

CS521 Homework 6

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Purpose

In this assignment, you will be demonstrating your understanding and use of python classes and inheritance and polymorphism, as covered in module 6.

Assignment Background

This assignment makes use of inheritance to create a set of related classes. At the end, you will have a more complex structure of parent-child classes than you saw in the module's examples.

Assignment Statement

- You will create the following classes using inheritance:
 - A base class called Pet
 - A mix-in class called Jumper
 - A Dog class and a Cat class that each inherit from Pet and Jumper
 - Two classes that inherit from Dog: BigDog and SmallDog
 - One classes that inherit from Cat: HouseCat
- The general skeleton of the Pet, Dog, and BigDog classes will be given to you, but you will have to identify the required inheritance for a class. You will be responsible for writing the functionality of those classes and their methods.
- A description of each class's functionality, as well as the data to use, is in the requirements below.
- You will be required to write the code to exercise your classes per the requirements.

Requirements

Use the provided template to complete the following. The details are in the skeleton file.

1. The Pet class:
 - a. Assign values to two variables: kind and color
 - b. Implement the constructor to initialize the pet's name
 - c. Implement `__str__` method per skeleton
 - d. Implement `do_tricks` method per skeleton
2. The Jumper class
 - a. Implement the jump method per the skeleton
3. The Dog class
 - a. Decide which classes to inherit from and implement inheritance
 - b. Change the kind to canine
 - c. Implement `__str__` per skeleton
 - d. Implement `__call__` per skeleton
4. The BigDog class
 - a. Change the color to tan
 - b. Implement `__str__` per skeleton
 - c. Implement `speak` per skeleton
5. The SmallDog class
 - a. Change the color to brindle
 - b. Implement `__str__` per skeleton
 - c. Implement `speak` per skeleton
6. The Cat class
 - a. Change the kind to feline
 - b. Implement `__str__` per skeleton
 - c. Implement `speak` per skeleton
 - d. Implement `climb` per skeleton
7. The HouseCat class
 - a. Change the color to white
 - b. Implement `__str__` per skeleton
 - c. Implement `speak` per skeleton
8. Create the code to exercise the class structure according to the following:
 - a. Instantiate each class(except Jumper)
 - b. Create a list of the instantiated objects
 - c. Loop through the objects
 - d. For each object:
 - i. Print `__str__`
 - ii. print the kind of pet
 - iii. Print the Color of the pet
 - iv. Have the pet do tricks
 - v. if applicable, print rollover action and the owners name
 - vi. If applicable, have the pet climb
 - vii. To separate each pet, print a line of underscores or dashes

Sample Output

Your output should look something like this and should be in this order:

I am a brown animal named Rover

animal

brown

Rover is doing tricks

I am a cat named Lion

feline

brown

Lion is doing tricks

Lion says Meow!!!

Lion is jumping

Lion is climbing the curtains again – note climbing action is for Cats

I am a dog named Roo

canine

brown

Roo is doing tricks

Roo is jumping

Roo is rolling over – note rollover and owner actions are for Dogs

My owner is George

Noah is a large, muscular dog

canine

tan

Noah is doing tricks

Noah says Woof!!!

Noah is jumping

Noah is rolling over

My owner is George

Lucky is a tiny, cute dog

canine

brindle

Lucky is doing tricks

Lucky says Yip!

Lucky is jumping

Lucky is rolling over

My owner is George

Zebra is a cat with fluffy, white fur

feline

white

Zebra is doing tricks

Zebra says Purr
Zebra is jumping
Zebra is climbing the curtains again

Process finished with exit code 0

What to Deliver

You are required to supply a single file - *emailID_hw6.py* (example: marc10is_hw6.py)

Notes

- Start by identifying and ordering the objectives.
- Look at the skeleton – there is a lot of guidance in it. The amount you need to code is smaller than in our other assignments. We want to make sure that you see how the different classes work together to show inheritance and polymorphism. This would be way too big an assignment without the skeleton.
- The “exercising your pet” portion of this tests all the methods and classes created in this assignment. Your output should match the order of the sample output provided. You can get “creative” – for instance, instead of “My owner is George”, feel free to say something along the lines of “My owner, George, is the BEST owner in the whole world” But it should all still print in the order below.
- A 25-point deduction for one day late. After 1 day late, a 0 will be given.

Grading

Pet class:

1. Variable assignment – 2 points
2. Implement constructor – 2 points
3. Implement `__str__` - 2 points
4. Implement `do_tricks`
 - a. Print statement – 2 points
 - b. Call `speak` method – 1 points
 - c. Call `jump` method – 1 points

Jumper Class

5. Implement `jump` – 2 points

Dog Class

6. Add inheritance – 5 points
7. Change `kind` variable – 2 points

8. Implement `__str__` - 2 points
9. Implement `__call__` - 5 points

BigDog Class

10. Add inheritance – 2 point
11. Change color to tan – 2 points
12. Implement `__str__` - 2 points
13. Implement speak – 2 points

SmallDog class

14. Add inheritance – 2 point
15. Change color to brindle– 2 points
16. Implement `__str__` - 2 points
17. Implement speak – 2 points

Cat class

18. Add inheritance – 2 points
19. Change kind to feline – 2 points
20. Implement `__str__` - 2 points
21. Implement speak – 2 points
22. Implement climb – 2 points

HouseCat class

23. Add inheritance – 2 point
24. Change color to white– 2 points
25. Implement `__str__` - 2 points
26. Implement speak – 2 points

Use your code

27. Instantiate each class(except jumper) – 4 points
28. Create a list of the instantiated objects – 1 points
29. Loop through the objects – 2 points
30. Print `__str__` - 4 points
31. print the kind of pet – 2 points
32. Print the Color of the pet – 2 points
33. Have the pet do tricks – 8 points
34. if applicable, print rollover action and the owners name – 8 points
35. If applicable, have the pet climb – 8 points
36. To separate each pet print underscores or dashes – 1 points