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## 0.1 ClassDef Main

# 1 Class: Main

## 1.1 Overview

The Main class serves as the entry point for the application and provides a collection of static utility methods for basic mathematical calculations and console output.

## 1.2 attributes

This class does not have any attributes or fields. It contains static methods that operate on the parameters passed to them.

## 1.3 Description

The Main class is a container for several independent, static methods. As the methods are static, they can be called directly on the class without needing to create an instance of Main. The class demonstrates basic Java functionalities including arithmetic operations, recursion, and console I/O.

The class includes the following methods:

* add(int a, int b): A simple function that accepts two integer arguments, a and b, and returns their sum.
* factorial(int n): A recursive function that calculates the factorial of a non-negative integer n. It uses a base case where if n is less than or equal to 1, it returns 1. Otherwise, it recursively calls itself with n - 1 and multiplies the result by n.
* greet(String name): A void function that takes a String argument name and prints a personalized greeting message to the standard output.
* main(String[] args): The primary entry point for the Java application. When the program is executed, this method is called. It demonstrates the usage of the add, factorial, and greet methods and prints their results to the console.

The main method orchestrates the execution flow by calling the other utility methods with sample data:

public static void main(String[] args) {  
 // Calls the add method with 5 and 10  
 System.out.println("Sum: " + add(5, 10));  
 // Calls the factorial method with 5  
 System.out.println("Factorial: " + factorial(5));  
 // Calls the greet method with "Prateek"  
 greet("Prateek");  
}

## 1.4 Usage Notes

* All utility methods (add, factorial, greet) are static and should be invoked directly on the class, e.g., Main.add(5, 10).
* The factorial method is implemented recursively. Providing a very large integer as input may lead to a StackOverflowError due to deep recursion.
* The main method is the designated starting point for execution by the Java Virtual Machine (JVM) and is where the program begins.

## 1.5 Example

The main method within the class itself provides a clear example of how to use the other methods. To run this example, you would compile and execute the Main.java file.

// Example usage is demonstrated within the main method  
public static void main(String[] args) {  
 System.out.println("Sum: " + add(5, 10));  
 System.out.println("Factorial: " + factorial(5));  
 greet("Prateek");  
}

**Output:**

Sum: 15  
Factorial: 120  
Hello, Prateek!