Chapter 1 Self-Review Exercises – Answers

1.1 Fill in the blanks

a) Programs  
b) Input unit, output unit, memory unit, arithmetic and logic unit, central processing unit, secondary storage unit  
c) Machine language, assembly language, high-level language  
d) Compilers  
e) Android  
f) Release  
g) Accelerometer

1.2 Fill in the blanks (Java Environment)

a) java  
b) javac  
c) .java  
d) .class  
e) Bytecodes

1.3 Fill in the blanks (OOP Concepts)

a) Encapsulation  
b) Classes  
c) Object-oriented design (OOD)  
d) Inheritance  
e) Unified Modeling Language (UML)  
f) Attributes

1.4 Fill in the blanks

a) Input unit  
b) Programming  
c) Assembly language  
d) Output unit  
e) Memory unit, secondary storage unit  
f) Arithmetic and logic unit (ALU)  
g) Central processing unit (CPU)  
h) High-level languages  
i) Machine language  
j) Central processing unit (CPU)

1.5 Fill in the blanks

a) Java  
b) C  
c) Transmission Control Protocol (TCP)  
d) C++

1.6 Fill in the blanks

a) Edit, compile, load, verify, execute  
b) Integrated Development Environment (IDE)  
c) Java Virtual Machine (JVM)  
d) Virtual machine  
e) Class loader  
f) Bytecode verifier

1.7 Two Compilation Phases of Java

1. Compilation Phase: The Java compiler (javac) translates the .java source file into a .class file containing bytecode.
2. Execution Phase: The JVM loads, verifies, and executes the bytecode on the computer.

1.8 OOP Concepts Applied to a Wristwatch

* Object: The wristwatch itself.
* Attributes: Color, size, brand, material.
* Behaviors: Show time, set alarms, stopwatch.
* Class: A "Watch" class defining common properties.
* Inheritance: An "AlarmClock" class inheriting from "Watch."
* Modeling: Representing a watch as an object in a software program.
* Messages: Methods like setTime() or ringAlarm().
* Encapsulation: Hiding internal mechanisms of the watch.
* Interface: A smartwatch's Bluetooth functionality.
* Information Hiding: Users don’t need to know the inner workings.

1.9 Carbon Footprint Calculator

1. Visit the TerraPass Carbon Calculator or Carbon Footprint Calculator.
2. Enter your travel, electricity, and fuel data.
3. Observe your total carbon footprint (CO₂ emissions).
4. Study the formulas used for calculations.
5. Prepare to develop your own carbon footprint calculator.

1.10 BMI Calculator

1. Use the [NIH BMI Calculator](http://www.nhlbi.nih.gov/guidelines/obesity/BMI/bmicalc.htm).
2. Enter weight (kg/lb) and height (m/in).
3. The BMI is calculated using:

A) weight(kg) / height(m)2

B) weight(lb) x 703 / height(in)2

1. Observe your BMI category (Underweight, Normal, Overweight, Obese).
2. Prepare to develop a BMI calculator program later.

1.11 Attributes of Hybrid Vehicles

* Fuel Efficiency: City & Highway MPG
* Battery System: Type, Capacity (kWh), Charging Time
* Performance: Hybrid engine, Regenerative Braking
* Emissions: Lower CO₂ output
* Technology: Eco Mode, Start-Stop System
* Examples: Toyota Prius, Honda Accord Hybrid, Hyundai Ioniq

1.12 Gender Neutrality Program

1. Read the input text.
2. Replace gendered words with neutral ones (e.g., "man" → "person").
3. Avoid incorrect replacements (e.g., "womanhood" → "personhood").
4. Use algorithms to automate this in Java or Python.