Documentation

Overall Purpose of the Project

To build a full-stack task execution system that:

- Allows users to **create, manage, and run tasks** (defined by shell commands).
- **Tracks** each task's execution history (start time, end time, output).
- Provides a **user-friendly frontend** to interact with tasks.
- Uses a **MongoDB backend** to store task definitions and execution logs.
- Automates command-line operations via a web interface, enabling technical users (like DevOps or engineers) to **execute scripts without needing terminal access**.

Backend (Spring Boot + MongoDB)

- REST API to handle CRUD operations for tasks.
- Executes shell commands when triggered.
- Stores the output, start/end time in MongoDB.
- Handles CORS to support frontend requests.
- Uses TaskController, Task, and TaskExecution models for logical separation.

Real-World Use Cases

- **DevOps Automation:** Run deployment, backup, or cleanup scripts from a web interface.
- **Admin Tooling:** Give operations teams the ability to execute predefined tasks without needing direct terminal access.
- **Remote Execution Dashboard:** Useful in cases where tasks must be managed or run remotely (e.g., servers, CI/CD scripts).
- **Education or Demonstration:** Useful for teaching how command-line tasks can be integrated into modern web systems.

Task-1

Backend Configuration

Task Management Backend – Overview

Purpose

The backend provides a RESTful API for managing shell-based tasks. It allows users to:

- Create and store task definitions
- Execute shell commands via tasks
- Track execution history
- Retrieve, search, and delete tasks

Architecture

- **Framework**: Spring Boot (Java)
- **Type**: RESTful Web Service
- **Data Access**: Spring Data JPA
- **Database**: MongoDB
- **Execution Logic**: Shell command execution tracked with timestamps

Core Components

1. Model: Task

Represents a task with:

- id (String): Unique identifier
- name (String): Task name
- owner (String): Creator
- command (String): Shell command to be executed
- taskExecutions (List): History of runs

2. Model: TaskExecution

Represents a single execution of a task:

- id: UUID
- startTime: Execution start timestamp
- endTime: Execution end timestamp
- output: Output of the shell command

3. Controller: TaskController

Handles REST API endpoints:

- GET /tasks – List all tasks
- GET /tasks/{id} – Get task by ID
- GET /tasks/search?name= – Search by name
- PUT /tasks – Create/update task
- DELETE /tasks/{id} – Delete task
- PUT /tasks/{id}/execute – Run task and log execution

4. Repository: TaskRepository

Handles data persistence using JPA:

- Standard CRUD methods
- Custom search by name using:
  List<Task> findByNameContainingIgnoreCase(String name);

CORS Handling

- @CrossOrigin(origins = "http://localhost:3000") allows requests from the React frontend running on a different port.

Execution Workflow

1. **User creates a task** with command and metadata.
2. **Task is saved** to the database.
3. On execution:
    - Backend runs the shell command using Java.
    - Captures start time, end time, and output.
    - Saves a new `TaskExecution` entry under the task.

✅ Features Summary

Feature	Status
Create Task	✅
Search Task by Name	✅
Delete Task	✅
Execute Task Command	✅
Track Execution History	✅
REST API w/ JSON	✅
CORS Support	✅

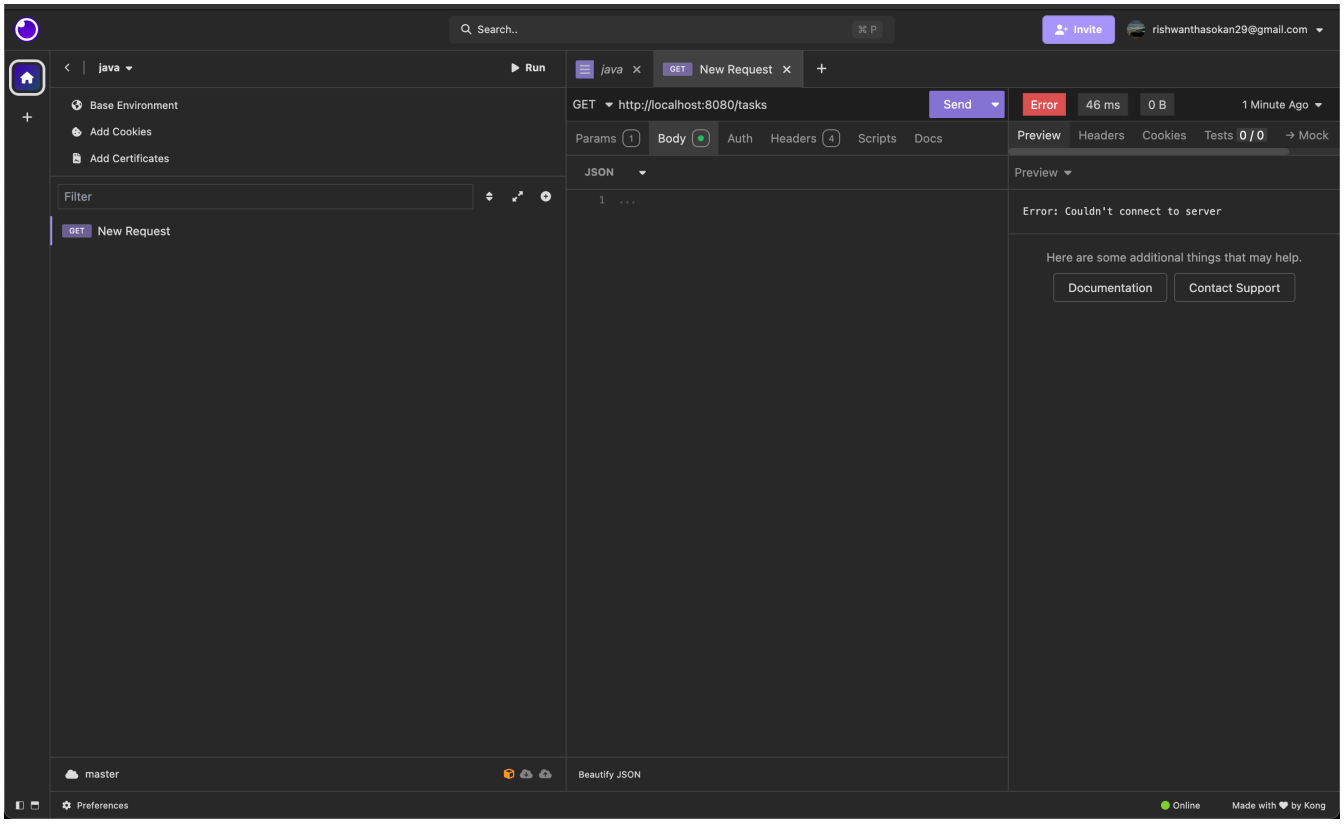
Example JSON Response


```
{
 "id": "task01",
 "name": "Backup",
 "owner": "Admin",
 "command": "tar -czf backup.tar.gz /home/data",
 "taskExecutions": [
   {
    "startTime": "2025-06-11T13:30:00",
    "endTime": "2025-06-11T13:30:05",
    "output": "Backup completed"
   }
```

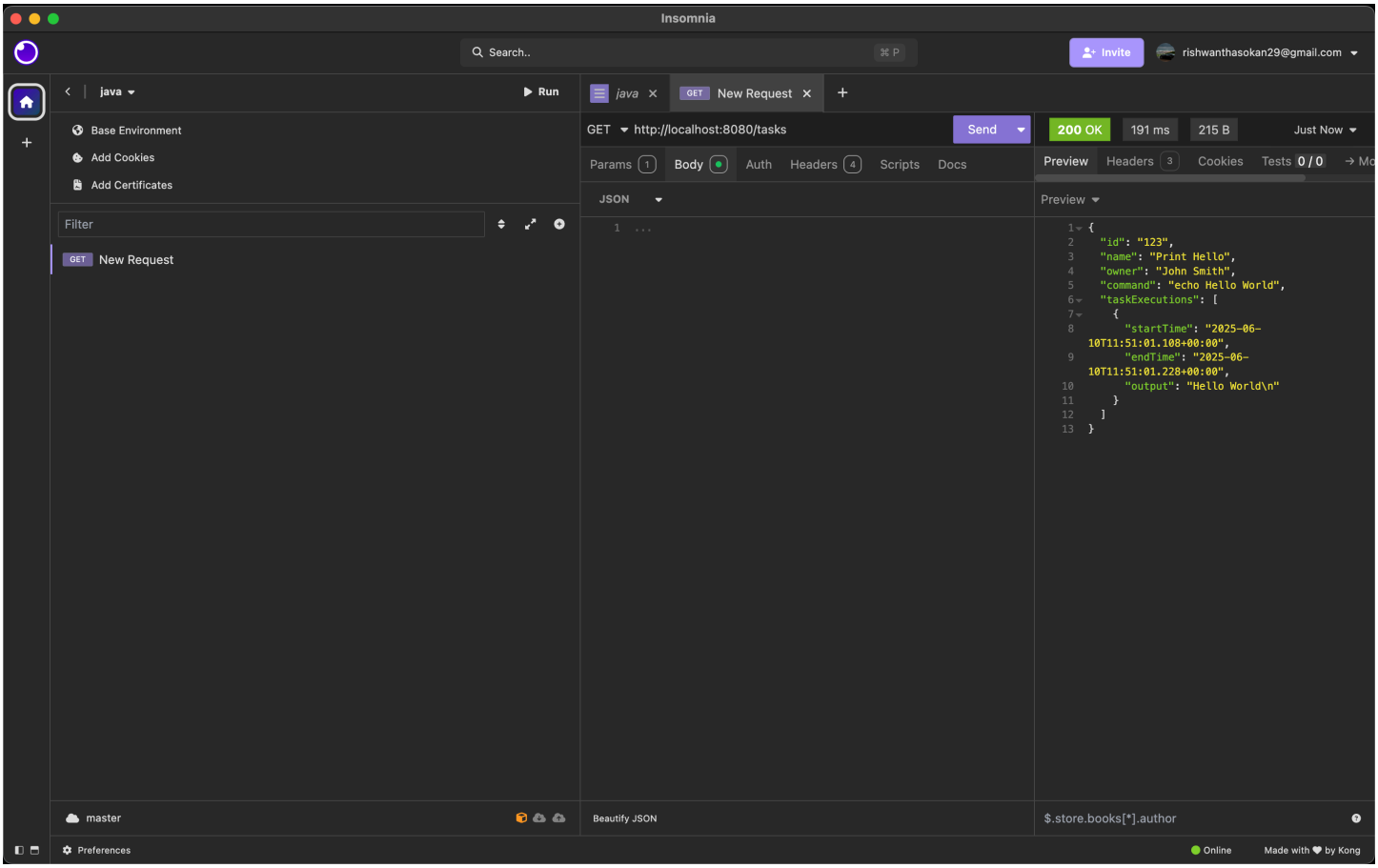
]
}

Api test Images - Insomnia

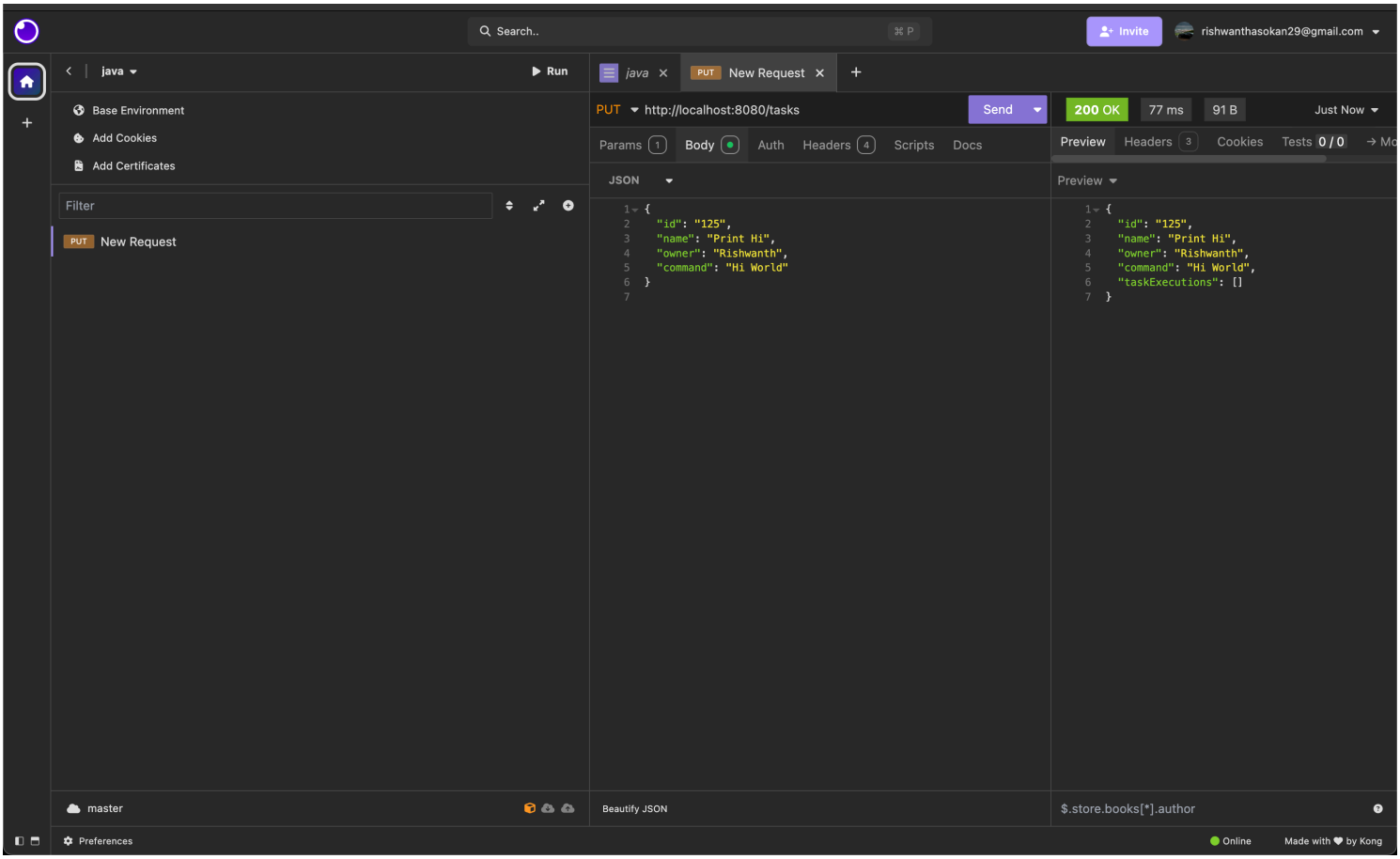
1, **Api**: http://localhost:8080/tasks
Method: Get
Description: Before Clicking Send Button



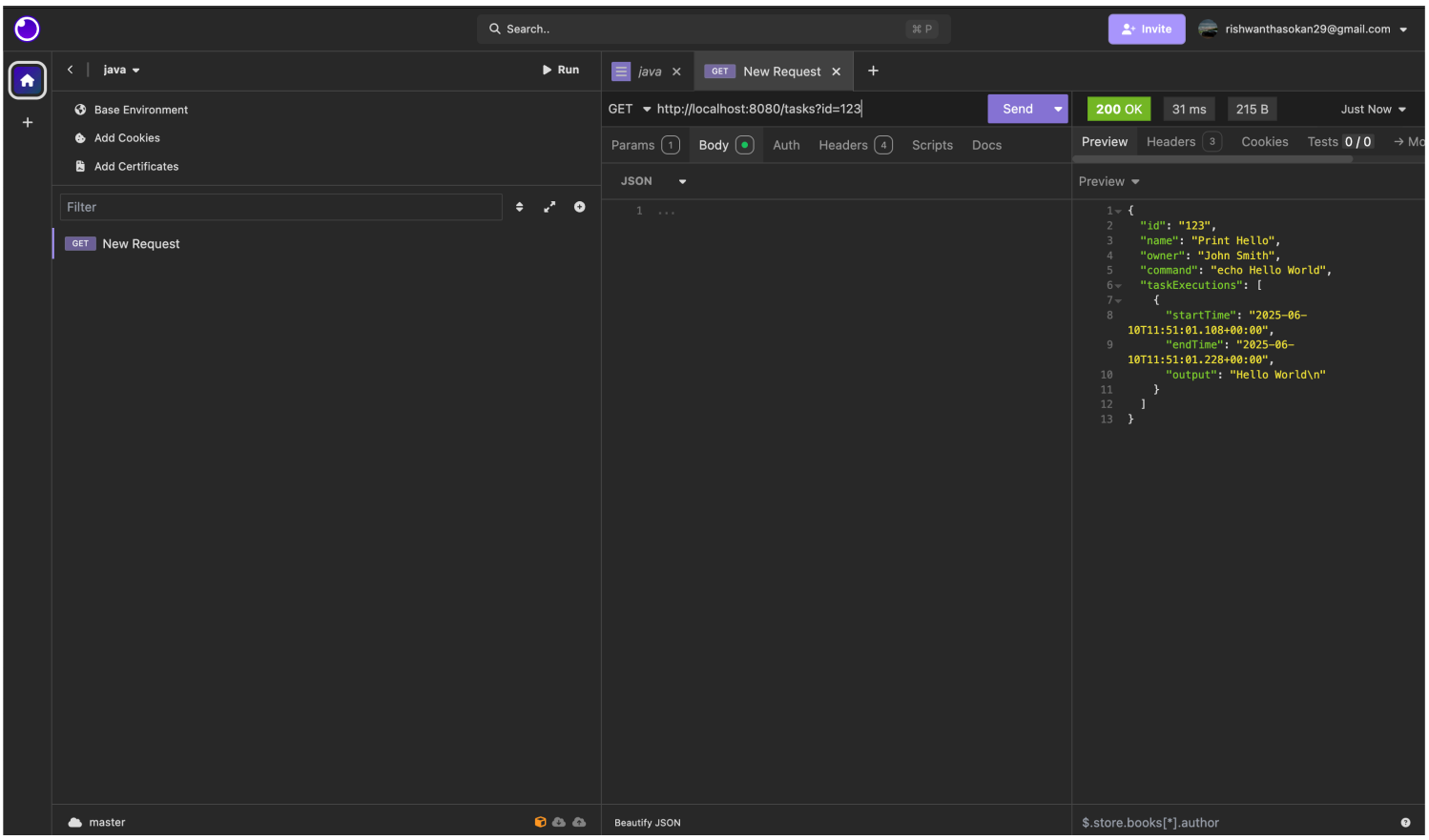
Description: After Clicking Send Button



2, **Api**: http://localhost:8080/tasks
Method: Put
Description: Creating new Data



3, **Api**: http://localhost:8080/tasks?id=123
Method: Get
Description: Getting task by id



4, **Api**: http://localhost:8080/tasks?id=126
Method: Get
Description: Getting task by id, if no task found through error message