15-112
Lecture 2

Week 4 Thu
1-D Lists

Instructor: Pat Virtue

Poll 6

L = L*2 ← Nope

L + L

[...] + [...]

Which is best?

I.

```
def doubleValues(L):
    for i in range(len(L)):
        L[i] *= 2
```

II.

```
def doubleValues(L):
    for i in range(len(L)):
        L[i] *= 2
    return L
```

III.

```
def doubleValues(L):
    A = []
    for item in L:
        A.append(item*2)
    return A
```

IV.

```
def doubleValues(L):
    A = []
    for item in L:
        A.append(item*2)
```

Creates A but doesn't ret

Poll 6

Which is best?

I.

```
def doubleValues(L):
    for i in range(len(L)):
        L[i] *= 2
```

III.

```
def doubleValues(L):
    A = []
    for item in L:
        A.append(item*2)
    return A
```

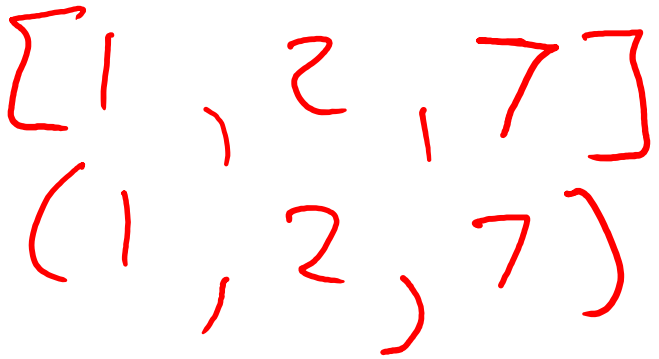
Poll 7

What does this print?

```
def f():
    return 'a', 3

x = f()
print(type(x))
```

I. <class ‘int'>
II. <class ‘str’>
III. <class ‘list’>
IV. <class 'tuple’>
V. (<class ‘str’>, <class ‘int’>)
VI. ERROR
VII. I have no idea



Tuples and List Comprehensions

Reference slide

Tuples

Like lists but immutable

FAIL: `myTuple[0] = 99`

Simulate multiple return values

```
def sumProd(x, y):
    return x+y, x*y
```

Multiple assignment

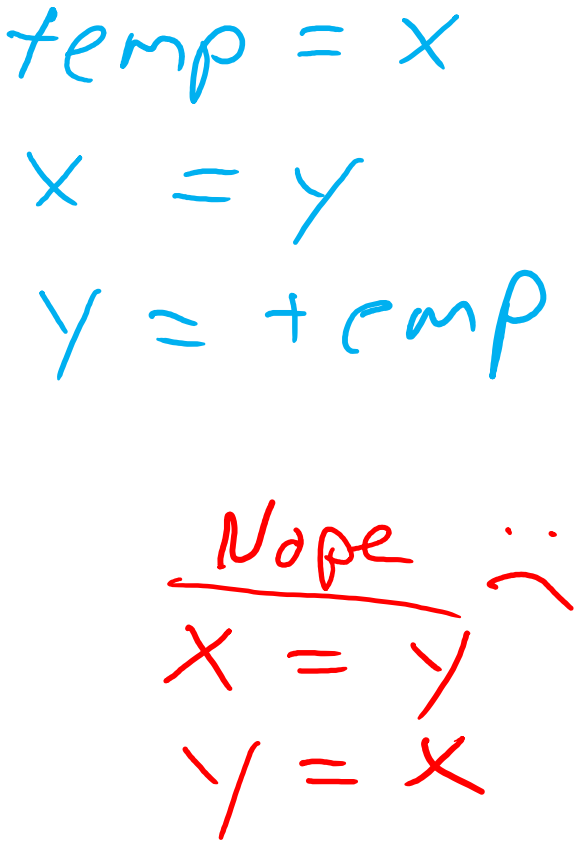
```
cx, cy = width/2, height/2
```

Single element tuples

```
myTuple = (99,)
```

One line swapping!

```
y, x = x, y
```



List Comprehension

Sample for loop

```
newList = []
for variable in sequence:
    newList.append(expression)
```

```
for x in range(10):
    newlist.append(x**2)
```

Python shorthand

```
newList = [expression for variable in sequence]
```

```
=[x**2 for x in range(10)]
```

Fashionable python

Image credit: https://www.nytimes.com/2020/09/21/style/exotic-skins-fashion-covid.html

Reference slide

List Comprehension

Sample for loop (now with a filter)

```
newList = []
for variable in sequence:
    if condition:
        newList.append(expression)
```

Python shorthand (now with a filter)

```
newList = [expression for variable in sequence if condition]
```

Image credit: https://www.nytimes.com/2020/09/21/style/exotic-skins-fashion-covid.html

1-D List Examples

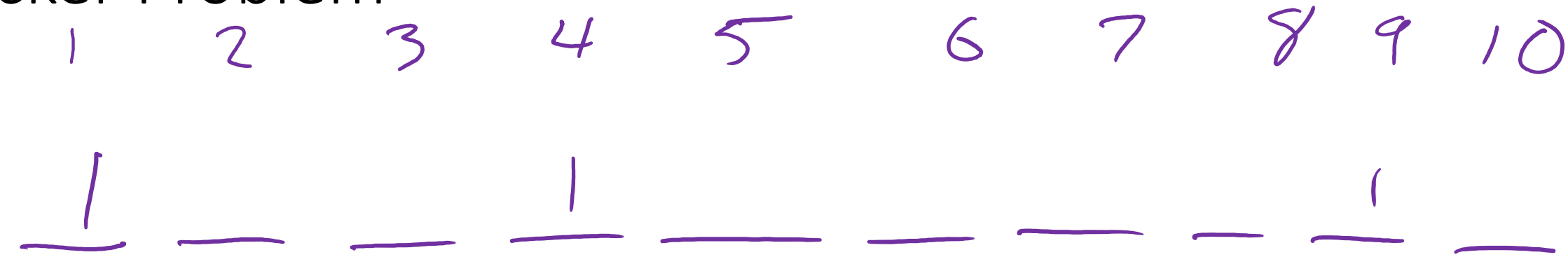
Anagrams

https://www.youtube.com/watch?v=_83ds4j16R8

"SETEC ASTRONOMY"

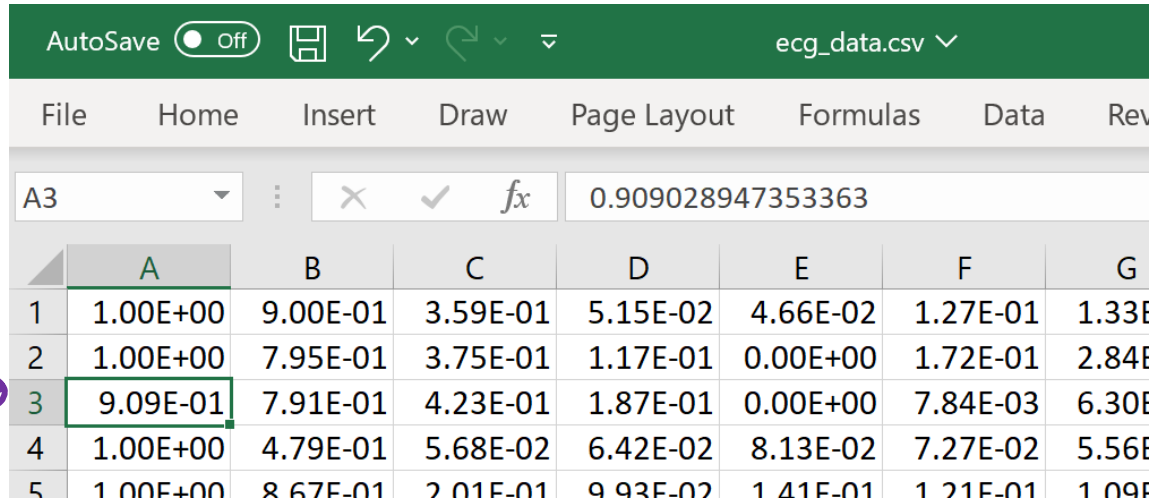
"TOO MANY SECRETS"

Locker Problem



Visualizing ECG Data

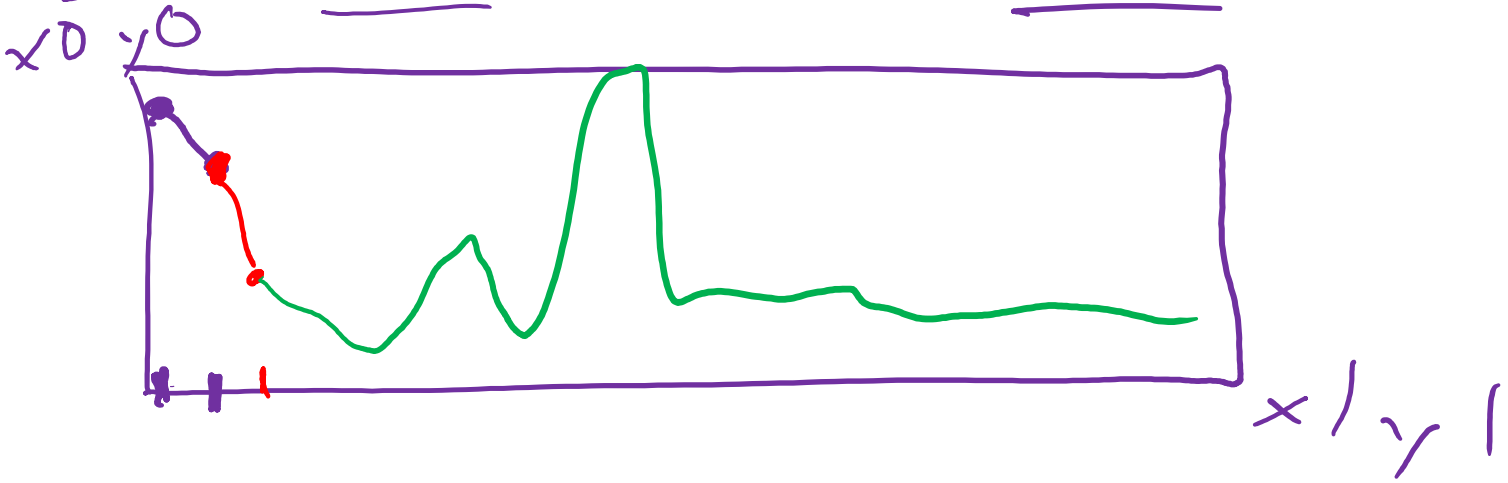
Data in CSV file



Data as list of floats

[0.909028947353363, 0.791[illegible], 0.42316865921020 51, ...]

Plot lines



Dataset: https://www.kaggle.com/datasets/shayanfazeli/heartbeat