CptS 122 – Data Structures
February 22, 2021

Your Name: _____ TA's Name: _____
ID#: _____ Section #: _____

SOLUTION: Take-Home: Quiz 3 (15 pts) – Intro to OOP and C++

Using Blackboard Learn https://learn.wsu.edu/webapps/login/ submit your quiz. You will submit your assignment in the ***lab*** Blackboard space. Under the "Content" link navigate to the "Quiz Submissions" folder and upload your solution to the appropriate "Quiz" space. You must upload your solution, through an attachment, as <your last name>_quiz3.pdf by the due date and time.

1. **(4 pts)** What is a *constructor*? Explain.

   A *constructor* is a special member function that is used to initialize the data members in the object. It MUST be named the same as the class, it cannot return a value, and it is called *implicitly* when an object is instantiated (i.e. when an object is declared). If a class does not *explicitly* provide a constructor, then the compiler provides a *default* constructor (a constructor with no parameters).

2. **(4 pts)** What are the *private* and *public* access specifiers in C++ used for? Explain.

   The public access specifier denotes that any class members (data members and member functions) that are declared with this visibility are available to all functions and objects in the program, including main ().

   Class members declared with the private access specifier are only visible by other members of the class and friends of the class. Non-member functions (excluding friend functions) and other classes cannot view the private data members of another class.

3. **(4 pts)** What is a *reference*? Explain.

   A *reference* is an alias or another name for a variable that already exists. Once a reference is set to a variable, either the original variable name or the reference may be used to access and modify the variable. We can pass parameters by reference. Pass-by-reference (PBR) – NO copy of the contents/value of each argument is made
   - **The called function can access the caller's data directly, and modify the data**

4. **(3 pts)** What is a class? Explain.

   A *class* is an object-oriented (OO) concept which groups (encapsulates) data and procedural abstractions to represent a real-world entity. Data

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abstractions that are hidden (information hiding) in the class are surrounded by procedural abstractions. In a well-designed class, the only way to access the data/attributes is to use the well-defined procedures/functions/methods that are available.

Another way to consider a *class* is that a class is a *blueprint* for an object. Classes describe the properties/attributes and functions/events that form the object. This is similar to the idea that a blueprint can describe a building. A blueprint can be used to create multiple objects (i.e. buildings).