**ITEC 2150**

**IC4**

**Summer 2018**

In this program we will be using inheritance, abstract classes, the Comparable interface and writing to a file. You will also need to create a custom exception which you must use and catch.

Create an abstract class Animal. This class should contain instance variables as follows:

* String name – must be at least 1 character but not more than 10 characters.
* int paws – must be from 0 to 4
* methods
  + abstract speak() – returns a String
  + toString() – returns name and number of paws
  + getters/setters
  + constructors – as needed
  + Should implement the Comparable interface. Compare on the name of the animal

Create a Dog class that extends Animal

* Implement the abstract speak method – return “Woof, woof!”
* Create a toString() method – should print the type of animal add the Animal toString() and append the results of the speak method.

Create a Cat class that extends Animal

* Implement the abstract method – return “Meow”.
* Create a toString() method – should print the type of animal add the Animal toString() and append the results of the speak method.

Create an InvalidAnimalException which will be used if an invalid animal is entered.

Create an AnimalTester class.

* Create an array of Animals – at least 5 Animals.
* Using a Random assignment – Assign a mixture of Cats and Dogs to the array.
  + You will need a method to allow users to enter the name and number of paws. This cannot be static.
* Write the original array to a file.
* Sort the array.
* Write the sorted array to the same file.
* Read the file and print the results.
* You must use your custom exception to tell the user if their entry is invalid.

Sample output:

Please enter the animal's name.

Dusty

Please enter the number of paws for Dusty.

4

Please enter the animal's name.

You must enter a name.

Please enter the animal's name.

A really long pet name

A really long pet name is not a valid name.

Please enter the animal's name.

Kenai

Please enter the number of paws for Kenai.

4

Please enter the animal's name.

Fluffy

Please enter the number of paws for Fluffy.

-4

An animal must have between 0 and 4 paws.

Please enter the number of paws for Fluffy.

6

An animal must have between 0 and 4 paws.

Please enter the number of paws for Fluffy.

3

Please enter the animal's name.

Buddy

Please enter the number of paws for Buddy.

4

Please enter the animal's name.

Dinky

Please enter the number of paws for Dinky.

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Unsorted List:

Dog Dusty 4 Woof, woof!

Cat Kenai 4 Meow

Cat Fluffy 3 Meow

Dog Buddy 4 Woof, woof!

Dog Dinky 2 Woof, woof!

Sorted List:

Dog Buddy 4 Woof, woof!

Dog Dinky 2 Woof, woof!

Dog Dusty 4 Woof, woof!

Cat Fluffy 3 Meow

Cat Kenai 4 Meow