

Problem Set 2

1. Refactor the MusicalInstrument constructors such that each invokes the mutator methods, rather than setting attributes directly. It is better programming practice for constructors to invoke mutator methods rather than setting instance variables directly. This programming paradigm is known as *delegation*.
2. Establish a constant instance variable (UNKNOWNNAME) set to the value "UNKNOWNNAME". Establish a constant instance variable (UNKNOWNNTYPE) set to the value "UNKNOWNNTYPE". Establish a constant instance variable (UNKNOWNKEYSORSTRINGS) set to the value -1. These will be used in mutators to indicate an attribute has not been set to a meaningful value.
3. The default constructor should set the numberOfKeysorStrings , type and name attributes to the constants UNKNOWNKEYSORSTRINGS , UNKNOWNNTYPE and UNKNOWNNAME respectively by invoking each attribute's mutator.
4. The setNumberOfKeysorStrings mutator method needs to "protect" the numberOfKeysorStrings instance variable from invalid values. Place a precondition in setNumberOfKeysorStrings() to verify the value passed in is within the range 0-100 or UNKNOWNKEYSORSTRINGS. Any other value will result in numberOfKeysorStrings being set to UNKNOWNKEYSORSTRINGS. Establish constants for these upper and lower limits.
5. The setName() mutator method must protect the name attribute from a null String or a String not containing any characters. If either of these values are passed in, set the name attribute to UNKNOWNNAME.
6. The setType() mutator method must protect the type attribute from a null String or a String not set to "woodwind", "string", "brass", "keyboard" or "percussion". Set the type attribute to UNKNOWNNTYPE if these values are not specified or a null or empty String is specified.
7. Do not assume String values are of any case. That is a type maybe Brass, brass or BRASS and so on.
8. Given the refactored MusicalInstrument class supply the following in a class named ProblemSet2:
 - Place the class in package edu.monmouth.problemSet2.
 - Create a MusicalInstrument object using the default constructor
 - Retrieve and print all attributes for this object
 - Using the three mutators, set this object's attributes to valid values
 - Retrieve and print all attributes for this object
 - Create another MusicalInstrument object specifying valid values for all attributes.
 - Retrieve and print all attributes for this object
 - Using a mutator method, change this object's name to "snare drum", its type to "percussion" and its numberOfKeysorStrings to 0.
 - Retrieve and print all attributes for this object
 - Create a number of other MusicalInstrument objects specifying invalid values for numberOfKeysorStrings, name and type. Retrieve and print all attributes for these objects.

Assignment Questions

1. Explain each of the following in full and complete sentences with an example:
 - Polymorphism
 - Method overloading
 - The "this" reference
 - API
2. The Java class String is part of what package?
3. What Java keyword is used to declare a constant value?

Submit:

- Output proving all requirements are met in a file named HW2.txt to eCampus
- Complete, well written answers to assignment questions in a file named ProblemSet2.txt to eCampus
- The link to your GitHub repo for this assignment to eCampus
- All source to GitHub <https://classroom.github.com/a/PZ0s6pob>

