ECS 10

2/15

Upcoming Schedule (changed)

- Monday – holiday
- Wds – Program 5 assigned
- Tues 2/26 Program 5 due
- Fri 3/1 – **MIDTERM 2**

The Rule

- If you're using functions, no code outside the main() function.

```
def main():
        ....
main()
```

Benefits of The Rule

- Variables in a function are local to that function.
- Information is passed between functions using arguments/parameters and return values.
- The flow of information should be clear.
- The main function is a roadmap to the rest of the program.

Multiple items as input

```
def power( base, pow ):
        result = 1
        for i in range(0,pow):
                result = result * base
        return result
def main():
        print( power( 2, 4 ) )
main()
```

Multiple items as output

```
def breakUp(s):
    items = s.split(",")
    name = items[0]
    age = items[2]
    return [name,age]
def main():
    data = "Clarabel,Clown,45"
    info = breakUp(data)
    print(info)
main()
```

- Use a list or tuple.

Lists as input to functions

- You can pass a list as input to a function
- Example: two loop program, written as two functions.
  - One loop reads a file and makes a list
  - Second loop does some computation with the list

Write main function first

```
def main():
    # read file and make list
    repList = readRepFile()

    # tell user who is rep for what district
    reportRep(repList)
```

- Kind of like an outline

Break up into logical bits

- Write functions as stubs first
- Roughly one loop per function

Warning! Example

```
def inc(y):
    # y is int
    y = y+1

def main():
    x = 1
    inc(x)
    print(x)
main()
```

- Prints 1

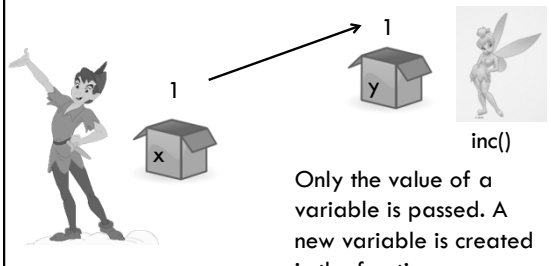
```
def inc(K):
    # K is list
    K[0] = K[0]+1

def main():
    L = [1]
    inc(L)
    print(L)
main()
```

- Prints [2]

Why? Lists can be huge.

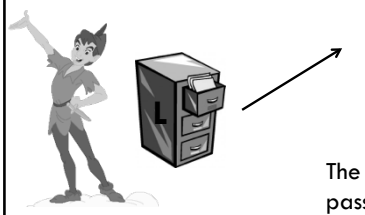
- One variable for whole filing cabinet full of data.
- Don't want to make a whole new filing cabinet every time you use a function.
- Exception to the rule that each function has its own variables; lists are shared

Inside Python - "pass by value"



Only the value of a variable is passed. A new variable is created in the function.

Inside Python – "pass by reference"

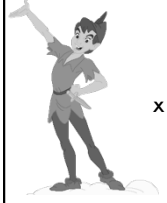


inc()

The entire list is passed.

main()

Inside Python



x

y

inc()

The entire list is passed. It's name might be changed.

main()

Coding standards

- Comment every variable where it is made; data type, role in program.
- Comment every loop; what does one pass through the block mean?
- Give different variables in different functions different names.
- Give list passed into a function the same name.