Practical Questions CSCA08 Fall 2017

Question # 1

Create the following classes with the specified variable(s) and method(s). Then make all of the classes interact in some sensible way

a) Create a Person class that has a name and age along with change_name, get_name methods and a speak method which states the name and age of the person. Create an Employee class that is a child class of Person that has a name, age and employee number.

b) Create a Shirt class that takes in the shirt size, color and pattern.

c) Create an Office class, which has a location and some number of employees

d) Create a Vehicle class that takes in the number of wheels, top speed and max number of occupants of that vehicle. Create a Car and a Bicycle class, which are each children of the Vehicle class. Instead of rewriting the __init__ method in the Car and Bicycle classes, use the __init__ method of the Parent class.

e) Create an Animal class that has a sensible variables and methods, along with a sound method, which returns a generic sound made by animals. Make a Horse class that is a child of the Animal class with its own sound method, which returns "Neigh".

f) Create a Centaur class which is a child of the Person class and the Horse Class. It should have all the methods and attributes of both parent classes

g) **Challenge**

Extend these classes in some new and interesting way, or come up with your own set of interacting classes. Impress your TA (either with your technical skills, or your creativity) to earn the challenge points.

Discussion Questions

Question # 2

In python, a class can have more than one parent. Say you had a class Professor, who is a child class of both Person and UniversityFaculty which each has a method identity(). If the class Professor did not define its own identity method, which identity method would be used when someone called brian.identity(), where brian is a Professor Object?

Question # 3

You have learned this week that when creating a class that is a child of another class, you put the parent class inside of the brackets when defining the class, class ChildClass(ParentClass). If you don't put any class within the brackets, does that mean that your newly defined class doesn't inherent from any other class? Do you think there may be some class(es) that all other classes must be a child class of? Why did the developers of Python choose to implement inheritance this way?

Question #4

In lecture, Brian said that when writing methods in a child class, you can either create your own method, use your parent's method, or have a hybrid approach where you use your parent's method, but also add your own code. He also said that 99 times out of 100 you will be using the hybrid approach for __init__. Why is that?

Question # 4, The “Logic Question” **(Challenge)**

You are trying to toast and butter 3 pieces of bread. You have an old fashioned `turnover’ toaster (Google it, and then be glad you live when you do). It holds 2 slices of bread at once, but only toasts one side of each at a time. To toast a piece of bread fully you must put it in, toast one side, open the toaster door, flip it over, and then toast the other.

It takes 3 seconds to put a slice of bread into the toaster, 3 seconds to take it out, and 3 seconds to flip a slice over. You can’t try to insert/remove/flip on both sides at once (you’ll get burned). It takes 30 seconds to toast one side of a piece of bread, and 12 seconds to butter a piece of bread. You may pause the buttering to move a slice of bread, but you can’t do both simultaneously (seriously, these things were dangerous, use both hands).

You can’t butter a side of a piece of bread until it has been toasted, but you can put a buttered slice of bread into the toaster to toast its other side.

How long will it take you to get three pieces of bread toasted on both sides with butter on one side of each?