

Compsci 101

List Comprehensions, Transform, Global - Live Lecture

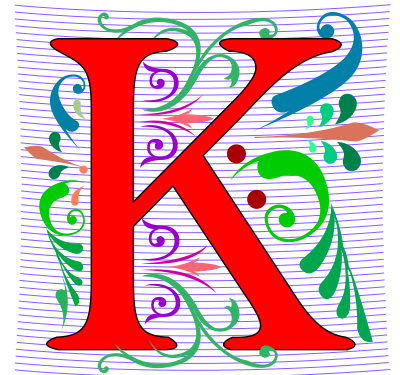
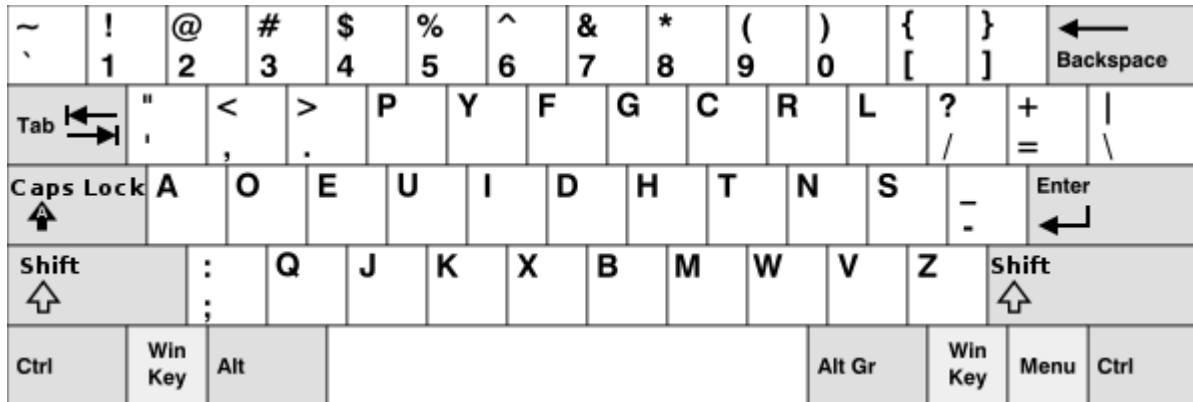
What is it?	Where first created?
Regular variable in main	In main
Regular local function variable	In function
Global variable	Top of file

Announcements

- Assign 2 – Turtles due Thursday!
- APT-4 out today due Thursday, March 11
- Assign3-Transform out today, due Thursday, March 18
 - There is a Sakai quiz on Assign3 – also by March 18
- Exam 1 – do not discuss with anyone until handed back
 - It is not autograded! Be patient!
- No class-Tues/Wed, March 9-10
 - Consulting hours may vary (if available)**

K is for ...

- **Kernel**
 - Core of the OS, Core for Machine Learning
- **Keyboard** - QWERTY or DVORAK
 - DVORAK:



- **Key and (Key,Value) pair**
 - Heart of a dictionary

Computer Scientists to Know

Frieda McAlear

- Senior Research Associate
 - Kapor Center
- Lead
 - Women of Color and Computing Collaborative
- Co-Lead (Partnership)
 - American Indian Science and Engineering Society



PFTD

- List Comprehensions
- Global Variables
- Transform Assignment

Review: List Comprehension Syntax

```
ret = []  
for V in LIST:  
    ret.append(V_EXP)
```



```
ret = [V_EXP for V in LIST]
```

```
ret = []  
for V in LIST:  
    if BOOL_EXP:  
        ret.append(V_EXP)
```



```
ret = [V_EXP for V in LIST if BOOL_EXP]
```

- **V** is any variable: all list elements in order
- **V_EXP** is any expression, often use **V**

WOTO-1 List Comprehension Examples

<http://bit.ly/101s21-0302-1>

- In your groups
 - Come to a consensus

WOTO-1 List Comprehension Examples

```
[w for w in words if w.count('e') == 0]
```

- What does this represent? When is the if true/false?

```
[v*2 for v in range(6) if v % 2 == 1]
```

- What does this represent? What is the length?

```
sum([1 for x in words if len(x) > 4])
```

- What does this represent?

WOTO-2 List Comprehension Examples

<http://bit.ly/101s21-0302-2>

- In your groups
 - Come to a consensus

WOTO-2 List Comprehension Examples

```
words = ['giraffe', 'zebra', 'ant', 'lion', 'elephant']  
x = [2*x for x in [len(w) for w in words if len(w)>3] if x%2== 0]
```

```
words = ['giraffe', 'zebra', 'ant', 'lion', 'elephant']  
y = [len(w) for w in words if len(w) > 3]  
x = [2*x for x in y if x%2== 0]
```

Don't do this!!!

y is [7, 5, 4, 8]

x is [8, 16]

Break it up to two
list comprehensions

Difficult to debug!!!

Assignment 3: Transform

- **Reading and writing files**
 - We've seen how to read, writing is similar
 - Open, read, and close
 - Open, write, and close - `.write(...)`
- **Apply a function to every word in a file**
 - Encrypt and decrypt
 - Respect lines, so resulting file has same structure

Encrypting and Decrypting

- We give you:
 - Transform.py
 - Vowelizer.py - Removes vowels
- You implement
 - Pig Latin
 - Caesar cipher
- Challenge: Shuffleizer

Concepts in Starter Code

- **Global variables**
 - Generally avoided, but very useful
 - Accessible in all module functions
 - **FileDialog and tkinter**
 - API and libraries for building UI and UX
 - **Docstrings for understanding!**
- Look at code

Reminder: Global Variables (Best Practice)

- Best practice = help other humans read the code
- All variables that will be global are created with an initial assignment at the top of the file
- When used in a function, variable is declared global at the beginning of the function

Reminder:

What, where, read, write? (in 101)

What is it?	Where first created?	Where accessible? (read)	Where reassignable? (write)
Regular variable in main	In main	In main only (technically anywhere, but don't do that)	In main only
Regular local function variable	In function	In function only	In function only
Global variable	Top of file	If not reassigning the value, in main and all functions	In main or in any function that first declares it global

WOTO-3 – Globals

<http://bit.ly/101s21-0302-3>

- If you are done early, revise and collaborate on your notes!
- In your groups:
 - Come to a consensus

Tkinter and FileDialog

- This library and API is useful for creating GUIs
 - Difficult and not always about the big picture
 - Debugging can be frustrating
 - Tedium of making things right versus exultation in creating wonderful programs!
- If you don't see the rocket-ship? Go to Consulting hours
 - What happens when you run Transform?