



# Lab 03: The Cow Says...

## **Overview**

This lab is designed to introduce students to the Bash Command Line Interface (CLI) and the concept of CLI arguments and give them practice writing classes. For (only) this lab, you are not allowed to use any windowed editor (such as IntelliJ, Eclipse, or Notepad++). Instead, you will use a Unix-based command line editor.

The **cowsay** utility is a popular Unix program from the 20<sup>th</sup> century (see <a href="https://en.wikipedia.org/wiki/Cowsay">https://en.wikipedia.org/wiki/Cowsay</a>). You will write a slightly simplified **cowsay** program that takes in several arguments and prints out different text depending on the arguments. You must log in to the school computers using your CISE account to do this lab.

## **Tools**

Please note that **you must use a text editor and the terminal to edit and run your program and its directories.** It is advised students learn/review basic Unix shell commands before beginning; a good run-through can be found here: <a href="https://linuxjourney.com/lesson/the-shell">https://linuxjourney.com/lesson/the-shell</a>.

Follow these steps to get started on the lab:

- 1) Open a terminal and enter the **pwd** command to identify the <u>path</u> to the <u>w</u>orking (current) <u>directory</u> (folder)
- 2) Enter 1s to list the contents of the current directory
- 3) Use the **mkdir** command to <u>make</u> a new <u>directory</u> called Cow*Lab*.
- 4) Use 1s to see the change, then **cd** to change to the directory Cow*Lab*.
- 5) Do your lab work in that folder. Use your googlefu skills to find more commands.

Recommended text editors include **nano** and **joe**. (If you hate yourself, you can use **vi** or **emacs** too.) You'll also need to use the **python3** program to execute Python programs. You can also use its interactive shell for testing.

You can read more information about some of these commands here:

https://www.howtogeek.com/howto/42980/the-beginners-guide-to-nano-the-linux-command-line-text-editor/https://introcs.cs.princeton.edu/java/15inout/linux-cmd.html

## **History of Command Line Names (Just for Fun)**

In case you are wondering... **nano** is a free-software version of a program called **pico**, which is the stand-alone editor for <u>Pi</u>ne at the <u>co</u>mmand line. The **pine** email program was an alternative version of Elm – you see, <u>P</u>ine <u>Is Not Elm</u>. The elm program was an earlier <u>email manager</u>. (If you think my jokes are bad, you cannot fathom the depths of terrible humor present in computer science and engineering! This is but the beginning of a terrible humor journey.)

## **Specification**

Students will construct one module which (cowsay) which will contain a main() method as the entry point (for command line execution) and a data class (Cow). Note: heiferfactory.py is provided for you; your code must use this module to create cow objects. All attributes / methods must be private unless noted in the specification!

### **Provided For Students - heiferfactory**

```
get_cows() -> list[Cow]
```

Returns an array of cow objects from the built-in data set. This will call the **Cow** constructor and **set\_image()** methods of the cow class to properly initialize new cow objects uniquely for each data set.

### **Entry Point**

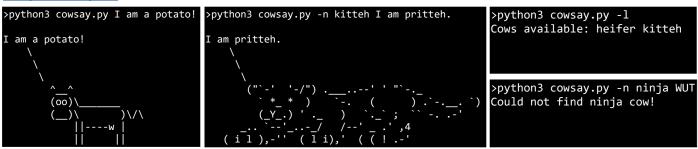
Your program must accept <u>command line arguments</u>. Command line arguments are captured as part of the <u>args</u> variable in the built-in **sys** module. (Review lecture slides for examples!)

The command line arguments that must be supported are as follows:

python3 cowsay.py -1 Lists the available cows
python3 cowsay.py MESSAGE
python3 cowsay.py -n COW MESSAGE
Prints out the MESSAGE using the default COW
Prints out the MESSAGE using the specified COW

If a user calls for a cow that does not exist, the program should print out "Could not find [COWNAME] cow!"

#### **Output Samples**



#### Suggested Methods

The following methods are suggested to make development easier, but are not required:

```
list cows(cows: list[Cow])
```

Displays the list of available cows from an array of Cow objects.

```
_find_cow(name: str, cows: list[Cow])
```

Given a name and an array of Cow objects, return the Cow object with the specified name.

#### **Cow Class**

The Cow class facilitates the creation and use of cow objects by providing the following methods (which students must implement):

```
_init__(name: str)
```

This method should be the **only** constructor for this class. There should not be a default constructor!

```
get_name() -> str
```

Returns the name of the cow.

```
get image() -> str
```

Returns the image used to display the cow (after the message).

```
set_image(_image: str)
```

Sets the image used to display the cow (after the message).

## **Testing**

Run the cow\_test.sh script provided. To run it, place it in the same folder as the rest of your files and make it executable via chmod +x cow\_test.sh. Then run it: ./cow\_test.sh. This script contains a series of commands to run cowsay.py in various ways, streaming the results into the text file output.txt. It then uses less command to view the output. Your output file should match the sample output in this document.

## **Submissions**

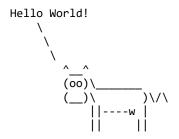
**NOTE**: Your output must match the example output \*exactly\*. If it does not, *you will not receive full credit for your submission*!

Files: cowsay.py

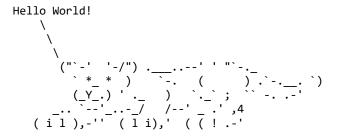
Method: Submit on Canvas

## **Sample Output**

>python3 cowsay.py Hello World!



>python3 cowsay.py -n kitteh Hello World!



>python3 cowsay.py -1

Cows available: heifer kitteh

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

>python3 cowsay.py Hello -n kitteh

