1. Write a class to represent a sphere. Implement a constructor, `getRadius(self)`, `volume(self)`, and `surfaceArea(self)`.

2. Consider the following description for a `Student` class.
   A student has a name, id number, graduation year, and a dictionary of classes they have taken and the grade points (4.0, 3.7, etc.) they received in the class.
   A student can graduate when they are a senior, taken 12 classes, and have a GPA of at least 2.0.
   When a `Student` object is created, assume they have not taken any classes yet.
   Implement a constructor, `addNewCourse(self, courseName, grade)`, `getGrade(self, courseName)`, `calculateGPA(self)`, and `canGraduate(self)`.
3. Will the following code produce an error? If not, what will it print?

class Fun:
    def __init__(self, foo, bar, fizz):
        self.x = foo
        self.y = bar
        self.z = fizz

    def total(self):
        return self.x + self.y + self.z

    def switch(self):
        self.x = self.y
        self.y = self.z
        self.z = self.x

    def __repr__(self):
        return "x: \n" + str(self.x) + ", y: \n" + str(self.y) + ", z: \n" + str(self.z)

firstFun = Fun(2,4,6)
secondFun = Fun(3,5,7)
thirdFun = firstFun
print(firstFun.total())
secondFun.total()
thirdFun.switch()
print(firstFun)
print(secondFun)
print(thirdFun)

apples = Fun([1,2], [4,5], [8,7,11])
oranges = Fun([0,0], [19,21], [1])
bananas = apples
bananas.total()
apples.switch()
print(apples.total())
print(oranges.total())
print(oranges)
print(apples)
print(bananas)
4. Write a simple Book class that has two instance variables: the name of the book and the year it was published.

5. Now, consider a dictionary, authorBooks, where the keys are authors’ names and the keys are lists of Books that they have written. Write snippets of code that accomplish the following things (assume that authorBooks has been defined appropriately):

(a) Print out the names of all the authors in authorBooks

(b) Print out the titles of all the books in authorBooks

(c) Find the author that has written the most books and print out their name and the number of books they have written.

(d) Find the book in authorBooks that was published first (earliest publication year) and print its author, title, and publication year
6. Write a function that takes as input a string and returns a list that contains the 3 letters that appear most frequently in the string:

7. What does the following code snippet print out?

```python
xs = ["cs", "math", "econ", "history", "biology", "sociology"]
for x in xs:
    print(x)
for x in range(len(xs)):
    print(x)
```

8. Does the following code create an error? If not, what does it output?

```python
pets = {
    "cats": 5,
    "dogs": 9,
    "birds": 2,
    "hamsters": 1
    "all pets": ["cats", "dogs", "birds", "hamsters"]
}
print("chinchilla" in pets)
pets["cats"] = 7
print("birds")
pets["dogs"] = pets["dogs"] + 1
for pet in pets["all pets"]:  
    print(pets[pet])
```