✅ 1) CIM (Component Interaction Model)

This is the updated and fully complete component-level sequence diagram description.

Components

- **Client** (browser, Postman, SuperTest)

- **Express Router** (`/users` , `/sessions` , `/tasks`)

- **Auth Middleware** (`authMiddleware`)

- **Controllers**

    - `userController`
    - `authController`
    - `taskController`

- **Services**

    - `userService`
    - `authService`
    - `taskService`

- **Models (Mongoose)**

    - `User`
    - `Session`
    - `Task`

- **MongoDB**

CIM Interaction Flows (final)

A) Create User

```
Client → Router(/users) → userController.createUser()
  → userService.createUser()
```

```
  → User.create() → MongoDB
 ← new User object
← 201 Created to Client
```

B) Login

```
Client → Router(/sessions/login) → authController.login()
  → authService.login()
    → User.findOne() → MongoDB
    ← user | null
    → Session.create() → MongoDB
    ← session + token
← 200 OK {token}
```

C) Authenticated Request (general)

```
Client → Router(/tasks/*)
  → AuthMiddleware
      → authService.verifyToken(token)
      → Session.findOne(token) → MongoDB
      ← session | null
    (if OK: next(), else 401)
```

D) Create Task

```
Client → Router(/tasks) → AuthMiddleware → taskController.createTask()
  → taskService.createTask()
    → Task.create() → MongoDB
    ← saved Task
← 201 Created
```

E) List Tasks

```
Client → GET /tasks/users/:id/tasks
 → AuthMiddleware
 → taskController.listTasksForUser()
    → Task.find({userId}) → MongoDB
       OR return 403 if user mismatch
← 200 OK | 403 Forbidden
```

F) Update Task

```
Client → PUT /tasks/:taskId
 → AuthMiddleware
 → taskController.updateTask()
    → Task.findById() → MongoDB
        if not found: 404
        if wrong user: 403
    → Task.save()
← 200 OK
```

G) Delete Task

```
Client → DELETE /tasks/:taskId
 → AuthMiddleware
 → taskController.deleteTask()
    → Task.findById()
        (404 or 403 handled)
    → Task.deleteOne()
← 200 OK
```