# DEBUGGING AND INDEFINITE LOOPS

CSSE 120—Rose Hulman Institute of Technology

# Exam 1

- Questions?
- Solutions are posted in the Exam 1 folder
- Later in class, we'll discuss solutions to computer problem #2.

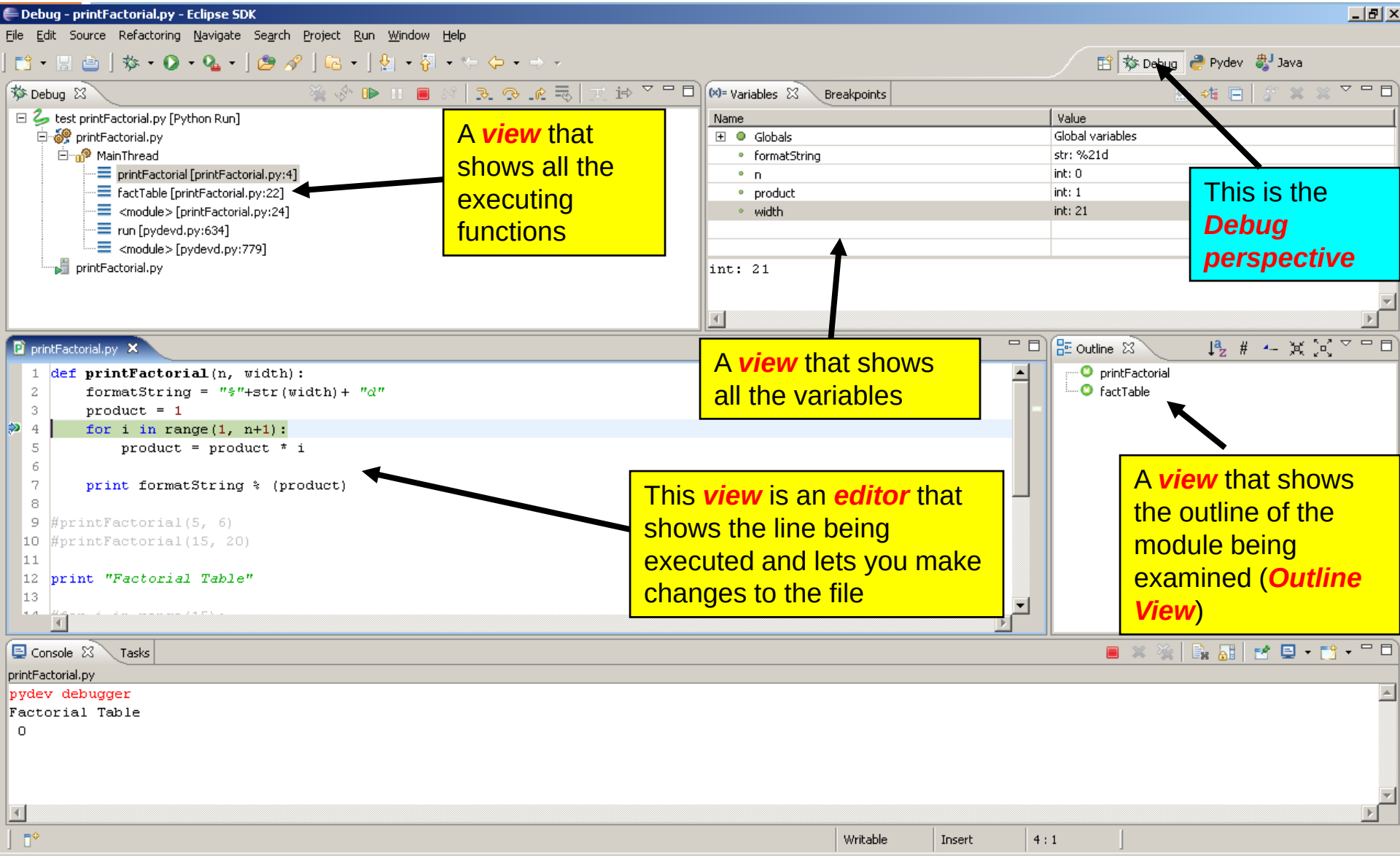
# Debugging

- 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 the debugger will 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

# Exam Question 2

- Let's solve it together, using the debugger as needed.

# Review: Definite Loops

- Review: For loop
  - Definite loop: knows *a priori* the number of iterations of 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
inFile = open(inputFileName, 'r')

# process each line of file
for line in inFile:
    angle, angVelocity, distance, linVelocity = line.split()
    robot.turnTo(angle, angVelocity)
    robot.moveTo(distance, linVelocity)
```

# 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?

# 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.