CSC 155	*Computer Science I*	Lecture Notes
Week 4	Introduction to Object - Oriented Programming	

Student Name _____

Here are a few important concepts, definitions and statements concerning the basics of object - oriented programming.

- The analysis of data and related functions into abstract classifications or classes is defined as **object - oriented** programming.
- A **class** encapsulates object - oriented data and functions. It defaults to a **`private`** access mode.
- A variable or property of a class is referred to as a **data member**.
- **Encapsulation** is the process of combining data members with the actions that are used to manipulate the type of data. This process is denoted with a class that contains both data and functions.
- Also referred to as an instance, an **object** is the actual variable associated with a class and its encapsulated properties and methods.
- Another term for an object, an **instance** is the actual variable that is associated with a class and its encapsulated properties and methods.
- The class **name** is used to declare objects of that class.
- A **constructor** is a specialized function that automatically executes when an object is created. The function's name is the same as the class to which it belongs.
- Also referred to as polymorphism, **overloading** is the ability to have many versions of the same function and to select the appropriate version at run time.
- **`public`** and **`private`** are two access types of variables and functions.
- **Polymorphism** is the ability to have many versions of the same function and to select the appropriate version at run time.
- A **Hierarchy** is a relationship between classes. It promotes reusability of code and allows features to be added to a program without altering code that is already in use.
- **Inheritance** is a feature of object - oriented programming that allows one class to be derived from another class.
- A **base** class is the broadest type of class in a system that uses inheritance and object - oriented models.
- A **derived** class is the more specific type of a class in a hierarchy system.
- A derived class may override an **attribute** of a base class.
- Separating **interface** from implementation is a fundamental principle of good software engineering.
- The **implementation** of a class should be hidden from its clients.
- The goal of **information - hiding** is to make the object as robust and independent as possible. This assures that attribute values cannot be accidentally changed by other parts of the system.

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Exercises Involving Object - Oriented Programming

(1) For each of the following, determine what data (attributes) may be of interest to someone considering purchasing the item:

(a) a college textbook

(b) a can of soda pop

(c) an automobile

(2) Paying attention to the important properties while ignoring inessential details is known as _____ .

(a) an abstraction
(b) selectiveness
(c) summarizing
(d) polymorphism
(e) functionality

Given the information below, identify each of the statements in Questions **(1)** through **(5)** as being true or false.

Geometrical figures called polygons are constructed only with straight line segments. Quadrilaterals are four - sided polygons that can be classified by either sides or angles. An important distinction involving quadrilaterals is whether one or more pairs of sides are parallel. The most familiar quadrilaterals are parallelograms, and the most familiar of these are rectangles and squares. Types of quadrilaterals are summarized below.

Types of Quadrilaterals

Sample Figure	Description
Trapezoid	A trapezoid is a quadrilateral with one pair of parallel sides.
Parallelogram	A parallelogram is a quadrilateral with two pairs of parallel sides.
Rectangle	A rectangle is a parallelogram with a right (90 degree) angle (and consequently, four right angles).
Square	A square is a rectangle with all sides having equal length.
Rhombus	A rhombus is a parallelogram with all sides having equal length.

(1) All trapezoids are quadrilaterals. (a) True (b) False

(2) A square is both a rectangle and a quadrilateral. (a) True (b) False

(3) A trapezoid is a type of parallelogram. (a) True (b) False

(4) A rhombus is both a square and a parallelogram. (a) True (b) False

(5) Rectangles are a special type of parallelogram. (a) True (b) False