the cause
  - Testing your hypothesis
  - Fixing the error
- Ways to debug
  - Insert print statements to show program flow and data
  - Use a debugger:
    - A program that executes another program and displays its runtime behavior, step by step
    - Part of every modern IDE

Using a Debugger

- Typical debugger commands:
  - Set a breakpoint—place where you want the debugger to pause the program
  - Single step—execute one line at a time
  - Inspect a variable—look at its changing value over time
- Debugging Example
  - Checkout the Session10 project from your repository and open factorialTable.py

Sample Debugging Session: Eclipse



Tips to Debug Effectively

- Reproduce the error
- Simplify the error
- Divide and conquer
- Know what your program should do
- Look at the details
- Understand each bug before you fix it
- Practice!

Use the scientific method:
- hypothesize,
- experiment,
- fix bug,
- repeat experiment

Review: Definite Loops

- Review: For loop
  - Definite loop: knows *before the loop starts to execute* the number of iterations of the loop body
  - Counted loop: sequence can be generated by range()
  - Example: for loop in slideshow.py
- Syntax:
  - for <var> in <sequence>:
    <body>

Is This Loop a Definite Loop?

```
# Open the file
inputFile = open(inputFileName, 'r')

# Process each line of file
for line in inputFile:
    image = Image(imageCenter, line.rstrip())
    image.draw(win)
    time.sleep(delay)

win.getMouse()
inputFile.close()
win.close()
```

Indefinite Loops

- Number of iterations is not known when loop starts
- Is a conditional loop
  - Keeps iterating as long as a certain condition remains true
  - Conditions are Boolean expressions
- Typically implemented using **while** statement
- Syntax:

```
while <condition> :
        <body>
```

While Loop

- A *pre-test loop*
  - Condition is tested at the top of the loop
- Example use of while loops

Nadia deposits $100 in a savings account each month. Each month the account earns 0.25% interest on the previous balance. How many months will it take her to accumulate $10,000?

Infinite loops on purpose

- With for loops, we could make the program run for a really long time, but not forever.
- Create a very simple while loop that runs forever.

Exercise: While Loops

- Open guessMyNumber.py in the Session10 project.
- Follow the instructions there and demo your program to your instructor or an assistant when you finish.
- Commit your work

- When you are done, please start HW10.