Unit I

Puzzle 1: What's the Output?

What will be the output of the following Java code?

```
public class Puzzle1 {
    public static void main(String[] args) {
        System.out.println(10 + 20 + "Java");
        System.out.println("Java" + 10 + 20);
    }
}
```

Options: a) 30Java and Java30
b) Java30 and 30Java
c) 30Java and Java1020
d) Java1020 and 30Java

Puzzle 2: Compilation Error or Not?

Does the following Java program compile successfully?

```
public class Puzzle2 {
    public static void main(String[] args) {
        int x;
        System.out.println(x);
    }
}
```

Options: a) Yes, prints garbage value
b) No, compilation error
c) Yes, prints 0
d) Yes, prints null

Puzzle 3: Final Variable Behavior

What will be the output of the following Java program?

```
class Puzzle3 {
    public static void main(String[] args) {
        final int x = 10;
        x = 20;
        System.out.println(x);
    }
}
```

Options: a) 10
b) 20
c) Compilation Error
d) Runtime Error

Puzzle 4: String Immutability

What will be the output of the following Java code?

```
public class Puzzle4 {
    public static void main(String[] args) {
        String s1 = "Hello";
        s1.concat(" World");
        System.out.println(s1);
    }
}
```

Options: a) Hello World
b) Hello
c) Compilation Error
d) Runtime Error

Puzzle 5: Loop Mystery

What will be the output of the following Java code?

```
public class Puzzle5 {
    public static void main(String[] args) {
        for (int i = 0; i < 5; i++) {
            if (i == 3) {
                continue;
            }
            System.out.print(i + " ");
        }
    }
}
```

Options: a) 0 1 2 3 4
b) 0 1 2 4
c) 1 2 3 4
d) Compilation Error

Answers

Puzzle 1: What's the Output?

```
public class Puzzle1 {
    public static void main(String[] args) {
        System.out.println(10 + 20 + "Java");
        System.out.println("Java" + 10 + 20);
    }
}
```

✅ Answer: c) 30Java and Java1020

Explanation:

- **First line:** `(10 + 20) + "Java"` → `30 + "Java"` → `"30Java"`
- **Second line:** `"Java" + 10 + 20` → `"Java10" + 20` → `"Java1020"`

Output:

```
30Java
Java1020
```

Puzzle 2: Compilation Error or Not?

```
public class Puzzle2 {
    public static void main(String[] args) {
        int x;
        System.out.println(x);
    }
}
```

✅ Answer: b) No, compilation error

Explanation:

- The variable `x` is declared but **not initialized** before use.
- Java does **not** allow access to **uninitialized local variables**.

💡 Fix:

```
int x = 0;  // Initialize x
System.out.println(x);
```

Puzzle 3: Final Variable Behavior

```
class Puzzle3 {
    public static void main(String[] args) {
        final int x = 10;
        x = 20;
        System.out.println(x);
    }
}
```

✅ Answer: c) Compilation Error

Explanation:

- `final int x = 10;` means **`x` is a constant** and **cannot be reassigned**.
- The line `x = 20;` causes a **compilation error** because you cannot change a `final` variable.

Puzzle 4: String Immutability

```
public class Puzzle4 {
    public static void main(String[] args) {
        String s1 = "Hello";
        s1.concat(" World");
        System.out.println(s1);
    }
}
```

✅ Answer: b) Hello

Explanation:

- `String` is **immutable** in Java.
- `s1.concat(" World")` **creates a new string but does not modify `s1`**.
- Since `s1` is not reassigned, it still holds `"Hello"`.

💡 Fix:

```
s1 = s1.concat(" World"); // Now s1 refers to "Hello World"
System.out.println(s1);
```

Puzzle 5: Loop Mystery

```
public class Puzzle5 {
    public static void main(String[] args) {
        for (int i = 0; i < 5; i++) {
            if (i == 3) {
                continue;
            }
            System.out.print(i + " ");
```

```
            }
        }
}
```

✅ Answer: b) 0 1 2 4

Explanation:

- The loop runs from `i = 0` to `i < 5` (`0 1 2 3 4`).
- When `i == 3`, `continue;` **skips the rest of the loop body** and jumps to the next iteration (`i = 4`).

Output:

```
0 1 2 4
```
