Loop Patterns

Rose-Hulman Institute of Technology

Computer Science and Software Engineering

Check out 13-LoopPatterns from SVN,
begin quiz questions 1-2

ROSE-HULMAN
INSTITUTE OF TECHNOLOGY

Exam Debriefing

- Problem discussion
- Student questions
- How did the class do?
- What should you do?
- If a problem was mis-graded …

ROSE-HULMAN
INSTITUTE OF TECHNOLOGY

Today's Goal

- Get better at solving problems that involve repetition by:
  - Seeing some different common loop patterns
  - Practicing with them!

Recap: Two main types of loops

- *Definite Loop*
  - We know at the beginning of the loop how many times its body will execute
  - Implemented in Python as a for loop
  - Cannot be an infinite loop
- *Indefinite loop*
  - The body executes as long as some condition is True
  - Implemented in Python as a while statement
  - Can be an infinite loop if the condition never becomes False

Q1-2

Some Indefinite Loop Patterns

- Interactive loops
- Sentinel loops
- File loops

Today's focus

- Post-test loops
- "Loop and a half"

Section 8.5 in Zelle

Q3

Interactive: Make the user count

- Open and run **averageUserCount.py**
- When does the loop terminate?
- Is this a user friendly way to get input?
  - Why?
  - Why not?

Interactive: More?

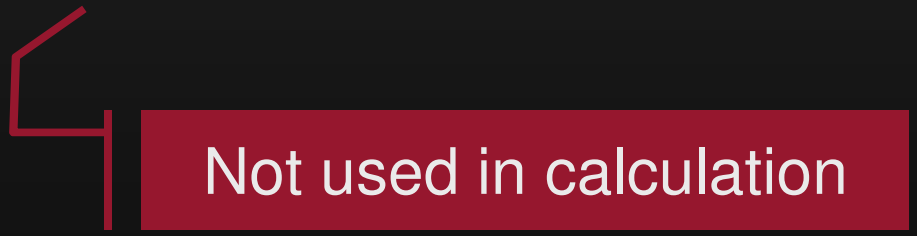
- Open and run **averageMoreData.py**
- Better?

Q4

ROSE-HULMAN
INSTITUTE OF TECHNOLOGY

Sentinel loop

- Open module **averageSentinel.py**
  - Study the code
  - Run it
- User signals end of data by a special *sentinel value*



Q5

ROSE-HULMAN
INSTITUTE OF TECHNOLOGY

Non-numeric Sentinel

- Suppose negative numbers are legitimate?
- Open module **averageOtherSentinel.py**
  - Study the code
  - Run it
  - What's the sentinel?

Still not used in calculation

File Loop

- Open and run **averageFile.py**
  - Use input file **numbers.txt**

Q6

ROSE-HULMAN
INSTITUTE OF TECHNOLOGY

Escaping From a Loop

- **break** statement ends the loop immediately
  - Does not execute any remaining statements in loop body
- **continue** statement skips the rest of this iteration of the loop body
  - Immediately begins the next iteration (if there is one)
- **return** statement ends loop and function call
  - May be used with an expression
    - within body of a function that returns a value
  - Or without an expression
    - within body of a function that just does something

Q7

Interactive Loop with Graphics

- Implement in module **clickInsideCircle.py**:
  - Display a window that contains a circle and a message saying **"Click inside Circle"**.
  - Whenever the user clicks outside the circle, display **"You missed!"**. Continue accepting clicks
  - If the user clicks inside the circle, display **"Bull's eye!"**. Then pause and close the window.

Individual Exercise on Using loops

- Define function **listAndMax()** in module **listMax.py** that
  - Prompts the user to enter numbers, one at a time
  - Uses a blank line (<ENTER>) as sentinel to terminate input
  - Accumulates the numbers in a list
  - Uses a loop to calculate the maximum value of the numbers
  - Returns two values:
    - the list of numbers entered in the order they were entered
    - the maximum value
- Define function **main()** that
  - Calls **listAndMax()**
  - Prints the list of numbers entered
  - Prints the maximum value of the list of numbers

Q8

ROSE-HULMAN INSTITUTE OF TECHNOLOGY

Start Homework

- When you are through with your individual exercise commit your solutions to your SVN repository
- Continue working on homework 13