Introduction to: Computers & Programming: Strings and Other Sequences in Python

Part I

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Outline

• What is a Data Structure?
• What is a Sequence?
• Sequences in Python
• All About Strings
What is a Data Structure?

• A Structure for Storing Data
• Formally defined parts
• Formally defined relations between parts
• Particular algorithms are designed to run with particular data structures
• We will focus on some data structures that are implemented in Python
  – Note that other programming languages may use the same names for different structures
What is a Sequence? What is a Sequence in Python?

- An ordered set of elements (math, e.g., permutations)
- In computer science, there are more than one way for elements to be arranged in a sequence. Python Examples:
  - Lists, Strings, Ranges, Tuples
    - different syntax
    - different functions designed for handling them
  - A string is a sequence of characters
  - Ranges are defined by start and end numbers
  - A list must contain a single type of element
    - It is possible to alter a list, once created
  - Tuples:
    - Can consist of multiple types
    - Cannot be changed once created
Strings in Python

- A String is a sequence consisting of characters
  - Characters also have special properties
- Special syntax allows the identification of subsequences or “slices”
- Special Python functions operate on the data structure “string”
  - testing, searching, changing case, formatting, stripping, splitting, etc.
New Data Type: Character

• Character
  – The smallest part of a string
  – Typically represented by one byte

• Coercion Functions:
  – chr(number) ## Number to ASCII/unicode character
  – ord(character) ## ASCII to number

• We can use these to write our own case changing functions
Using Characters

• Convert Upper Case to Lower Case
  – Let's try to figure this out logically by trying out the type conversions on the previous slide
    • ord('a')
    • ord('A')
    • Use `chr` to convert numbers to characters
    • Use `for` loop to convert words
  – Do the reverse: convert Lower Case to Upper Case

• Convert Number Characters 1-9 to corresponding letters using a similar strategy

• Convert whole strings using a `for loop`