Chapter 3 Summary Notes

- Object-oriented programming entails writing programs that use classes and objects. Using prewritten classes shortens development time and creates more reliable programs. Programs that use prewritten classes are called clients of the class. Benefits of object-oriented programming include encapsulation, reusability, and reliability.

- Classes consist of data, plus instructions that operate on that data. Objects of a class are created using a class as a template. Creating an object is called instantiating an object, and the object is an instance of the class. The new keyword is used to instantiate objects.

- The object reference is the variable name for an object and point to the data of an object.

- The data of a class are called fields and consist of instance variables and static variables. The instructions of the class are called methods. Methods of a class get or set the value of the data or provide other services of the class.

- The name of a method, along with its argument list and return value, is called the API of that method. Methods that are declared to be public can be called by any client of the class.

- Instance methods are called using the object reference and the dot notation.

- A constructor is called when an object is instantiated. A constructor has the same name as the class and its job is to initialize the object’s data.

- Accessor methods (getters) allow clients to retrieve the current value of object. Mutator methods (setters) allow clients to change the value of object data.

- The String class can be used to create objects consisting of a sequence of characters. String constructors accept String literals, String objects, or no argument, which creates an empty String. The length method returns the number of characters in the String object.

- The charAt method extracts a character from a String, while the substring method extracts a String from a String. The indexOf method searches a String for a character or substring.

- The DecimalFormat class provides methods to format numeric output. For example, we can specify the number of digits to display after the decimal point or add dollar signs and percentage signs.

- When prompting the user for input, phrase the prompt in language the user understands. Describe the data requested and any restrictions on valid input values. Describe the data requested and any restrictions on the valid input values.

- Static methods, also called class methods, can be called without instantiating an object. Static methods can access only static data of a class. Static methods are called using the ClassName and dot notation.

- Classes provide a toString method to convert objects to a String in order to be printed.

- The Math class provides constants such as PI and E and static methods to perform common mathematical calculations, such as finding the maximum or minimum of two numbers, rounding values, and raising a number to a power.

- The NumberFormat class provides static methods for creating objects to format numeric output as currency or a percentage.

- Wrapper classes provide an object interface for a primitive data type. The Integer and Double classes provide static methods for converting between ints and doubles and Strings.

- The Character wrapper class provides methods for testing whether a character is a digit or a letter and for converting letters to uppercase or lowercase.