

Objectives

- Usability
- Problems with print
- Built-in functions
- Import statements
- Puzzles from Cyberspace

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Review

- How can I covert one primitive type to another primitive type?
- What is the short cut for adding 1 to a variable and saving it in that variable?
- String operators:
 - How do I concatenate two strings?
 - How can I concatenate a string x times?
- How do I put a tab in a string?

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Review

- Type conversion
 - Use type's constructor
- Shorthands, such as $x+=1$
- String operators
 - $+$: concatenate strings together
 - $*$: concatenate the string n number of times
- Escape Sequences
 - Example: `'\t'` → prints a tab

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Software Qualities

- Beyond functionality, what qualities do you like in software?
 - Web included

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Usability

- Want users to *like* to use your software
 - More revenue
 - Develop even better software
- How Apple makes money: best user interfaces → user buys products

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Usability Goals

- Pretty output, display, layout
 - Easy to read, understand, interpret
- Clear navigation
- Easy to perform frequent tasks
- Undoability
- Difficult to make irrecoverable errors



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Problem with print

- By default, `print` puts spaces around numbers when they get printed out
- Example:

```
x = 13.54
print "You owe $", x, "."
```

Displays:
You owe \$ 13.54 .

Extra spaces

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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 constructor with the `+` (i.e., *concatenation*) operator when printing output

```
print "You owe $" + str(x) + "."
```

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Another problem with print

```
SALES_TAX=.05 # the sales tax in VA
value = input("How much does your item cost? ")
with_tax = value * (1+SALES_TAX)
print "Your item that cost ($", value, ")",
print "costs $", with_tax, "with tax"
```

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sales_tax.py

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Solution: Format Operator & Specifiers

- Format operator: `%`
- Format specifiers allow us to control how output is displayed to user
 - Right, left justification
 - Number of decimals to display

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FORMATTING STRINGS

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Formatting Strings

- Syntax is
 - `<templatestring> % (<value1>, <value2>, ..., <valuen>)`
- Semantics: creates a **formatted string**
 - Means "format the templatestring, using the format(s) specified by **format specifiers** on the corresponding replacement values"
- Typically used with print statements

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Formatting Practice

- `x = 10`
- `y = 3.5`
- `z = "apple"`
- `"%6.2f" % x`
- `"%6.2d" % x`
- `"%06.2f" % y`
- `"%+6.2f" % y`
- `"%-10s" % z`
- `"%5d %-7.3f" % (x,y)`

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Example: Printing Out Tables

- A table of temperature conversions

Temp F	Temp C	Temp K
-----	-----	-----
-459.7	-273.1	0.0
0.0	-17.8	255.4
32.0	0.0	273.1

- If we want to print data in rows, what is the template for what a row looks like?
 - How do we make the column labels line up?

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Broader Issues

- Let's say I have 21 people in a class
- I want 5 groups of approximately equal size
- How many people will be in each group?

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Four Puzzles in Cyberspace

- Context: Book *Code* v2 by Lawrence Lessig
- You read Chapter 2
 - Presents the problems, not the author's proposed solutions

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Four Puzzles from Cyberspace

- How many of you knew about MMOGs before reading this article?
 - How many of you participated in this or something similar?
 - What do people gain and lose by using an MMOG?
- Do you consider Facebook to be "cyberspace"? If so, why? If not, how close is it?
- W&L administrators tried to regulate students use of juicycampus and acb
 - Why did they feel it should be regulated?
 - What types of regulation did they do? Was it effective?
- Every advancement in technology has positive and negative effects
 - What are the positive and negative effects of email? IM? Facebook?

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Relation to Class

- Problem solving through code

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Looking Ahead

- Read rest of “chapter” of *Four Puzzles from Cyberspace*
 - Other two problems