CSC 230: Elementary Data Structures and Algorithms

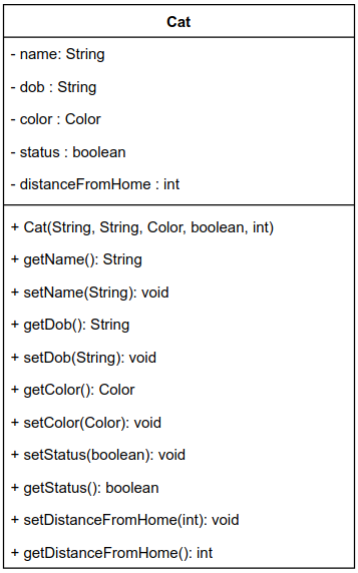
Fall 2022

Assignment 2

- General programming guidelines:
  - Create a separate NetBeans project with the name `QuestionXX`, where `XX` is the question number.
  - Do not forget necessary javadoc comments before classes and methods.
  - You should use *single line* or *multiline* comments, **if it is required**. Do not put unnecessary comments (Do not state the obvious!!!).
  - Use meaningful identifier.
  - Throw `IllegalArgumentException` if appropriate after argument checking.
  - Don't forget to check the parameters of your methods and throw appropriate exceptions as necessary.
  - **Creating correct NetBeans projects, zipping your final assignment folder, and testing it before uploading are your responsibilities. If any of these steps fails, you will receive a grade of zero.**
- Academic integrity policy
  - You are **not** allowed to use any online resources EXCEPT the book, class lecture notes and Java documentation.
  - All programs/ code must be your own work.
  - You should be able to clearly explain every line of your code, if instructor requests you to do so.
  - Any violation of these policies will be considered as plagiarism and dealt accordingly.

Question 1 (50 points) Create a public class to abstract a cat according to the following UML diagram. Note the followings.

- The date of birth is a `String`. This can result invalid entries, but you can ignore it for the time being.
- The `Color` can only be white, black, orange, white_orange, white_black, black_orange (you can add more if you want!!!). You can define `Color` an an enumerated type. I will show you that in class.
- The `distanceFromHome` is the radial distance from home (Note: A sleeping cat cannot walk!!!).
- The `status` tells whether your cat is sleeping or not.



Create a cat with the name "Tom" with appropriate parameters for the constructor. Make sure to test/show all your methods (getters and setters) are working appropriately.

Question 2 - Asymptotic Analysis (50 points) This question needs a written answer. Do not forget to put your answer inside your assignment folder with above programming question before you zip and upload. If you are submitting a scanned copy of a handwritten answer, make sure it is legible.

Write pseudo-code to find the maximum element of an array of length n. Now use the second technique demonstrated in class (assign cost to each line and find the total cost) to come up with the running time.

1. Do we have cases (best, worst) in this particular problem?
2. What is the running time, $T(n)$? What is the shape of the function?