

## Objectives


- Reading from files
- Writing to files

## Midway Check: Parts of an Algorithm

- Primitive operations
  - What data you have, what you can do to the data
- Naming
  - Identify things we're using
- Sequence of operations
- Conditionals
  - Handle special cases
- Repetition/Loops
- Subroutines
  - Call, reuse similar techniques

- Which of these have we covered?
- How do we implement them in Python?

## Midway Check: Parts of an Algorithm

- Primitive operations 

where most of the rest of the semester focuses

  - What **data** you have, what you **can do** to the data
- Naming
  - Identify things we're using
- Sequence of operations
- Conditionals
  - Handle special cases
- Repetition/Loops
- Subroutines
  - Call, reuse similar techniques

Working toward  
no longer *primitive*

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## Exam 2

- Next Friday
- Prep document online
  - No files, dictionaries (Monday)

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## Review

- What is the major difference between strings and lists?
  - What are the implications of that difference?

## Review: Lists vs. Strings

- Strings are **immutable**
  - Can't be mutated?
  - Err, can't be modified/changed
- Lists are **mutable**
  - Can be changed
  - Changes how we call/use methods

### Implications:

- Think of list variables as **pointing** to the list
- Assigning a list to another variable does **not make a copy** of the list
- list methods **modify** the list on which the method was called
  - Don't return a copy of the object, modified
- When you pass a list into a function, you **can modify** the list

## Review

- Why should we care about files?

## Files

- Conceptually, a file is a **sequence** of data stored in memory
- To use a file in a Python script, create an object of type **file**
  - **file** is a *data type*
  - `<varname> = open(<filename>, <mode>)`
    - `<filename>`: string
    - `<mode>`: string, "r" for read, "w" for write, "a" for append (and others)
  - Ex: `dataFile = open( "years.dat", "r" )`

**Built-in function**  
"constructs" a file object

## Problem: Searching a File

- We want to search a file for some term. We want to know *which lines* of the file contain that term and a *count* of the number of lines that contained that term

## Writing to a File

- Create a file object in **write** mode:
  - `myFile = open("myfile.txt", "w")`
- Example: create a file from user input
  - `file_write.py`

What happens if you execute the program again with different user input?

## Handling Numeric Data

- We have been dealing with reading and writing *strings* so far
  - Read from a file: get a string
  - Write to file: use a string
- What do we need to do to **read numbers** from a file?
- How can we **write numbers** to a file?

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## Handling Numeric Data

- We have been dealing with reading and writing *strings* so far
  - Read from a file: get a string
  - Write to file: use a string
- What do we need to do to **read numbers** from a file?
  - Cast as a numeric type, e.g., `int` or `float`
- How can we **write numbers** to a file?
  - Cast number as a `str`

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## Problem: Temperature Data

- **Given:** data file that contains the daily high temperatures for last year at one location
  - Data file contains one temperature per line
  - Example: `data/florida.dat`
- **Problem:** What is the average high temperature (to 2 decimal places) for the location?

**Rule of Thumb:** Always look at data file before processing it

## Broader Issue: Cryptography

Abhi  
Drew  
Landon  
Rinn  
Sam

Chris  
Katlin  
Prakriti  
Tristan  
Utkrist

Daniel  
Gabe  
Isaac  
Max  
Pranam

Amalia  
Angel  
Annie B.  
Liam  
Turner

Aimee  
Alex  
JD  
Pengrui

## Broader Issues Discussion

- What is cryptography?
  - What is public key cryptography?
  - Why is cryptography useful?
- Who is Alan Turing?
- Why are computer scientists involved in politics?
  - Has this class informed your politics?

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## Senator Franken vs Facebook lawyer Stretch

- “People are buying ads on your platform with roubles. They’re political ads. You put billions of data points together all the time. **That’s what I hear that these platforms do: they’re the most sophisticated things invented by man, ever.** Google has all knowledge that man has ever developed. You can’t put together roubles with a political ad and go hmm, those two data points spell out something bad?”

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## Your Supervisor



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