Java Basics Review (Chapters 1–8)

For COMP2311 - Java 2 Intro

Chapter 1 – Introduction to Java

- What is Java?
  - Platform-independent, object-oriented programming language.
- Java Program Structure:

```
public class Main {
  public static void main(String[] args) {
    System.out.println("Hello World!");
  }
}
```

- Compiling : javac Main.java
- Running : java Main
- Basic terms: class, method, statement, keyword

Chapter 2 – Elementary Programming

- Variables and Data Types: int, double, char, boolean
- Input/Output:

```
Scanner input = new Scanner(System.in);
int num = input.nextInt();
```

- Expressions & Operators: +, -, *, /, %
- Type casting:

```
double x = 5.0;
int y = (int)x; // y = 5
```

Chapter 3 – Selections

- If Statements:
  - if (x > 0) { ... }
- If-Else, Nested If, Switch:

```
switch (grade) {
  case 'A': ...; break;
  default: ...;
}
```

Chapter 4 – Mathematical Functions & Strings

- Math Methods: Math.pow(), Math.sqrt(), Math.random()
- String operations:

```
String name = "Ahmad";
Int x = name.length();
Boolean y = name.equals("Ahmad");
```

Chapter 5 – Loops

- While Loop:
  while (condition) { ... }
- For Loop:
  for (int i = 0; i < 5; i++) { ... }
- Do-While Loop

- Loop control:
  break,
  continue

Chapter 6 – Methods

- Method Definition:

```
public static int add(int a, int b) {
  return a + b;
}
```

- Method overloading
- Scope of variables (local/global)
- Passing parameters: by value

Chapter 7 : Single-Dimensional Arrays

- Declaration:

  int[] nums = new int[5];

  int[] scores = {90, 80, 70};

- Accessing Elements:
  nums[0]

- Array loop:

  for (int i = 0; i < nums.length; i++) { ... }

Chapter 8 – Multidimensional Arrays

- 2D Arrays:

  ```
  int[][] matrix = new int[3][4];
  matrix[0][1] = 10;
  ```

- Nested Loops to process arrays
- Useful for matrices, tables, grids

Summary & Transition

- You've learned:
  - Java syntax, control flow, methods, and arrays.
- Coming next:
  - Object-Oriented Programming!
  - Classes, Objects, Inheritance, GUI, Multithreading, Collections

Java Review Questions

- Q1: What does the main method do in a Java program?

Answer: It is the entry point of any Java application.
Explanation:
The Java Virtual Machine (JVM) looks for the main(String[] args) method to start executing the program.

Java Review Questions

- Q2: What will this print?
  System.out.println("Java" + 2 + 3);

Answer: Java23

Explanation:
String concatenation happens from left to right. "Java" + 2 becomes "Java2", then adding 3 results in "Java23".

Java Review Questions

- What is the result of 5 / 2 in Java?

Answer: 2

Explanation:
Both 5 and 2 are integers. Integer division in Java discards the decimal part.

Java Review Questions

- Which of the following is a valid variable name?
  a) 2value
  b) value_2
  c) @name
  d) class

Answer: b) value_2

Explanation:
Variable names can't start with numbers, can't contain symbols like @, and can’t use reserved keywords like class.

Java Review Questions

- What is the output?

```
int x = 7;
 if (x > 5)
   System.out.print("A");
 else
   System.out.print("B");
```

Answer: A
Explanation:
Since 7 > 5, the if block runs and prints "A".

Java Review Questions

- What keyword is used to declare a constant variable in Java?

Answer: final
Explanation:
final makes a variable unchangeable after it's assigned.

Java Review Questions

- Write a method named multiplyByTwo that takes an int and returns double its value.

Answer:

```
public static int multiplyByTwo(int num) {
  return num * 2;
}
```

Explanation:
This method accepts an integer, multiplies it by 2, and returns the result.

Java Review Questions

- What is the output?

```
int sum = 0;
 for (int i = 1; i <= 3; i++) {
 sum += i;
 }
System.out.println(sum);
```

Answer:
6
Explanation:
The loop adds 1 + 2 + 3 → sum = 6.

Java Review Questions

- What is the output?

```
int sum = 0;
 for (int i = 1; i <= 3; i++) {
 sum += i;
 }
System.out.println(sum);
```

Answer:
6
Explanation:
The loop adds 1 + 2 + 3 → sum = 6.

Java Review Questions

- What is the difference between == and .equals() for strings?

Answer: == compares references, .equals() compares content.
Explanation:
== checks if two references point to the same object; .equals() checks if their contents are equal.

Java Review Questions

- What does this code print?

```
String s = "java";

System.out.println(s.length());
```

Answer: 4
Explanation:The string "java" has 4 characters.

Java Review Questions

- Given int[] arr = {4, 1, 3};, write a loop to print all elements.

Answer:

```
for (int i = 0; i < arr.length; i++) {
  System.out.println(arr[i]);
}
```

Explanation: Standard for loop iterates over the array from index 0 to 2.

Java Review Questions

- How many rows and columns does this array have?
  int[][] m = new int[3][2];

Answer: 3 rows and 2 columns

Explanation: The array has 3 subarrays, each with 2 elements → 3×2 matrix.

Java Review Questions

- Fix the error:

```
public static void printSum(a, b) {
System.out.println(a + b);
}
```

Answer:

```
public static void printSum(int a, int b) {
 System.out.println(a + b);
}
```

Explanation: The parameters must have data types.

Java Review Questions

- What is the output?

```
int x = 10;

while (x > 7) {

 x--;

}

System.out.println(x);
```

Answer: 7

Explanation : Loop runs while x > 7. It stops at x == 7, then prints 7.

Java Review Questions

- What is method overloading? Give an example.

Answer: Defining multiple methods with the same name but different parameters.
void print(int a) { }
void print(String b) { }

Explanation : Overloading helps reuse method names for different parameter types.