CS101: Intro to Computing
Spring 2016

Lecture 13
Administrivia

• Midterm results released
• Homework 7 posted today (due Friday)
  – Posted on RELATE, NOT CODELAB
  – Make sure you have an account!
• Writing a program from scratch
• To code outside of lab, install Anaconda
  https://www.continuum.io/downloads
s="WTE"
t="ANY"
u={}
for a,b in zip(s,t):
    u[a]=b
x=u["T"]

What is the final value of x?
a) "A"
b) "Y"
c) "T"
d) "N"
s=[4,8,15,16,23,42]
d={0:0,1:0}
for a,b in enumerate(s):
    d[a%2]+=1
x=d[1]

What is the final value of x?
a) 0
b) 1
c) 2
d) 3
DICTIONARIES
USES FOR DICTIONARIES
Dictionaries to Encode

• We can use dictionaries to encode/decode data
• We can use dictionaries to translate from one representation to another
Exercise

• Encipher all of the words in a file with the Caesar cypher
• Substitute each letter with the next in the alphabet

HELLO  →  IFMMP
def encypher(word):
    word=word.upper()
    x="ABCDEFGHIJKLMNOPQRSTUVWXYZ"
    y=x[1:]+x[0]
    e={}
    for a,b in zip(x,y):
        e[a]=b
    encoded=""
    for c in word:
        if c in encoded:
            encoded+=e[c]
        else:
            encoded+=c
    return encoded

for line in open("words.txt"):
    line=line.strip()
    print(encypher(line))
Dictionaries as Accumulators

• We can use dictionaries as a collection of counters for many things at once

x = “ABBACAB”
d = {}
for c in x:
    if c not in d:
        d[c] = 0
    d[c] += 1
Counting bigrams

counter={}

for word in open("words.txt"): 
    word=word.strip().upper()
    for i in range(len(word)-1):
        bi=word[i:i+2]
        if bi not in counter:
            counter[bi]=1
        else:
            counter[bi]+=1
Exercise

• Count category frequencies in Jeopardy questions
Dictionaries to Join/Merge Data

• We can link data based on a common field:

```python
zip={"Bill":60644,
    "Jim":41073,"Beth":63103}

city={60644:"Chicago",
    41073:"Cincinnati",
    63103:"St. Louis"}

for name in zipcode:
    print(name,city[zipcode[name]])
```
Exercise

• Print the album, artist, and track names for each song in tracks.csv
import csv

# read in artist data from csv file
artist_file=open("artist.csv")
artist_d=
artist_reader=csv.DictReader(artist_file)
for artist in artist_reader:
    artist_id=artist["ArtistId"]
    name=artist["Name"]
    artist_d[artist_id]=name

artist_file.close()
# read in album data from csv file
album_file=open("album.csv")
album_reader=csv.DictReader(album_file)
album_d={}
for album in album_reader:
    album_id=album["AlbumId"]
    album_t=album["Title"]
    artist=album["ArtistId"]
    # store artist/album as a tuple
    # store artist/album as a tuple
    album_d[album_id]=(album_t, artist)
album_file.close()
# read track data and merge with album
# and artist data to print it out
track_file = open("track.csv")
track_reader = csv.DictReader(track_file)
for track in track_reader:
    name = track["Name"]
    album_id = track["AlbumId"]
    title, artist_id = album_d[album_id]
    artist = artist_d[artist_id]
    print(name, ",", title, ",", artist

track_file.close()