CSE 262: Quiz #2  
Due September 30th, 2022 at 11:59 PM

The quiz has TWO questions. Please submit your answer by updating this file in the quizzes folder of your Bitbucket account, and then committing and pushing. You should use as much space as you want for each answer. Please be detailed in your answers. Remember: this quiz is worth 9% of your grade, and you will not receive very many points if you do not give detailed answers.

**Question 1:** In software engineering classes, a popular topic is “patterns,” one of which is the “Singleton” pattern. What is the Singleton pattern? Please be detailed in your answer. Then describe (in text, possibly with some accompanying pseudocode) how you would implement the Singleton pattern in Scheme. (Hint: a function is not able to define new globals, so if you’re going in that direction, you’re probably not thinking about it correctly).

The Singleton pattern revolves around the idea of creating a single object of a class, and that single object of the class that is using the Singleton pattern is the only instance/object that will be made. This single object is created within the class and declared static so that it belongs to the class, instead of instances of that class. Furthermore, its constructor is private so that no other instances could be made and the way to retrieve the single object is through the get method which returns the single object.

PSUEDOCODE:

class SingletonClass

// creating static SingletonClass obj so that it belongs to the class

public static SingletonClass obj = new SingletonClass()

// creating private constructor so that no other instances could be made

private SingletonClass ()

// getter method to get the Singleton object

public static SingletonClass getObj()

// return obj

return obj;

endClass

Having

**Question 2:** In our discussion of semantic analysis, we talked about how it can be used to “check” a program (to find semantic errors or produce warnings for programs that are able to be parsed) and also to “transform” a program (typically to make it faster). There are quite a few examples of semantic analysis online and in the book. Study one analysis that falls into the “check” category, and one that falls into the “transform” category. For each, describe it in detail. (Note: if possible, please describe analyses that we did not discuss in depth in class; if that’s not possible, please be sure to go into more detail than what we discussed in class.)