UNIVERSITY OF CALIFORNIA, MERCED

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CSE-165: Object-Oriented Programming
Lab 5

Spring 2024

Preliminary Notes

- Write separate file(s) for each exercise. Zip all your files together and submit the zip file to CatCourses.
- Your solution must be exclusively submitted via CatCourses. Email submissions will not be accepted. Pay attention to the posted deadline!

1 Inheritance (50 points)

The file **Animal.h** contains an Animal class that stores the name and age of a generic animal. Besides the appropriate constructors, getters, and setters, it has a function called feed() which prints out the message "Some food, please!"

Dogs are one kind of animal, so we can extend the Animal class to produce a Dog class. Create a Dog class which inherits from the Animal class and change its constructor and destructor to print more appropriate messages and change the feed() function to print a message saying "Dog food, please!"

Your class should be stored in **Dog.h**. Your solution will be tested with the file **animals.cpp**.

Example Output:
Creating Generic Animal
Creating Dog
Snoopy is 4 years old.
Dog food, please!
Deleting Dog
Deleting Generic Animal

2 More on Inheritance (50 points)

Suppose we wish to store several different animals in an array. We do not know ahead of time what kind of animals they will be. C++ allows us to create a vector of pointers to Animal, and store in that vector any object of type Animal or a descendant of Animal.

Reuse the **Animal.h** and **Dog.h** files from the previous exercise and get the **display.h** file. Write a C++ program that reads in an integer N. This is followed by N lines, where each line contains a character, a

string, and an integer, separated by spaces. The character will either have the value A or D, indicating whether the animal described on this line is a generic animal (A) or a dog (D). The string and the integer describe the animal's name and age, respectively.

For each line of input, instantiate the appropriate object and push it to the vector of pointers to Animal that you have created, using upcasting if necessary. Once you have pushed all the animals to the vector, call the display function, found in display.h, with your vector passed as an argument.

Put your program in **Inherit.cpp**.

Example Input/Output:

```
2
A Rex 7
Creating Generic Animal
D Snoopy 4
Creating Generic Animal
Creating Dog
Rex
Snoopy
```