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* Basics of Java

**Arrays in Java**

1. **Single-Dimensional Arrays**:
   * A linear collection of elements of the same type.
   * Example:

int[] numbers = {1, 2, 3, 4, 5};

1. **Multi-Dimensional Arrays**:
   * An array of arrays, such as a matrix.
   * Example:

int[][] matrix = {{1, 2, 3}, {4, 5, 6}};

1. **Array Operations**:
   * Traversing, sorting, searching, and modifying elements.
   * Example:
   * Arrays.sort(numbers);

System.out.println(Arrays.toString(numbers));

**Strings in Java**

1. **String Class and String Methods**:
   * Strings are immutable sequences of characters.
   * Example methods: length(), charAt(), substring(), toUpperCase(), toLowerCase().
2. **StringBuilder and StringBuffer**:
   * StringBuilder: A mutable sequence of characters, faster but not thread-safe.
   * StringBuffer: A thread-safe, mutable sequence of characters.
   * Example:

StringBuilder sb = new StringBuilder("Hello");

sb.append(" World");

System.out.println(sb);

1. **String Manipulations**:
   * Concatenation, replacement, and trimming.
   * Example:

String str = " Java ";

System.out.println(str.trim()); // Removes leading and trailing spaces

**Methods and Functions in Java**

1. **Defining Methods**:
   * Methods are blocks of code designed to perform a specific task.
   * Example:

public static int add(int a, int b) {

return a + b;

}

1. **Method Overloading**:
   * Defining multiple methods with the same name but different parameters.
   * Example:

public int multiply(int a, int b) {

return a \* b;

}

public double multiply(double a, double b) {

return a \* b;

}

1. **Recursion**:
   * A method calling itself to solve a problem.
   * Example:

public static int factorial(int n) {

if (n == 0) return 1;

return n \* factorial(n - 1);

}