CIS 122

Storing things away
Recap

- Types
  - Integers
  - Floats
  - Strings

- IDLE
  - Type into the shell
  - Python responds immediately
Nothing lasts forever

- So far, everything is temporary
  - Expressions are evaluated once
  - Statements are executed once

- Why might we want permanence?
Nothing lasts forever

- So far, everything is temporary
  - Expressions are evaluated once
  - Statements are executed once

- Why might we want permanence?
  - We might not get a problem right the first time
  - We might want to solve a similar problem
  - We might want to solve a problem in pieces

- We would like to store things
  - Values (ints, strings)
  - Code
Or does it...

- We can store values in variables
  - Similar to algebra
  - Variables store data until we need it

- Remember this code?

```python
centimeters = 7
ratio = 0.4
inches = centimeters * ratio
```
Your first assignment

- To create a variable, you must assign it some value
- Use the assignment operator: 
  - NOT the same as in algebra
  - Assigns the value on the right to the variable on the left
Anatomy of an Assignment

Left Hand Side (LHS)
Variable Name

Assignment Operator

Right Hand Side (RHS)
Value

\[ \text{myNumber} = 7 \]
Anatomy of an Assignment

● What can go on the left?
  ○ Valid variable names
  ○ Contain letters, numbers, or underscores (_)
  ○ May not start with a number

● These are valid:
  ○ cow
  ○ myVariable
  ○ this_is_an_unwieldy_variable_name_12

● These are not:
  ○ 12cow
  ○ cats&dogs
Anatomy of an Assignment

- Variable names are case sensitive
- These are all different variables
  - cow
  - Cow
  - COW
- If you define cow, but try to use Cow, python will be confused
  - NameError: name 'Cow' is not defined
Anatomy of an Assignment

- What can go on the right?

- Expressions
  - Values
  - Anything that can be evaluated to a value

- These work:
  - 5
  - "Hello"
  - 4 + 2
  - myVariable (if we've defined myVariable previously)
  - myVariable + 2
Anatomy of an Assignment

● What if your assignment has variables on both sides?
  ○ myVariable = otherVariable

● The two variables mean different things!
  ○ The LHS is used for its name
  ○ The RHS is used for its value

● Take the value stored in otherVariable and give it to myVariable as well
  ○ Now both variables contain the same value
Variable Assignment - Pop Quiz

- \( x = 5 \)
- \( \text{fruit} = "banana" \)
- \( 3 = \text{myVar} \)
- \( \text{Seven} = 3+4 \)
- \( \text{song} = "Happy " + "Birthday" \)
- "Quote" = Quote
Using Variables

centimeters = 7
ratio = 0.4
inches = centimeters * ratio
Which is better?

centimeters = 7
ratio = 0.4
inches = centimeters * ratio

x = 7
y = 0.4
z = 7 * 0.4
Which is better?

- Both programs do the same thing
  - But the left is much more readable

- Be clear
  - Code is meant for humans to read
  - Use descriptive variable names

```plaintext
centimeters = 7  \hspace{1cm} x = 7
ratio = 0.4       \hspace{1cm} y = 0.4
inches = centimeters * ratio \hspace{1cm} z = 7 * 0.4
```
Storing Code

- We've seen how to store values using variables
- We can store programs too
  - Let's go to IDLE