CHAPTER ONE

General Computing Exercises 1.1

1. **Programs**
2. **Input unit, output unit, memory unit, Arithmetic and logic unit (ALU) and control unit**
3. The three types of languages are**: Machine Language, Assembly Language and High-Level Language.**
4. **Compilers.**
5. **Android** is an operating system for mobile-devices based on the Linux kernel and Java.
6. **Open-source Software.**
7. **An Accelerometer.**

1.2 Java Environment.

1. The **Java-**command from JDK executes a java application
2. The **Javac** command from the JDK compiles a java program.
3. A java source code must end with the **.java** file extension.
4. The file produced by the compiler must end with the **.class** file extension.
5. The file produced by the java compiler contains **Bytecode** that is executes by the JVM.

1.3 Object-Oriented-Programming (OOP) in Java

1. Objects enable the design practice of **Encapsulation.**
2. Java programmers concentrate on creating **Classes.**
3. The process of analyzing and designing from an object-oriented point of view is called **Object-Oriented- Analysis and Design (OOAD).**
4. A new class of object can be created conveniently by **Inheritance**.
5. **Unified-Modeling-Language (UML)** is a graphical language that allows people who design software systems to use an Industry-Standard Notation to represent them.
6. **Attributes**

**1.4 Computer Basics**

1. **Input unit**
2. **Programming**
3. **High-Level-Language**
4. **Output unit**
5. **Memory Unit and Storage Unit**
6. **Arithmetic and Logic Unit**
7. **Control Unit.**
8. **High-Level-Language** is more convenient for writing programs quickly and easily.
9. **Machine Language.**
10. **Control Unit.**

**1.5**

1. **The Java Programming**
2. **C** initially became widely known as the development language of the UNIX operating system.
3. **The TCP/IP**
4. **The C++**

**1.6**

1. Java programs go through five phases: Edit, Compile, Load, Verify and Execute.
2. An integrated Development Environment (IDE).
3. The command Java.
4. A Virtual Machine.
5. The Class Loader.
6. The bytecode Verifier.

1.7 Explain the two compilation phases of Java

Java program go through two phases:

1. Compilation Phase: the Java source code (.java file) is compiled by the java compiler (javac) into bytecode (.class file).
2. Execution(interpretation) phase: The Java Virtual Machine (JVM) interprets the bytecode and executes it, converting it into machine code that computer can understand.
   1. How Do The Following Terms Apply To A Wristwatch?
3. Object: A wristwatch is a physical object that has attributes and behaviours.
4. Attributes: Includes Brand, Color, Material, Display type(analog/digital) and size.
5. Behaviours: Displays time, sets alarms, starts/stops the stopwatch.
6. Class: A general blueprint for watches, defining their attributes and behaviours.
7. Inheritance: Different type of watches(alarm clock, smartwatch) can inherit properties from a base “watch class.
8. Modelling: Creating a digital conceptual representation of a watch in program.
9. Messages: Communication between different watch components such as sending signal to update the display when time changes.
10. Encapsulation: keeping internal mechanisms (like time-setting algorithms) hidden while providing a public interface.
11. Interface: Defining how users interact with the watch (buttons, touchscreen).
12. Information Hiding: Internal components like circuits and software logic are hidden from the user.
    1. Test-Drive: Carbon Foot-Print Calculator.

* Carbon emissions, mainly from burning fossil fuels, contribute to global warming.
* Carbon footprint calculators (like those from TerraPass and carbonFootPrint) estimate individual or organizational carbon footprint.
* Users can reduce their carbon footprint by limiting energy consumption, using renewable energy and reducing travel emissions.
* Research carbon footprint calculation formulas will help in programming a custom carbon footprint calculator.

1.10

* Obesity: is linked to illness like diabetes and heart disease.
* BMI: (Body Mass Index): is a metric to determine if a person is overweight or obese.
* BMI Formula: BMI = weight (kg) / height2(m2).
* The U.S Department of Health Provides a BMI calculator for reference.
* This exercise involves creating a BMI calculator using programming.

1.11(Attributes of Hybrid Vehicles)

* Mileage: city-miles-per-gallon and highway-miles-per-gallon.
* Battery: Type (Lithium-ion, Nickel-metal hydride), weight and capacity.
* Engine: fuel type, horsepower and efficiency.
* Emissions: lower than gasoline-powered vehicles.
* Regenerative Banking: converts kinetic energy into electrical energy.

1.12 (Gender Neutrality)

* The task is to create a program that replaces gender-specific words with gender neutral alternatives.
* Examples:
* Replace “wife” and “husband” with “Spouse”.
* Replace “man” and “woman” with “person”.
* Replace “daughter” and “son” with “child”.