**Day 1**

**Variable , data type and taking input**

**What is a variable in Java?**

* **Answer**: A variable in Java is a container that holds data that can be changed during the execution of a program. It acts as a storage location in memory with a specific data type.

**2. What are the different types of variables in Java?**

* **Answer**: There are three types of variables in Java:
  1. **Local Variables**: Declared inside a method, constructor, or block.
  2. **Instance Variables**: Declared in a class but outside of methods, constructors, or blocks (non-static fields).
  3. **Static Variables**: Declared with the static keyword and shared across all instances of a class.

**3. What are the eight primitive data types in Java?**

* **Answer**:
  1. byte: 8-bit integer (Range: -128 to 127)
  2. short: 16-bit integer (Range: -32,768 to 32,767)
  3. int: 32-bit integer (Range: -2^31 to 2^31-1)
  4. long: 64-bit integer (Range: -2^63 to 2^63-1)
  5. float: 32-bit floating point
  6. double: 64-bit floating point
  7. char: 16-bit Unicode character
  8. boolean: true/false values

**4. What is the default value of a local variable?**

* **Answer**: Local variables do not have a default value in Java. They must be initialized before use, otherwise, the compiler will throw an error.

**5. What is typecasting in Java?**

* **Answer**: Typecasting is converting one data type into another. There are two types:
  1. **Implicit Typecasting (Widening)**: Automatic conversion of a smaller data type to a larger data type (e.g., int to double).
  2. **Explicit Typecasting (Narrowing)**: Manually converting a larger data type to a smaller data type (e.g., double to int).

**6. What is the difference between float and double?**

* **Answer**:
  + float is a single-precision 32-bit floating-point data type, while double is a double-precision 64-bit floating-point data type.
  + double has a greater precision and can store larger decimal values compared to float.

**How do you take input from the user in Java?**

To take input from the user, Java provides the Scanner class, which is part of the java.util package.

Example:

**java**

**Copy code**

**import java.util.Scanner;**

**public class InputExample {**

**public static void main(String[] args) {**

**Scanner sc = new Scanner(System.in);**

**// Taking input for an integer**

**System.out.print("Enter an integer: ");**

**int number = sc.nextInt();**

**// Taking input for a string**

**System.out.print("Enter your name: ");**

**String name = sc.next();**

**System.out.println("You entered: " + number + " and " + name);**

**}**

**}**

**7. What is the difference between next() and nextLine() methods of Scanner class?**

* **next()**: Reads input till the first space or whitespace is encountered. It’s used to read a single word.
* **nextLine()**: Reads the entire line of input (including spaces) until the user hits the Enter key.

**8. What is the default value of variables in Java?**

* **Local variables**: No default value. They must be initialized before use.
* **Instance variables**: Default values depend on the data type:
  + int = 0
  + double = 0.0
  + char = '\u0000'
  + boolean = false
  + Object references (non-primitives) = null

**9. Can a variable name start with a number in Java?**

No, variable names in Java cannot start with a number. They must start with a letter (A-Z or a-z), a dollar sign ($), or an underscore (\_).

**10. What is the difference between primitive and reference data types?**

* **Primitive types**: Store the actual values (e.g., int, char, boolean).
* **Reference types**: Store references (addresses) to objects or arrays. Examples are String, arrays, and user-defined objects.