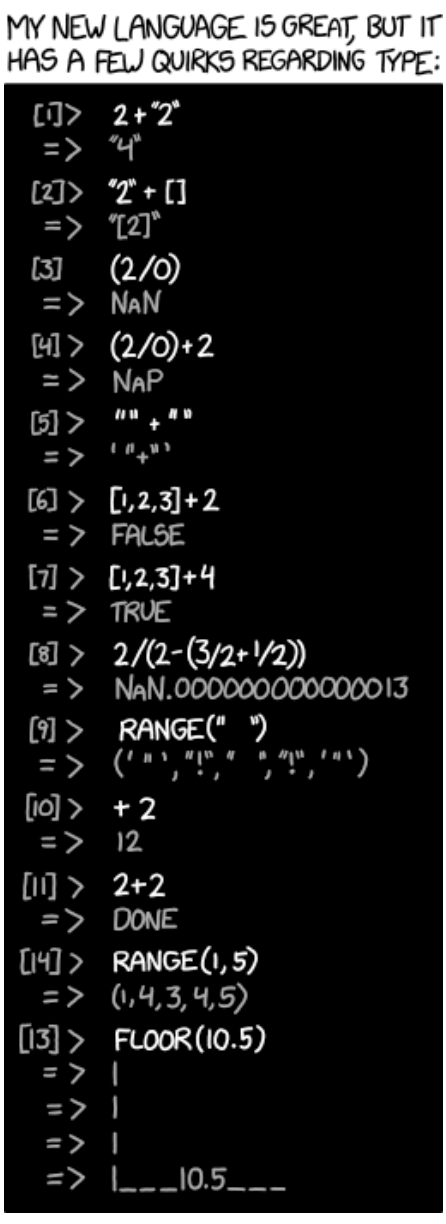
CSCI 141

Scott Wehrwein

Variables
The Assignment Operator



Goals

- Know how to name and store values in variables
- Understand the behavior of the assignment operator
- Know how to use a variable to stand in for the value it represents (stores)
- Know the rules for naming variables and the conventions for deciding on good variable names

Variables

- Variables are a basic component of most programming languages
- They allow you to **store** (or remember) **values**.
- Computers are pretty dumb, but they're really good at a few things, for example:
  - arithmetic
  - remembering things

Variables: Definition

- A variable is a name in your program that *refers* to a piece of data (value).

Variables: Usage

- A variable is a name in your program that *refers* to a piece of data (value).
- How do you use them?
  1. Decide what value you want to store in the variable
  2. Decide on a sensible name
  3. In your program, use the assignment operator to assign that variable name to the value:

```
my_age = 32
```

The assignment operator.

Variables: Usage

```
my_age = 32
```

The assignment operator.

- For now, think of `my_age` as a named place where we can store any value.
- You can replace the current value with a different one:

```
my_age = 33
```

The Assignment Operator: Not “Equals”

```
my_age = 32
```

The assignment operator.

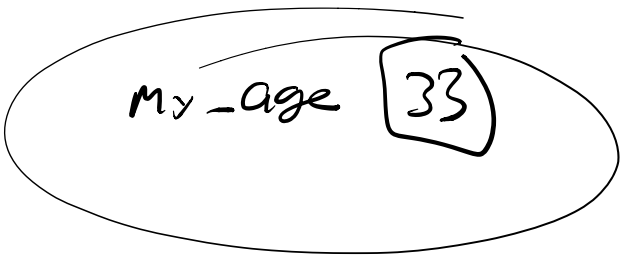
- This is not *stating an equality*, like in math.
- It is *associating a name with a value*.

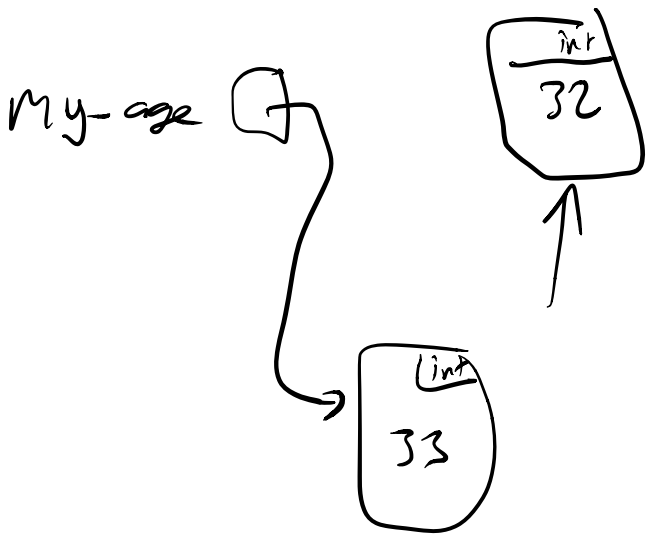
```
my_age = 32
my_age = 33
```

The Assignment Operator: Not “Equals”

A helpful diagram

```
my_age = 32
my_age = 33
```





Using Variables

Assigning a value is **not** stating an equality, like in math: it's storing a value.

```
my_age = 32
my_age = 33
```

A variable's value can be **updated** (overwritten) by a new value using the assignment operator.


"my_age equals 32"


"my_age becomes 32"


"my_age gets 32"


"the variable my_age takes on the value 32"

What can you do with variables?

Use them anywhere you'd use a value!

```
print(5)
```

```
a = 5
print(a)
```

These two programs both print 5.

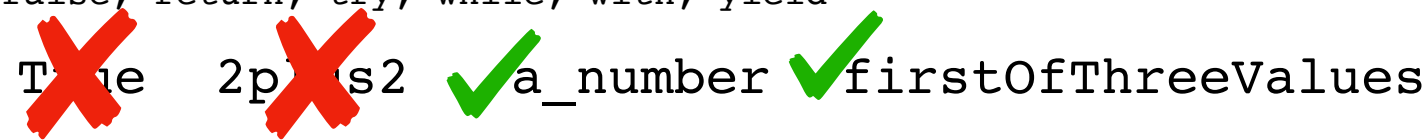
Variable Names

- How do you use variables?
  1. Decide what value you want to store in the variable
  2. **Decide on a sensible name**
  3. In your program, use the assignment operator to store that value in the variable
- Great power, great responsibility: variables names can be almost anything!

Variable Names

- Great power, great responsibility:
  variables names can be almost anything!
- **Valid** variable names:
  - start with a letter or an underscore (_)
  - can contain any letters and digits
  - are case-sensitive (name is not the same as Name)
  - are not the same as any Python language **keywords** (words that already mean something else):

```
False, None, True, and, as, assert, async, await, break, class,
continue, def, del, elif, else, except, finally, for, from,
global, if, import, in, is, lambda, nonlocal, not, or, pass,
raise, return, try, while, with, yield
```



Variable Names

- Great power, great responsibility:
  variables names can be almost anything!
- A **good** variable name:
  - is descriptive - tell a reader what data they refer to
  - is not too long
  - follows a standard naming convention, e.g.:
    - starts with lower case letter
    - words are separated by underscores

these depend on context!

✓ `current_time` ✗ `a4` ✓ `hair_color`

✗ `midterm_exam_grade_as_a_percent`