

Objectives

- Review: format specifiers, for loops
- Nested for loops
- Code readability

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Exam-like Review Questions

- If you want to use functions or constants that are defined in a module, what type of statement do you use?
- In `module_example.py`, when we computed $e^{i\pi} + 1$, the answer wasn't 0. Why?

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Formatting Output

- Make the output from the program easy for user to read, understand
- Using `str()` constructor
- Format specifiers:
 - More formatting options for `print`
 - Control over how output is displayed to user
 - Right, center, left justification
 - Number of decimals to display

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Solution: using `str()`

- Recall: `str()` is **constructor/converter** function to convert other data types to strings
 - Example: `str(33) → '33'`
- Use when printing output with the `+` (i.e., concatenation) operator
 - `print "You owe $" + str(x) + "."`

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Format Specifiers

- General format: `%[flags][width][.precision]code`

The `[]` mean "optional"
- flags:
 - 0: zero fills
 - +: include a sign before positive integers
 - -: left-justification
- width:
 - *Minimum* number of character spaces reserved to display the entire value
 - Includes decimal point, digits before and after the decimal point and the sign

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Format Specifiers

- General format: `%[flags][width][.precision]code`
- precision:
 - Number of digits after the decimal point for **real** values
- code:
 - For the value's **type**
 - s - string
 - d (or i) - integer
 - f - floating point
 - e - floating point with exponent

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Using Format Specifiers

- Basic format is
 - print <templatestring> % (<value1>, <value2>, ..., <valuen>)
- **templatestring** is a template for the print statement with format specifiers instead of the values
 - For each format specifier in **templatestring**, should have a **replacement value**
 - Throws **TypeError** if not enough replacements for specifiers in **templatestring**
 - If only one replacement value, don't need ()

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Format Specifiers

print "%5d" % month print "%9.2f" % expense

Field width is 5 Right-justified Field width is 9 Precision is 2

- What if precision is bigger than the decimal places?
 - Fills decimal with 0s
- What if field width is smaller than the length of the value?
 - Prints entire value
- For more info:
 - <http://docs.python.org/lib/typesseq-strings.html>

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[format_specifiers.py](#) 8

Practice

- Format output from `xrange_analysis.py` nicely

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Practicing For Loops

- Print the following:

1 2 3 4 5

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Practicing For Loops

- Print the following:

1 2 3 4 5
1 2 3 4 5
1 2 3 4 5

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Improving Code Readability

- Comments
 - Don't affect Python's execution
 - Start with a '#' sign
- Constants
 - Change one value (at top of program) to change value everywhere in program
 - Flexible programs
 - Gets rid of "magic numbers"
 - Give a clear name/purpose to values

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Variable Name Conventions

- Variables start with lowercase letter
- Constants (values that won't change) are in all capitals
- Example: Variable for the current year
 - `currentYear`
 - `current_year`
 - ~~`current year`~~
 - `CURRENT_YEAR`

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Improving Code Readability/Usability

- What does this program do?
 - How would you figure it out?
- What would you do to improve the program's readability and usability?

`program_before.py`
`program_after.py`

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Fence Post Problem

- Given some posts and some beams to connect the posts, build a fence that is X fenceposts long

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`fence_post.py`

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Assigning Students to Groups

- Using a for loop and the modulo (%) operator

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TODO

- Read "Why You Can't Cite Wikipedia in My Class" for Friday

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