

## Lab 08: Return of the Cow

### Overview

This lab's purpose is to provide students with experience in file I/O and C++ exceptions. 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. Students will need to look up the constructors for some C++ standard objects, such as exceptions, in the C++ documentation to complete this lab. Note that you will need to set the language version to C++17 in your CMakeLists.txt file for this project.

### Specification

Students will update the driver program class (**cowsay**) and also add one new class - **FileCow**. The **FileCow** class should extend the **Cow** class, and **IceDragon** must be derived from **Dragon**. As before, the **HeiferGenerator** class 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 chose to do so. This is not required – it is purely optional. **No public attributes / methods should be added to the specification!**

### Cowsay Class (Program Driver)

Your program must accept command line arguments as follows:

<b>cowsay -l</b>	Lists the available cows
<b>cowsay MESSAGE</b>	Prints out the <b>MESSAGE</b> using the default cow
<b>cowsay -n COW MESSAGE</b>	Prints out the <b>MESSAGE</b> using the specified built-in <b>COW</b>
<b>cowsay -f COW MESSAGE</b>	Prints out the <b>MESSAGE</b> using the specified file <b>COW</b>

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.

```
>cowsay -l
Regular cows available: heifer kittah dragon ice-dragon
File cows available: moose turkey turtle tux
```

### Previous Work

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

#### Cow

```
public Cow(const string& _name)           // Constructor
public string& getName()                   // Returns name of this cow object
public string& getImage()                   // Return image for this cow object
public virtual void setImage(const string& _image) // Sets image for this cow object
```

#### Dragon (extends Cow)

```
public Dragon(const string& _name, const string& _image) // Constructor
public bool canBreatheFire()                          // Defaults to true
```

### IceDragon (extends Dragon)

```
public Dragon(const string& _name, const string& _image)    // Constructor
public bool canBreatheFire()                                // Returns false
```

## FileCow Class

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

```
public FileCow(const string& _name, const string& 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 **throw** a new **std::ifstream::failure** exception object with the message "MOOOOOO!!!!!!". This should be the **only** public constructor for the **FileCow** class!

```
public void setImage()
```

Should **throw** a new **std::runtime\_error** exception object with message "Cannot reset FileCow Image".

## Submissions

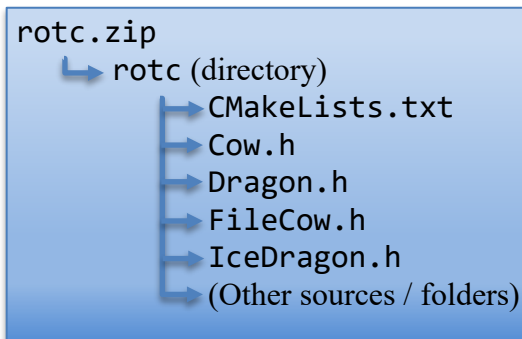
**NOTE:** Your output must match the example output *\*exactly\**. If it does not, *you will not receive full credit for your submission!*

Files:           rotc.zip  
Method:          Submit on Canvas

### Compressed Archive (rotc.zip)

We do not list required source files, only headers. You may include any additional source or header files in addition to those listed, but you must have the listed files at a minimum.

Your compressed file should have the following directory/file structure:



## Sample Output

```
>javac Cowsay.java
>java Cowsay Hello World!
```

Hello World!

```
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    ||----w |
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```

Moew-Moew!

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(continued)

```
Regular cows available: heifer kitteh dragon ice-dragon
File cows available: moose turkey turtle tux
```

Could not find ninja cow!

Do you have any herring?

$$\begin{array}{c} \cdot \text{---} \cdot \\ | \text{ } \text{ } | \\ | \text{o} \text{---} \text{o} | \\ | \text{:} \text{---} / | \\ // \quad \backslash \backslash \\ ( | \quad | ) \\ / ' \backslash \quad \backslash / \backslash \\ \backslash \quad ) = ( \quad / \end{array}$$

Could not find alien cow!

Could not find kitteh cow!

Could not find tux cow!