

## CS456 Homework Assignment 3

**Due date:** \_\_\_\_\_

**General info:** Turn in all code on both paper and by email (to [dbahr@Regis.edu](mailto:dbahr@Regis.edu) with “CS456 Homework” in the subject line). Use old-fashion paper for everything else. For calculations, please show all your work.

In the real world, your ideas and your work must be communicated effectively to your boss, to your client, and to potential investors. Therefore, please use succinct but clear and well-written English for your answers (as if I was your boss). Sometimes you will need to look up salient facts to effectively support your ideas and answers. Please briefly quote sources.

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**Problem #1:** In my Artificial Life class, we use graphics to display artificial “critters” moving around on the screen. Download that graphics code and draw an appropriate class diagram. Don’t forget to show associations, inheritance, aggregation, and composition. To keep things simple, don’t include multiplicities, constraints, methods, or instance variables in the diagram (unless you really feel like it).

The code is available at <http://academic.regis.edu/dbahr/>. Go to the “Artificial Life” link and then the “Homework Assignments” link. Download the “graphics code for Final Project”. There are 8 classes, but you may need to show some additional Java classes if they are important (e.g., when one of the graphics classes inherits from a class in the Java API).

**Problem #2:** The World Wildlife Federation is monitoring endangered species in East Africa. East Africa is composed of the following nations: Somalia, Ethiopia, Kenya, Tanzania, Rwanda, Uganda, Burundi, Malawi, and Mozambique. Only Kenya and Tanzania are politically stable, but crime and corruption is high in both and may push Kenya into political instability. Zanzibar is part of Tanzania but may soon seek political independence, pushing Tanzania into war and instability. Tourists still visit politically stable countries. Endangered species are threatened by political instability because tourists stop visiting and fewer tourist dollars are available for conservation efforts.

- (a) Pick classes for code that the WWF can use to monitor the endangered species. Please assume that each country has many common features, but that each country also has many unique features (cultural, geographical, geological, and other unforeseeable elements) that might need to be added to the code at a later date.
- (b) Give a UML diagram showing the likely relationships between the classes. Include multiplicities, constraints, etc. Include any public or private methods or variables that you consider essential to describe the code to your client.

**Problem #3:** Convert your UML diagram from problem #2 into a Java classes. *Only include* the class declarations, method declarations, and variable declarations – the details (i.e., the insides or guts) of the methods, constructors, etc. are not necessary for this assignment. You do not need to include methods or variables unless they were listed in your UML diagram.

Note 1: If it is on your UML, then it *has* to be in your code! Period. No exceptions. You have been warned!

Note 2: If it is not in your code, then it shouldn't be in the UML. Period. No exceptions.

Note 3: On the other hand, if it is in your code, it does not have to be in your UML. For example, you may decide to leave some code out the UML if it would only confuse the UML.

*Warning:* Does your code compile? Just because you didn't include details doesn't mean that your code shouldn't compile! Just leave the methods empty and then compile to make sure that you haven't forgotten something silly.