What will you do in Compsci 6/101?

- Review loops and lists
  - Loop over sequence: string, file, list, "other"
  - Process each element, sometimes selectively
  - Toward understanding the power of lists

- The idiom of "value being updated"
  - What does \( x = x + 1 \) actually do for int value?
  - What does \( s = s + \text{"way"} \) actually do for string value?
  - What does \( ls = ls + [4] \) actually do for list value?
  - Loop with update solves lots of problems

- Using 'r' libraries random and regular

Anatomy of a Python list

- Create list with brackets (values optional) or list
  - \( s1 = [] \)
  - \( s2 = [\text{"a"}, \text{"b"}, \text{"c"}] \)
  - \( s3 = \text{list(\"123\") \# from an iterable} \)

- Lists are mutable and iterable
  - Append to list, change value stored at index
    - \( s2[1] = 5, s2.append(77) \)
  - for elem in list:

- Use function on lists: len, min, max, sum
  - Operator: in

List methods

- In object oriented programming methods are functions that operate on an object
  - Inspect or change the object
  - Sometimes return values

- List methods that inspect a list
  - Search: count and index

- List methods that mutate by adding or removing
  - append, insert, pop, remove

- List methods that re-arrange list
  - reverse, sort

Indexing a list

- Lists, like strings, start indexing with zero
  - Strings are immutable, lists are mutable

- For some problems, looping by index useful
  - Use range function, range creates open-ended list
    - \( \text{range(0,10), range(5,20), range(10,100,5)} \)
  - Advice/warning: in Python 3 range doesn't create list

- For some problems index and list useful
  - Use for \( x, y \) in enumerate(list): idiom
  - Preview: tuple
Making choices at random

- Why is making random choices useful?
  - How does modeling work? How does simulation work?
  - Random v Pseudo-random, what's used?
  - Online gambling?

- Python random module/library: import random
  - Methods we'll use: `random.random()`, `random.randint(a,b)`, `random.shuffle(seq)`, `random.choice(seq)`, `random.sample(seq,k)`, `random.seed(x)`

- How do we use a module?

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Niklaus Wirth (Turing Award, 1984)

- Designed and implemented several programming languages including Pascal, Modula-2, Oberon
- Wrote the paper that popularized the idea of step-wise refinement
  - Iterative enhancement
  - Grow a working program
- Cranky or tasteful?

Simple, elegant solutions are more effective, but they are harder to find than complex ones, and they require more time which we too often believe to be unaffordable

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Rock stars for CompSci

- P-p-p-pyhton
- Functions are def!
- I love to code!