CS1301

Recitation #10

Sections B1
Wednesday 4:35pm - 5:55pm
IC 217

Reminders

- Homework 8 - **Thursday, April 6th**
- Exam **next Wednesday, April 12th**
- TA applications **due this Sunday, April 9th**

Today’s Agenda

1. Object Oriented Programming
2. Exam 3 Topics
3. Exam 3 Review

Want to be a TA? Apply!

https://ta-app.cc.gatech.edu/index.phphttps://ta-app.cc.gatech.edu/index.php

Object Oriented Programming

OOP Overview

- Python is an object-oriented programming language. That means it provides features that support object-oriented programming (OOP).
- By 1980s that it became the main programming paradigm used in the creation of new software. (1960s roots)
- In OOP we focus on the creation of objects, which contain both data and functionality together.
- Usually, each object definition corresponds to some object or concept in the real world and the functions that operate on that object correspond to the ways real-world objects interact.
- We've already seen classes like Turtle, Math, Random, and many others. We are now ready to create our own user-defined class.

class

blueprints for creating objects.

```python
class Point:
    """ Create a new Point, at coordinates x, y """

    def __init__(self, x=0, y=0):
        """ Create a new point at x, y """
        self.x = x
        self.y = y

    def distance_from_origin(self):
        """ Compute my distance from the origin """
        return ((self.x ** 2) + (self.y ** 2)) ** 0.5
```

objects

- We first *define* a class.
- To create an object we must first ‘initialize it’ using the `__init__` method with the right number of arguments.

```
p = Point(1,1)

q = Point(2,5)
```

Question...
What is the type of the variables p and q?

Accessing attributes

- To access attributes, you use the dot operator
- Syntax: variable name. attribute name

```
p = Point(1,1)

print(p.x)

print(p.y)
```

Question...

What happens if we do the following?

```
>>> print(p.z)
```

Changing attributes

- To change the value of your attributes, you use the dot operator and the assignment operator (a.k.a =).
- Syntax: variable name. attribute name = new value

```
p = Point(1,1)

p.x = 5

print(p.x)
```

`self`

- Use methods for a specific instance.
- Let’s take a look at a method definition:
  - `def distance_from_origin(self):`
- `self` is the instance of the `Point` that the `distance_from_origin` method is being called on.

  ```
  >>>p.distance_from_origin()
  ```

Very Helpful OOP-Tutorial

https://jeffknupp.com/blog/2014/06/18/improve-your-python-python-classes-and-object-oriented-programming/

Live Coding

Coding Problem

Write a class called BankAccount, which has the following attributes and the following methods:

Attributes

- Owner
- accountId
- bankName
- balance

Methods

- deposit(amount)
- withdraw(amount)
- printAccountInfo()
- transfer(amount, other)

Exam 3 Topics

Topics

Try / Except

API / Requests Handout Concepts (no coding)

Big O

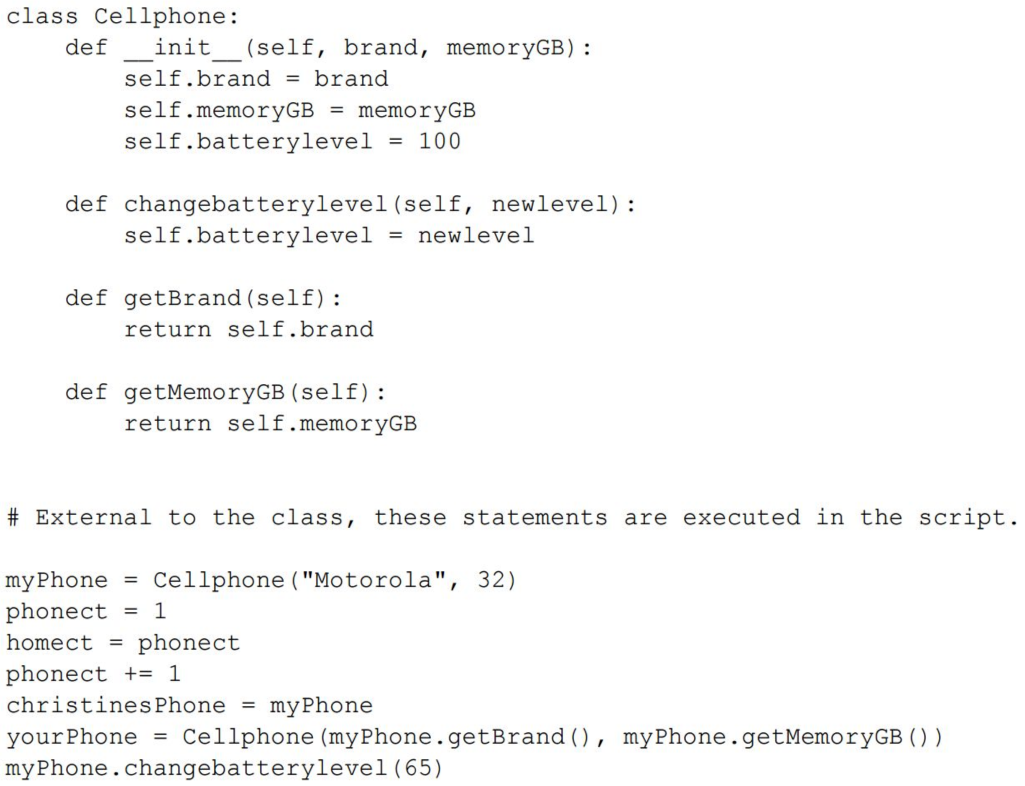
Searching

Sorting

OOP (concepts and coding)

Exam 3 Practice Questions

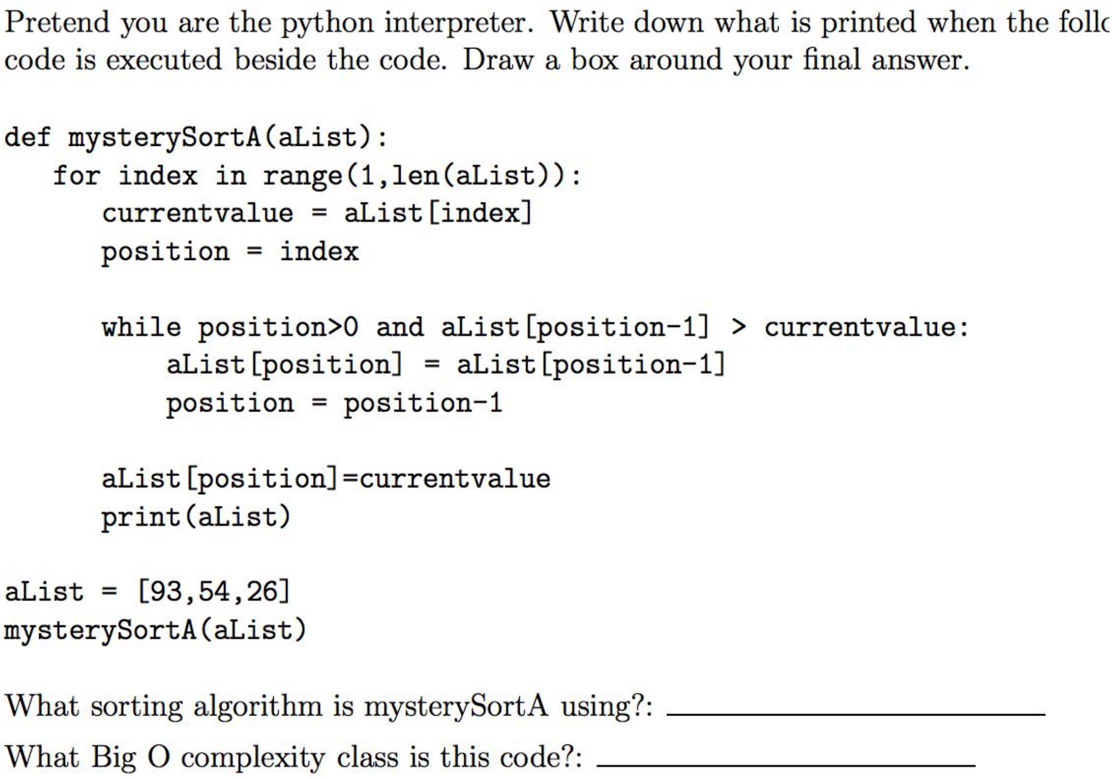
OOP Question



```
class Cellphone:
    def __init__(self, brand, memoryGB):
        self.brand = brand
        self.memoryGB = memoryGB
        self.batterylevel = 100

    def changebatterylevel(self, newlevel):
        self.batterylevel = newlevel

    def getBrand(self):
        return self.brand

    def getMemoryGB(self):
        return self.memoryGB


# External to the class, these statements are executed in the script.

myPhone = Cellphone("Motorola", 32)
phonect = 1
homect = phonect
phonect += 1
christinesPhone = myPhone
yourPhone = Cellphone(myPhone.getBrand(), myPhone.getMemoryGB())
myPhone.changebatterylevel(65)
```

What are christinesPhone and yourPhone 's battery levels after the code executes?

Sorting Question



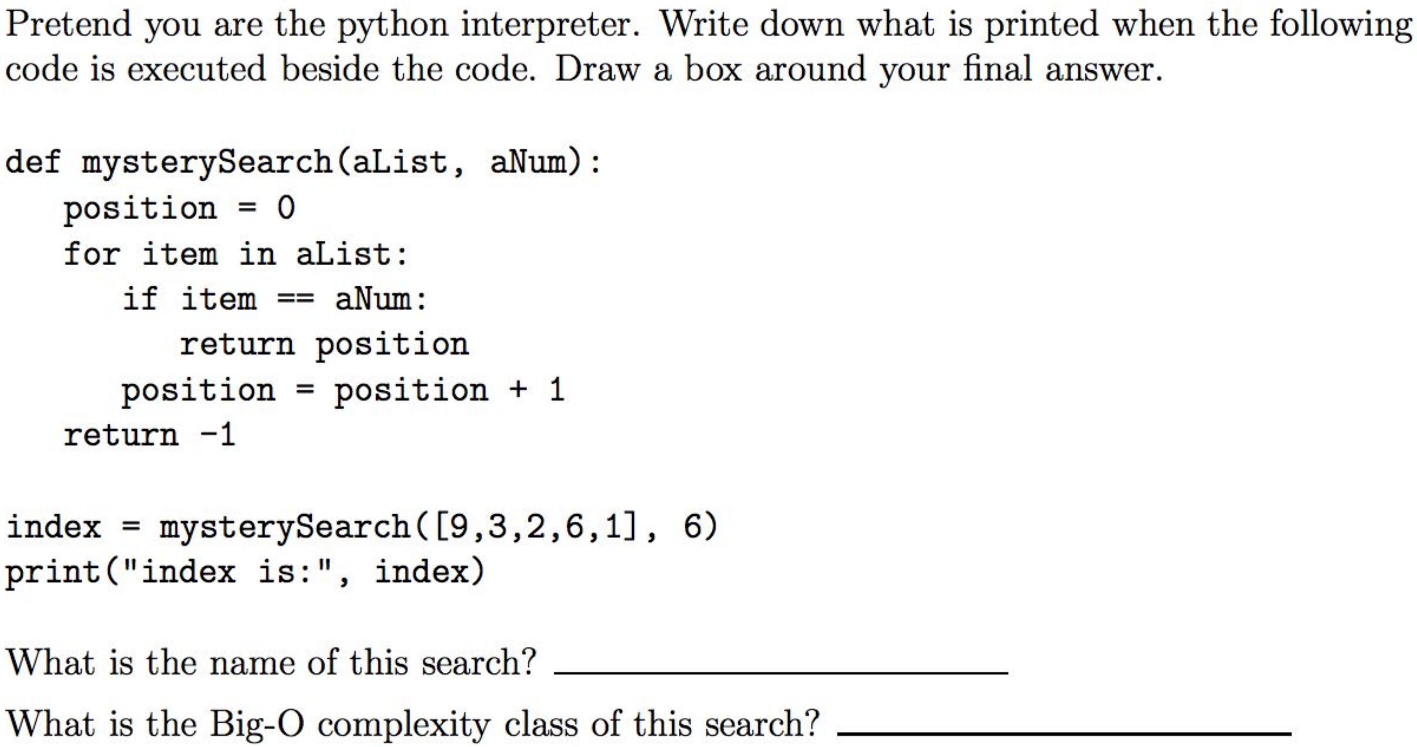
Pretend you are the python interpreter. Write down what is printed when the follc code is executed beside the code. Draw a box around your final answer.

```
def mysterySortA(aList):
   for index in range(1,len(aList)):
      currentvalue = aList[index]
      position = index

      while position>0 and aList[position-1] > currentvalue:
          aList[position] = aList[position-1]
          position = position-1

      aList[position]=currentvalue
      print(aList)

aList = [93,54,26]
mysterySortA(aList)
```

What sorting algorithm is mysterySortA using?: ________________________

What Big O complexity class is this code?: ________________________

Searching Question



Pretend you are the python interpreter. Write down what is printed when the following code is executed beside the code. Draw a box around your final answer.

```
def mysterySearch(aList, aNum):
   position = 0
   for item in aList:
      if item == aNum:
         return position
      position = position + 1
   return -1

index = mysterySearch([9,3,2,6,1], 6)
print("index is:", index)
```

What is the name of this search? ________________________

What is the Big-O complexity class of this search? ________________________

Any questions??