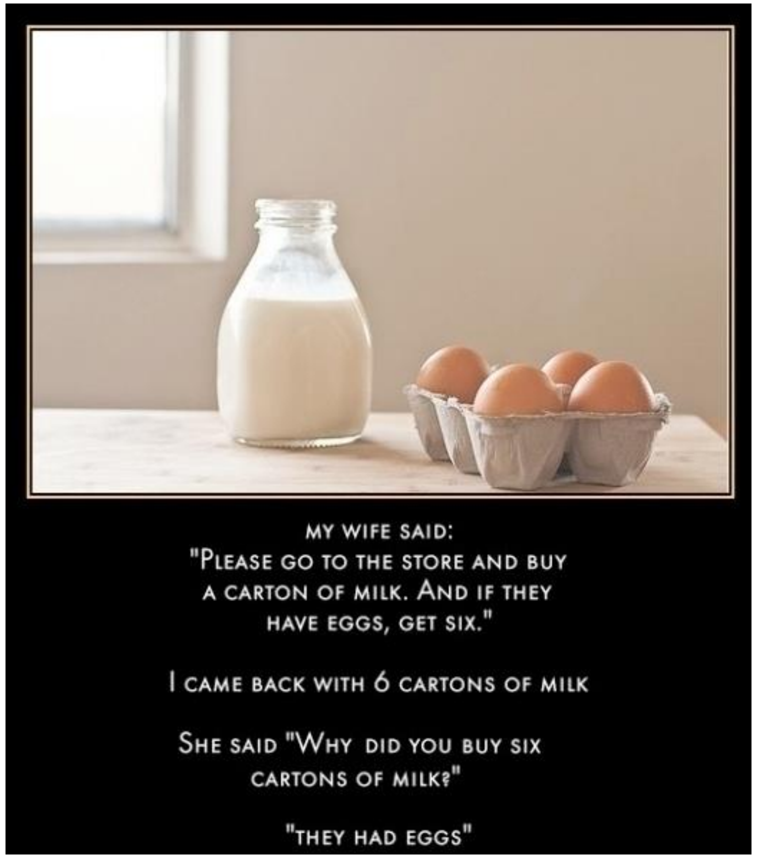
CSc 110, Autumn 2016

Lecture 18: Line-Based File Input

Adapted from slides by Marty Stepp and Stuart Reges



My wife said:
"Please go to the store and buy a carton of milk. And if they have eggs, get six."

I came back with 6 cartons of milk

She said "Why did you buy six cartons of milk?"

"They had eggs"

Programming feel like that?

IMDb movies problem

- Consider the following Internet Movie Database (IMDb) data:

```
1 9.1 196376 The Shawshank Redemption (1994)
2 9.0 139085 The Godfather: Part II (1974)
3 8.8 81507 Casablanca (1942)
```

- Write a program that displays any movies containing a phrase:

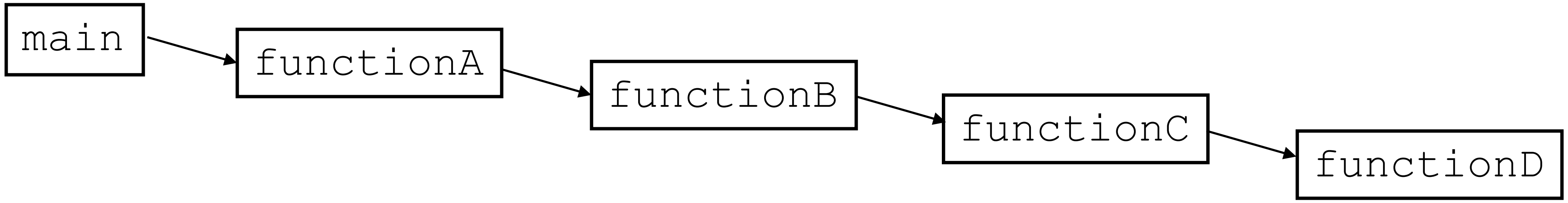
```
Search word? part

Rank    Votes   Rating  Title
2       139085  9.0     The Godfather: Part II (1974)
40      129172  8.5     The Departed (2006)
95      20401   8.2     The Apartment (1960)
192     30587   8.0     Spartacus (1960)
4 matches.
```

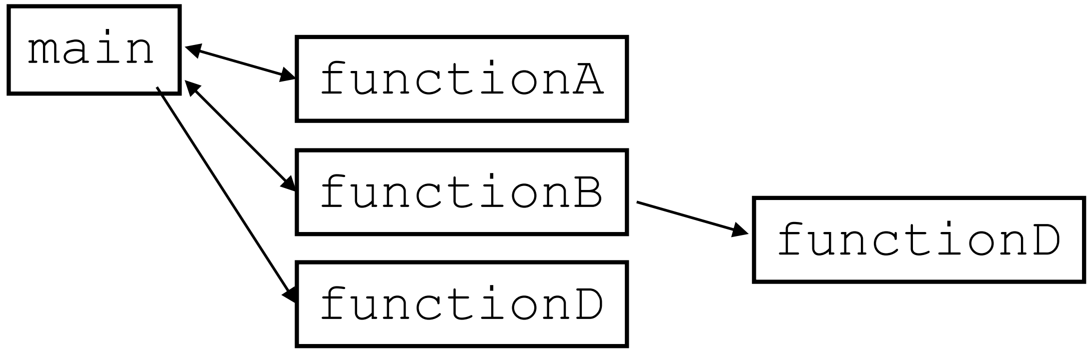
  - Is this a token or line-based problem?

"Chaining"

- `main` should be a concise summary of your program.
  - It is bad if each function calls the next without ever returning (we call this *chaining*):



- A better structure has `main` make most of the calls.
  - Functions must return values to `main` to be passed on later.



Bad IMDb "chained" code 1

```
# Displays IMDB's Top 250 movies that match a search string.
def main():
    get_word()

# Asks the user for their search word and returns it.
def get_word():
    search_word = input("Search word: ")
    search_word = search_word.lower()
    print()
    file = open("imdb.txt")
    search(file, search_word)

# Breaks apart each line, looking for lines that match the search word.
public static String search(file, search_word):
    matches = 0
    for line in file:
        line_lower = line.lower()      # case-insensitive match
        if (search_word in line_lower):
            matches += 1
            print("Rank\tVotes\tRating\tTitle")
            display(line)
        print(str(matches) + " matches.")
```

Bad IMDb "chained" code 2

```
# Displays the line in the proper format on the screen.
def display(line):
    parts = line.split()
    rank = parts[0]
    rating = parts[1]
    votes = parts[2]
    title = ""
    for i in range(3, len(parts):
        title += parts[i] + " "    # the rest of the line
    print(rank + "\t" + votes + "\t" + rating + "\t" + title)
```

Better IMDb answer 1

```
# Displays IMDB's Top 250 movies that match a search string.

def main():
    search_word = get_word()
    file = open("imdb.txt")
    line = search(input, search_word)

    if (line.length() > 0):
        print("Rank\tVotes\tRating\tTitle")
        while (line.length() > 0):
            display(line)
            line = search(input, search_word)
        print(matches + " matches.")

# Asks the user for their search word and returns it.
def get_word():
    search_word = input("Search word" ")
    search_word = search_word.lower()
    print()
    return search_word

...
```

Better IMDb answer 2

```
    ...

# Breaks apart each line, looking for lines that match the search word.
def search(file, search_word):
    for line in file:
        line_lower = line.lower()     # case-insensitive match
        if (search_word in line):
            return line
    return ""   # not found

# displays the line in the proper format on the screen.
def display(line):
    parts = line.split
    rank = parts[0]
    rating = parts[1]
    votes = parts[2]
    title = ""
    for i in range(3, len(parts)):
        title += parts[i] + " "    # the rest of the line
    print(rank + "\t" + votes + "\t" + rating + "\t" + title)
```

Output to files

- Open a file in write or append mode
  - 'w' - write mode – replaces everything in the file
  - 'a' – append mode – adds to the bottom of the file preserving what is already in it

```
name = open("filename", "w")     # write
name = open("filename", "a")     # append
```

Output to files

name.`write(`**str**`)`	– writes the given string to the file
name.`close()`	– closes file once writing is done

Example:

```
out = open("output.txt", "w")
out.write("Hello, world!\n")
out.write("How are you?")
out.close()

text = open("output.txt").read()   # Hello, world!\nHow are you?
```

Removing short words

- A lot of algorithms that process language ignore very common words like "and".
- Write a program that reads a file and displays the words of that file as a list.
    - Then display them with all words shorter than 4 characters removed.

Removing short words

```
def main():
    file = open("text.txt")
    words = file.read().split()

    print(words)
    i = 0
    while(i < len(words)):
        word = words[i]
        if len(word) < 4:
            words.remove(word)
            i -= 1
        i += 1
    print(words)
main()
```