Question 1
What are these primitive data types and what is each one used for?

Answer
Java has **eight** primitive data types:

- **byte** – Stores very small whole numbers from **-128 to 127**. Used when memory is limited.
- **short** – Stores numbers from **-32,768 to 32,767**.
- **int** – Default choice for integers, stores large whole numbers from **-2,147,483,648 to 2,147,483,647**.
- **long** – Stores very large whole numbers up to about **9 quintillion**.
- **float** – Stores decimal numbers with single precision (about 6–7 digits accuracy).
- **double** – Stores decimal numbers with double precision (about 15–16 digits accuracy).
- **char** – Stores a single Unicode character (like 'A', '9', or '@').
- **boolean** – Stores either **true** or **false**.

Question 2
"How are primitive data types in Java different from non-primitive ones?"

Answer

- **Primitive data types** are the most basic forms of data (like int, boolean, char). They store values directly in memory and are not objects.
- **Non-primitive data types** (like String, arrays, classes) are objects that store references to the actual data in memory.
- Primitives are faster and require less memory, while non-primitives are more flexible and can store complex data structures.

Question 3
"Can you write a Java program that uses all primitive data types?"

Answer

java

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```
public class PrimitiveTypesExample {
  public static void main(String[] args) {
    byte b = 100;
```

```
    short s = 20000;
    int i = 1000000;
    long l = 123456789L;
    float f = 5.75f;
    double d = 19.99;
    char c = 'A';
    boolean bool = true;

    System.out.println("byte: " + b);
    System.out.println("short: " + s);
    System.out.println("int: " + i);
    System.out.println("long: " + l);
    System.out.println("float: " + f);
    System.out.println("double: " + d);
    System.out.println("char: " + c);
    System.out.println("boolean: " + bool);
  }
}
```

Question 4
"What does type casting mean in Java? Can you give an example of both implicit and explicit casting?"

Answer
Type casting means **changing a variable from one data type to another**.

- **Implicit casting (widening)** – Happens automatically when converting from a smaller to a larger data type.
  Example:

java

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int num = 10;

double result = num; // int → double

- **Explicit casting (narrowing)** – Done manually when converting from a larger to a smaller data type.
  Example:

java

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double value = 9.78;

int num = (int) value; // double → int

Question 5
"What are the default values of each primitive data type in Java?"

Answer
If a primitive variable is declared but not initialized, Java assigns it a default value:

- byte → **0**
- short → **0**
- int → **0**
- long → **0L**
- float → **0.0f**
- double → **0.0d**
- char → **'\u0000'** (null character)
- boolean → **false**