Class 8
Chapter -5
Program Coding in Java

Let's Work Out – Solutions

A. Tick (✓) the correct option

1. **Which of the following is not a feature of Java Language?**
   - a. It is a case-sensitive language
   - b. It is platform-dependent language ✓
   - c. It is a robust language
   - d. It is an object-oriented language
2. **Java supports**
   - a. Seven types of comments
   - b. Two
   - c. Three ✓
   - d. Four
3. **Which of the following is a memory location used to store values?**
   - a. Variables ✓
   - b. Operators
   - c. Constants
   - d. Expressions
4. **Represents the fixed and specified values in Java.**
   - a. Expressions
   - b. Constants
   - c. Identifier
   - d. Literals ✓
5. **Which of the following variable name is invalid?**
   - a. Ben Parker ✓ (contains whitespace)
   - b. Peter123
   - c. MaySParker
   - d. Age

B. Fill in the blanks

1. Java is a **programming language**.
2. **Operators** are special symbols used to perform mathematical operations.
3. An **Identifier** is the name given to an object in a Java code.
4. int is a **data type**.
5. **BlueJ** is an IDE for beginner coders in Java.

C. True / False

1. Keywords are the reserved words in Java. ✓ T
2. Java code is converted into bytecode by its compiler. ✓ T

3. The values on which an operator works are called operands. ✓ T
4. IDE stands for Integrated Document Environment. ✗ F (Correct: Integrated Development Environment)
5. The operator == is used to check equality between two values. ✓ T

D. Descriptive Answers

1. **Define coding in detail. Explain all components of a code.**

Answer:
Coding or programming is the process of writing instructions for a computer to perform specific tasks. Since computers cannot understand human language, coding uses programming languages (like Java) to communicate instructions.

Components of a Code:

- **Identifiers:** Names given to variables, classes, methods, etc. (must follow naming rules)
- **Keywords:** Reserved words in Java that have special meaning (e.g., `class`, `int`)
- **Literals:** Constant values used in the program (e.g., 5, true, 'A')
- **Operators:** Symbols that perform operations on values (e.g., `+`, `-`, `*`)
- **Data types:** Define the type and size of variables (e.g., int, float, boolean)
- **Comments:** Notes written for programmers; ignored by the compiler (`//`, `/* */`, `/** */`)
- **Tokens:** Smallest meaningful units in a code (keywords, operators, identifiers, literals)

2. **What is Java? Write all the features of Java.**

Answer:
Java is a **high-level, object-oriented, platform-independent programming language**. It allows developers to write once and run anywhere (WORA) using the Java Virtual Machine (JVM).

Features:

- Platform independence
- Object-Oriented Programming
- Simple and readable syntax
- Robust and secure
- Supports multi-threading
- Rich standard library
- High performance (JIT compilation)
- Automatic memory management (garbage collection)

3. **Explain the role of BlueJ and its components.**

Answer:
BlueJ is a free **IDE (Integrated Development Environment)** designed for beginner Java programmers. It helps in writing, compiling, and running Java code.

Components:

- **Menu Bar:** Contains menus to manage projects and tools
- **Project Area:** Area to create or add classes

- **New Class Button:** Used to create new classes in a project
- **Compile Button:** Compiles the code and shows errors
- **Object Bench:** Lets objects communicate and test methods

4. **Define variables and rules to name variables. How to declare and initialize a variable?**

Answer:
Variables are named memory locations used to store data in a program.

Rules:

- Can contain letters, digits, `$` and _
- Must not start with a digit
- No whitespaces allowed
- Must not be a keyword
- Case-sensitive

Declaring a variable:

```
int age;
float temp;
char gender;
```

Initializing a variable:

```
age = 20;
temp = 34.5f;
gender = 'M';
```

Declare and initialize together:

```
int age = 20;
float temp = 34.5f;
char gender = 'M';
```

5. **State the role of operators in Java and define all types.**

Answer:
Operators perform operations on variables and values.

Types of Operators:

- **Arithmetic:** `+`, `-`, `*`, `/`, `%`
- **Relational:** `==`, `!=`, `>`, `<`, `>=`, `<=`
- **Logical:** `&&`, `||`, `!`
- **Unary:** `++`, `--`
- **Assignment:** `=`, `+=`, `-=`, `*=`, `/=`, `%=`

L E T' S A P P L Y

Ritesh wants to display his name

Code:

```
public class DisplayName {
    public static void main(String[] args) {
        System.out.println("Ritesh");
    }
}
```

L E T' S D O I T

1. Display Bio-Data

```
public class BioData {
    public static void main(String[] args) {
        String name = "Susanto";
        String fatherName = "Ramesh Chandra";
        String address = "123 Main Street";
        String place = "Dhanbad";
        String state = "Jharkhand";
        String contactNumber = "9876543210";
        String email = "susanto@example.com";

        System.out.println("----- BIO-DATA -----");
        System.out.println("Name: " + name);
        System.out.println("Father's Name: " + fatherName);
        System.out.println("Address: " + address);
        System.out.println("Place: " + place);
        System.out.println("State: " + state);
        System.out.println("Contact Number: " + contactNumber);
        System.out.println("Email ID: " + email);
    }
}
```

Output Example:

```
----- BIO-DATA -----
Name: Susanto
Father's Name: Ramesh Chandra
Address: 123 Main Street
Place: Dhanbad
State: Jharkhand
Contact Number: 9876543210
Email ID: susanto@example.com
```

2. Sum, Difference, Product, Quotient, Remainder of Two Numbers

```
public class ArithmeticOperations {
    public static void main(String[] args) {
        int num1 = 1273;
        int num2 = 58;

        int sum = num1 + num2;
        int difference = num1 - num2;
        int product = num1 * num2;
        int quotient = num1 / num2;
        int remainder = num1 % num2;

        System.out.println("Numbers: " + num1 + " and " + num2);
        System.out.println("Sum: " + sum);
        System.out.println("Difference: " + difference);
        System.out.println("Product: " + product);
        System.out.println("Quotient: " + quotient);
        System.out.println("Remainder: " + remainder);
    }
}
```

Output Example:

```
Numbers: 1273 and 58
Sum: 1331
Difference: 1215
Product: 73834
Quotient: 21
Remainder: 55
```

3. Double, Half, 2/7 of a Number

```
public class NumberOperations {
    public static void main(String[] args) {
        int num = 5768;

        int doubleNum = 2 * num;
        double halfNum = num / 2.0;  // Using double for accurate half
        double fraction = (2.0 / 7) * num;

        System.out.println("Number: " + num);
        System.out.println("Double the Number: " + doubleNum);
        System.out.println("Half the Number: " + halfNum);
        System.out.println("2/7 of the Number: " + fraction);
    }
}
```

Output Example:

```
Number: 5768
Double the Number: 11536
Half the Number: 2884.0
2/7 of the Number: 1647.4285714285713
```

Worksheet 1 – Solutions

A. Tick (✓) the correct option

1. Which of the following is a CUI based OS?
   - ✓ d. DOS
2. Symbol entered before formula in Excel:
   - ✓ b. =
3. Step-by-step representation of a task:
   - ✓ b. Algorithm
4. Circular graph for percentage:
   - ✓ d. Pie
5. Error for incorrect output:
   - ✓ b. Logical error

B. Fill in the blanks

1. Decision box in flowchart is used to **check a condition**
2. **Functions** are predefined formulas in Excel
3. You can use **operators** to solve logical/mathematical problems
4. In a **real-time operating system**, you can control the machines in real-time
5. Sparkline is used for **representation of data**

C. True / False

1. Scatter chart is used to observe values of two series over time ✓ T
2. Connector is used to connect parts of a flowchart ✓ T
3. Sorting only rearranges in ascending order ✗ F (can be ascending or descending)
4. Java code converted to bytecode ✓ T
5. Peek button hides all open apps and shows desktop ✓ T

D. One-word answers

1. **Multi-user OS**
2. **MAX function** (highest value in range)
3. **Grouping Worksheets**
4. **Input/Terminal Box**
5. **Runtime Error**

E. Descriptive Answers

1. **Functions of an OS:** Manage hardware, software, memory, input/output, multitasking. Windows has GUI; DOS is CUI-based.
2. **Types of operators in Java:** Arithmetic, relational, logical, unary, assignment.
3. **Cell referencing in Excel:**
    - **Absolute:** `$A$1` (fixed row and column)
    - **Relative:** `A1` (changes when copied)
    - **Mixed:** `$A1` or `A$1`
4. **Short Notes:**
    - **Sparklines:** Small charts in a cell for trend analysis
    - **BlueJ:** IDE for Java programming
    - **Conditional Formatting:** Format cells based on conditions
    - **Desktop:** Primary screen area to access apps

Worksheet 2 – Solutions

A. Define

1. **Operating System:** Software that manages computer hardware and software resources.
2. **Combo Charts:** Charts combining two types of charts (e.g., column + line)

B. Examples

1. Multi-processor OS: UNIX, Linux
2. Functions in Excel: SUM, AVERAGE

C. Descriptive

1. **Types of OS:**
    - **Single-user, Multi-user, Real-time, Network, Distributed**
2. **Syntax for declaring a variable:**

```
int age; // declares an integer variable
```

3. **Why create charts:** For visual representation; four types: Column, Bar, Pie, Line
4. **Data types in Java:** Primitive (int, float, char, boolean, double, byte, short, long), Non-primitive (String, arrays, class objects). `void` means method returns nothing.

D. Differentiate

1. **CUI vs GUI:** CUI uses text commands, GUI uses graphical interface
2. **Absolute vs Mixed Referencing:** `$A$1` fixed vs `$A1` partially fixed
3. **Column vs Bar Chart:** Column vertical, Bar horizontal
4. **Decision Making vs Looping:** Decision executes conditional path, Loop repeats statements

E. Application-based

1. Hitendra is using **Multitasking OS** (Windows or similar)
2. Urvashi can **Right-click → Move/Copy Worksheet → Select location → OK**
3. #NUM! error in Excel: Invalid numeric calculation, e.g., square root of negative
4. Adding `@` in variable name: **Invalid character → Syntax error**

F. Algorithms & Flowcharts

1. **Sum 1 to 12**
   Algorithm:

```
Start
sum = 0
for i = 1 to 12
   sum = sum + i
End for
Print sum
End
```

Flowchart: Standard Start → Loop → Add → End

2. **Print odd numbers 1–100**
   Algorithm:

```
Start
for i = 1 to 100
   if i%2 != 0
      print i
End for
End
```

3. **Check multiple of 7**
   Algorithm:

```
Start
Input n
if n%7 == 0
   Print "Multiple of 7"
else
   Print "Not multiple of 7"
End
```

G. Java Programs

1. **Display favorite book, hobby, food, movie**

```
import java.util.Scanner;
public class PersonalInfo {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter your favorite book: ");
        String book = sc.nextLine();
        System.out.print("Enter your hobby: ");
        String hobby = sc.nextLine();
        System.out.print("Enter your favorite food: ");
        String food = sc.nextLine();
```

```
        System.out.print("Enter your favorite movie: ");
        String movie = sc.nextLine();

        System.out.println("Book: " + book);
        System.out.println("Hobby: " + hobby);
        System.out.println("Food: " + food);
        System.out.println("Movie: " + movie);
    }
}
```

2. **Enter date of birth & calculate age**

```
import java.util.Scanner;
import java.time.LocalDate;
public class CalculateAge {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter birth year: ");
        int birthYear = sc.nextInt();
        int currentYear = LocalDate.now().getYear();
        int age = currentYear - birthYear;
        System.out.println("Your age is: " + age);
    }
}
```

3. **Area of a circle**

```
import java.util.Scanner;
public class CircleArea {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter radius of circle: ");
        double r = sc.nextDouble();
        double area = 3.1416 * r * r;
        System.out.println("Area of circle: " + area);
    }
}
```