CS 162 LAB #8 – Polymorphism and Vectors

In order to get credit for the lab, you need to be checked off by the end of lab. You can earn a maximum of 3 points for lab work completed outside of lab time, but you must finish the lab before the next lab and get checked off with your lab TAs during their office hours. For extenuating circumstances, contact your lab TAs and the instructor.

This lab is worth 10 points total. Here's the breakdown:

- 6 points: Polymorphism
- 4 points: Vector

In this lab, you'll start to work with and polymorphism and vectors in C++.

(6 pts in total) Step 1: Basic Polymorphism Practice

(3 pts) Use classes from lab 7 (Fruit, Apple, Watermelon, and Granny Smith) to create polymorphism. Answer the questions below and implement the polymorphism.

- Which function are you going to make virtual?
- How will you make it polymorphic?
- Can it be a pure virtual function?
- Which class have you made an abstract base class?
- Do any of the destructors need to be virtual? If so, which one(s)?

(3 pts) Modify your application.cpp file to show polymorphism by making a `void print_fruit_info ()` function. **(Note: this function should not be a member function of any classes!!!)** In this function, you will print the name, color, and price of the fruit (the fruit can be an apple, a watermelon, or a Granny Smith). You should pass your fruit by reference (or address explicitly) to have polymorphism.

```
void print_fruit_info (Fruit &);
```

OR

```
void print_fruit_info (Fruit *);
```

(4 pts in total) Step 2: Vectors

Now, create a vector of Fruit pointers, i.e., `vector <Fruit *> fruit_vec`, then insert 10 different fruits (apple, watermelon, granny smith) into the vector using `push_back()` (The insertion order is up to you). These fruits need to be dynamically allocated. Print all fruit info in the vector using `print_fruit_info()` that you implemented above. Then answer the following questions:

- What is the size and capacity of the vector? How to check them?

- Does your program have any memory leaks? Do you need to manually free the memory? Why or why not?

Show your completed work and answers to the TAs for credit. You will not get points if you do not get checked off!

Submit your work to TEACH for our records **(Note: you will not get points if you don't get checked off with a TA!!!)**

1. Create a **zip file** that contains all files you've created in this lab:
2. Transfer the tar file from the ENGR server to your local laptop.
3. Go to TEACH.
4. In the menu on the right side, go to **Class Tools → Submit Assignment**.
5. Select **CS162 Lab 8** from the list of assignments and click "**SUBMIT NOW**"
6. Select your files and click the Submit button.