Lab 09: Return of the Cow

Overview

This lab's purpose is to provide students with experience in file I/O. It is recommended that students use command line tools and editors for this lab (though it is not strictly speaking required). This lab will require students to build on their previous lab experience, in which a version of the **cowsay** utility was created.

Specification

Students will update the driver program (`cowsay.py`) and also add one new class – `FileCow` (in file_cow.py). The `FileCow` class should extend the `Cow` class, and `IceDragon` must be derived from `Dragon`. As before, `heifer_generator.py` is provided for you – but updated to handle the new `FileCow` class. (Please refer to specification for previous lab for a refresher.) Students may implement protected attributes and methods if they choose to do so. This is not required – it is purely optional. **No public attributes / methods should be added to the specification!**

cowsay.py (Program Driver)

Your program must accept command line arguments as follows:

`python3 cowsay.py -l`	Lists the available cows
`python3 cowsay.py MESSAGE`	Prints out the MESSAGE using the default COW
`python3 cowsay.py -n COW MESSAGE`	Prints out the MESSAGE using the specified built-in COW
`python3 cowsay.py -f COW MESSAGE`	Prints out the MESSAGE using the specified FILECOW

```
>python3 cowsay.py -l
Cows available: heifer kitteh dragon ice-dragon
File cows available: moose turkey turtle tux
```

Note that this version of the utility handles a special set of `Cow`-derived `FileCow` objects. The `HeiferGenerator` will automatically create `FileCow` objects (using the `FileCow` constructor) from files in the "cows" directory.

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Previous Work

The following classes, developed previously, are required for this lab to function.

Cow
```
__init__(self, name) # Constructor
get_name(self) # Returns name of this cow object
get_image(self) # Returns image for this cow object
set_image(self, image) # Sets the image for this cow object to image
```

Dragon (extends Cow)
```
__init__(self, name, image) # Constructor
can_breathe_fire(self) # Defaults to true
```

IceDragon (extends Dragon)
```
__init__(self, name, image) # Constructor
can_breathe_fire(self) # Returns false
```

FileCow Class

The `FileCow` class must be derived from the `Cow` class. In addition, `FileCow` must add the following behavior:

`__init__(self, name, filename)`
Constructor; creates a new `FileCow` object with the given **`name`** and an image loaded from **`filename`**.
If the file cannot be loaded, it should ***raise*** a new `RuntimeError` with the message **`"MOOOOO!!!!!!"`**. This should be the **only** public constructor for the `FileCow` class!

`set_image(self, image)`
Should immediately ***raise*** a new `RuntimeError` with the message **`"Cannot reset FileCow Image"`**.

Submissions

NOTE: Your output must match the example output *exactly*. If it does not, ***you will not receive full credit for your submission***!

Files: cowsay.py, file_cow.py, cow.py, dragon.py, ice_dragon.py
Method: Submit on ZyLabs

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Sample Output

```
>python3 cowsay.py Hello World!

Hello World!
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>python3 cowsay.py -n kitteh Moew-Moew!

Moew-Moew!
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>python3 cowsay.py -l
Regular cows available: heifer kitteh dragon ice-dragon
File cows available: moose turkey turtle tux

>python3 cowsay.py -n ninja Hello world!
Could not find ninja cow!

>python3 cowsay.py -f tux Do you have any herring?

Do you have any herring?
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>python3 cowsay.py -f alien Earth is ours!
Could not find alien cow!

>python3 cowsay.py -f kitteh MEOW!!!
Could not find kitteh cow!

>python3 cowsay.py -n tux How about tuna?
Could not find tux cow!
```