Carnegie Mellon University
Computer Science Academy

CS1: Unit 9 Review

Types and Input

Types

- All values have a specific type
- Types that we will use:
  - **integers** (**ints**): Numbers (Ex. 13, 0, 20)
  - **floats**: Numbers with a decimal point (Ex. 4.5, 0.0)
  - **strings**: Characters within single or double quotes (Ex. 'hello', "world")
  - **booleans**: One of two values, either `True` or `False`
  - **shapes**: Rectangles, Ovals, Labels, Arcs, etc.
- Type errors result from using one type of value when another is expected
  - Ex. using a string where an integer is expected when drawing a shape
- Use `+` with two strings to concatenate them (combines them one after the other)
- Use the `str()` function to convert a value into a string
  - Ex. `str(13)` is the string `'13'`

Input

- `app.getTextInput()` takes a prompt, which is a string that the user sees when the input dialog box pops up
  - Ex. `app.getTextInput('Enter a message')` shows users the text 'Enter a message'
- `app.getTextInput()` **returns a string**, which the user entered
- `int()` is a function that converts a string into an integer
  - Ex. `int('3') == 3` returns True
  - It can only take an integer inside the string, not a float
    - Ex. `int('20.5')` crashes

Strings

Looping and Indexing with Strings

- Looping over a string allows access to individual characters in the string
  - Ex. `for c in 'str'` gives you individual characters 's', 't', and 'r'
- String indexing allows access to specific characters in the string
  - If `s` is a string:
    - `s[0]` is the first character in `s`
    - `s[i]` is the ith character in `s`
    - `i` is an index into the string `s`
    - `len(s)` is the length of the string `s`, or the number of characters in the string
    - Ex. if `s='Hello!'`, `len(s)` is 6, and `i=5`, then `s[0]` is 'H' and `s[i]` is '!'
- The `in` operator can check if a string occurs within another string
  - Ex. `('ab' in 'abc')` is True, and `('ac' in 'abc')` is False
- The `in` operator can also be used as part of a `for c in 'str'` loop

String Methods

String Methods

- isupper() is a string method that returns True if a string only contains uppercase letters
    - Ex. 'String'.isupper() returns False
- islower() is a string method that returns True if a string only contains lowercase letters
    - Ex. 'string'.islower() returns True
- isalpha() is a string method that returns True if a string only contains letters
    - Ex. 'String'.isalpha() returns True
- isdigit() is a string method that returns True if a string only contains digits
    - Ex. '12345'.isdigit() returns True
- upper() is a string method that returns a new string with all letters uppercase
    - Ex. 'hello'.upper() returns 'HELLO'
- lower() is a string method that returns a new string with all letters lowercase
    - Ex. 'HELLO'.lower() returns 'hello'

While Loops

While Loops

- We use while loops when we don't know how many times we need to loop
- A while loop is like an if statement except the body of the while loop runs until the condition becomes False
- A while loop can run forever and the program would never stop if the condition never became False
    - Ex. while (True): will continue to loop forever because the condition will never be False.