Lecture 3: October 3, 2019

Reading: §3, 5 **Assignments:** Homework 1, due on October 10 at 11:59pm

1. Simultaneous assignment [*swap.py*]
   (a) Simple assignment: `variable = expression`
   (b) Simultaneous assignment: `variableA, variableB = expressionA, expressionB`
2. Decision structures [*if0.py*]
   (a) If statement
   (b) Executes once, based on condition
   (c) Syntax
3. Conditions
   (a) Resolves to boolean value
   (b) Literal booleans: True (1), False (0)
   (c) Testable as `true` or `false`
   (d) Relational operators
      i. Use two arithmetic expressions connected with relational operators to create a boolean
      ii. Relational operators: $>$, $>=$, $<$, $<=$, $==$, $!=$
      iii. Precedence: resolved after arithmetic operators
      iv. `6 > 2 + 3`; `"UCD" == "Sac State"`
4. Two-way decisions [*if1.py*]
   (a) if … else statements
   (b) One condition, two possible code blocks
   (c) Syntax
   (d) else very powerful when the positive condition is easy to describe but not the negative
   (e) String comparison example
5. Multi-way decisions [*if2.py*]
   (a) Can execute code based on several conditions
   (b) `elif` (else if)
   (c) Syntax
   (d) *else* only reached if all previous conditions false
   (e) Nested if statements
6. Iteration
   (a) Definite loops: execute a specific (definite) number of times
   (b) Indefinite loops: execute until a general condition is false
7. For loops
   (a) General form: `for i in iterator`
   (b) *Iterator* is either list or something that generates a list
   (c) Very common form: `for i in range(1, 10)`
8. While loops [*while.py*]
   (a) Contrast with `for`

   (b) `break` causes program to fall out of loop (works with `for` too) [*loop1.py*]
   (c) `continue` causes program to start loop over immediately (works with `for` too) [*loop1.py*]

9. `range()` in detail [*for.py*]
   (a) `range(10)` gives 0 1 2 3 4 5 6 7 8 9
   (b) `range(3, 10)` gives 3 4 5 6 7 8 9
   (c) `range(2, 10, 3)` gives 2 5 8
   (d) `range(10, 2, -3)` gives 10 7 4
10. Program: counting to 10 [*toten.py*]
11. Program: sum the first 10 squares [*sumsq.py*]
12. Program: Fibonacci numbers [*fib.py*]