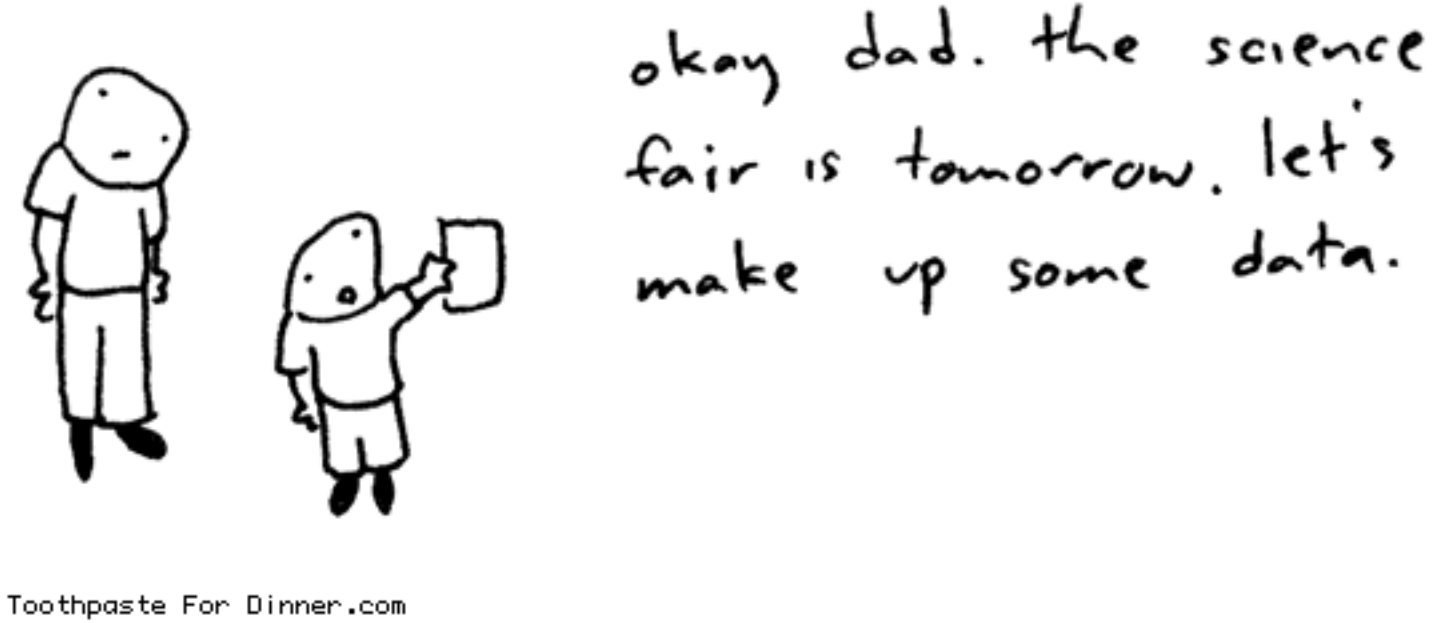
CSc 110, Spring 2018

Lecture 20: File Input

Adapted from slides by Marty Stepp and Stuart Reges



Weather question 2

- Modify the weather program to print the following output:

```
Type in a temperature or "done" to finish
Day 1's high temp: 45
Day 2's high temp: 44
Day 3's high temp: 39
Day 4's high temp: 48
Day 5's high temp: 37
Day 6's high temp: 46
Day 7's high temp: 53
Day 7's high temp: done
Average temp = 44.6
4 days were above average.
```

Weather 2 answer

```
# Reads temperatures from the user, computes average and # days above average.
def main():
    print("Type in a temperature or \"done\" to finish")

    temps = []                # list to store days' temperatures
    sum = 0
    done = input("Day 1's high temp: ")
    day = 1

    while done != "done":          # read/store each day's temperature
        done = int(done)
        sum += done
        temps.append(done)
        done = input(("Day " + str(day + 1) + "'s high temp: "))
        day += 1
    average = sum / day

    count = 0                          # see if each day is above average
    for i in range(0, day - 1):
        if temps[i] > average:
            count += 1
    # report results
    print("Average temp = " + str(average))
    print(str(count) + " days above average")
```

File Input/output (I/O)

- **name** = `open`("**filename**")
  - opens the given file for reading, and returns a file object

- **name**`.readlines()` - file's entire contents as a string

```
>>> f = open("weather.txt")
>>> f.readlines()
['42', '34', '35', '46', '45',
'43', '43', '49']
```

File paths

- **absolute path**: specifies a drive or a top `"/"` folder

  `C:/Documents/smith/hw6/input/data.csv`

  - Windows can also use backslashes to separate folders.

- **relative path**: does not specify any top-level folder

  `names.dat`
  `input/kinglear.txt`

  - Assumed to be relative to the *current directory*:

    `file = open("data/readme.txt")`

    If our program is in `H:/hw6`,
    `open` will look for `H:/hw6/data/readme.txt`

File input question

- We have a file `weather.txt`:

```
16.2
23.5
19.1
7.4
22.8
18.5
-1.8
14.9
```

- Write a program that prints the change in temperature between each pair of neighboring days.

```
16.2 to 23.5, change = 7.3
23.5 to 19.1, change = -4.4
19.1 to 7.4, change = -11.7
7.4 to 22.8, change = 15.4
22.8 to 18.5, change = -4.3
18.5 to -1.8, change = -20.3
-1.8 to 14.9, change = 16.7
```

File input answer

```
# Displays changes in temperature from data in an input file.

def main():
    input = open("weather.txt")
    lines = input.readlines()
    prev = float(lines[0])        # fencepost

    for i in range(1, len(lines)):
        next = float(lines[i])
        print(prev, "to", next,  ", change =", (next - prev))
        prev = next
```

Gas prices question

- Write a program that reads a file `gasprices.txt`
  - Format: *Belgium $/gal US $/gal date …*

```
8.20 3.81 3/21/11 8.08 3.84 3/28/11 ...
```

- The program should print the average gas price over all data in the file for both countries:

```
Belgium average: 8.3
USA average: 3.9
```

Multiple tokens on one line

You can use `read` to read the whole file into a string and the `split` function to break a file apart

- **str**`.split()` – splits a string on blank space
- **str**`.split(`**other_str**`)` – splits a string on occurrences of the other string

```
>>> f = open("hours.txt")
>>> text = f.read()
'1 2\n45 6\n'

>>> f = text.split()
['1', '2', '45', '6']
```

Looping through a file

- The result of `split` can be used in a `for` … `in` loop

- A template for reading files in Python:

```
file = open("filename")
text = file.read()
text = text.split()
for line in text:
        statements
```

Gas prices solution

```
def main():
    file = open("gasprices.txt")
    belgium = 0
    usa = 0
    count = 0
    lines = file.read().split()

    for i in range(0, len(lines), 3):
      belgium += float(lines[i])
      usa += float(lines[i + 1])

    print("Belgium average:", (belgium / count), "$/gal")
    print("USA average:", (usa / count), "$/gal")
```