Lab 6

Due May 4 by 1pm **Points** 10 **Submitting** a file upload **File Types** pdf and tgz **Available** until May 18 at 1pm

This assignment was locked May 18 at 1pm.

Reopened in case you wish to improve your grade; however that offer is only for students that meet with me personally this week during lab hours as scheduled -- see Piazza for sign-up @220

In this lab we are studying the **API** (https://en.wikipedia.org/wiki/Application_programming_interface), implementation and application of a **binary decision tree** (https://en.wikipedia.org/wiki/Binary_decision_diagram). The author gives us all the code needed to build the tree and play a guessing game with the computer trying to guess our chosen animal from its decision tree. **This code is in the textbook** (https://bookshelf.vitalsource.com/books/9781119402978/epubcfi/6/782%5B%3Bvnd.vst.idref%3Dbc3e_ch16-4%5D!/4%5Bbc3e_ch16-4%5D/2/94%5Bcode_cnt_2%5D%400:122).

We are enhancing that game by:

Add new member function to BinaryTree to modify the Node of the object that calls it (data, left, and right).

Unit testing each BinaryTree member function using **Catch2** (https://github.com/catchorg/Catch2/blob/master/docs/tutorial.md)

(3 constructors, height, empty, data, left, right, and your new function)

Put each unit test in a separate SECTION.

Modularizing the code so that each function is in a different cpp file (except for perhaps the BinaryTree member functions). Some functions may need to be divided into two in order to fit them into reasonable size (e.g. 15-20 lines?). The exact number of lines is not as important as the **coupling and cohesion characteristics.** (https://courses.cs.washington.edu/courses/cse403/96sp/coupling-cohesion.html)

Asking user to expand the **database of animals** (https://bookshelf.vitalsource.com/books/9781119402978/epubcfi/6/816%5B%3Bvnd.vst.idref%3Dbc3e_ch16-21%5D!/4%5Bbc3e_ch16-21%5D/4/12/2%400:7) whenever the computer guesses incorrectly. This uses the new function you added to BinaryTree.

Reading/Writing the tree to a file (http://P16.2Continue%20Exercise%20%E2%80%A2%E2%80%A2%20E16.4%20and%20write%20the%20tree%20to%20a%20file%20when%20the%20program%20exi 3)%20Horstmann,%20Cay%20S.%20Big%20C++:%20Late%20Objects,%20Enhanced%20eText,%203rd%20Edition.%20Wiley,%202017-10-11.%20VitalBook%20file.%20The%20citation%20provided%20is%20a%20guideline.%20Please%20check%20each%20citation%20for%20accuracy%20before%20us so that new animals added will still be there when game is played again.

Displaying a gif image of the animal that the computer chooses by querying **giphy** (https://rapidapi.com/giphy/api/giphy) using **libcurl** (https://curl.haxx.se/libcurl/using/). (see @184 and @191 in Piazza)

Using **FLTK** (https://www.fltk.org/doc-1.4/index.html) /**Cairo** (https://cairographics.org/tutorial/) to interact with the user in a nice GUI

Add comments ***on each page*** with brief explanations of the important design decisions you make.

Use **cpp2pdf** to create the PDF that will have all source, code, images and comments nicely formatted and easy to read.

Use the Latex **\newpage** command in a C++ comment where needed to make logical breaks in the program structure.

Save your work by using this command in the working directory (e.g. lab6), retrieve the tgz and pdf file using the web server, and upload and submit to Canvas.

```
save . *.pdf
```