National University of Computer and Emerging Sciences

Lab Manual

for

Web Engineering (SL3003)

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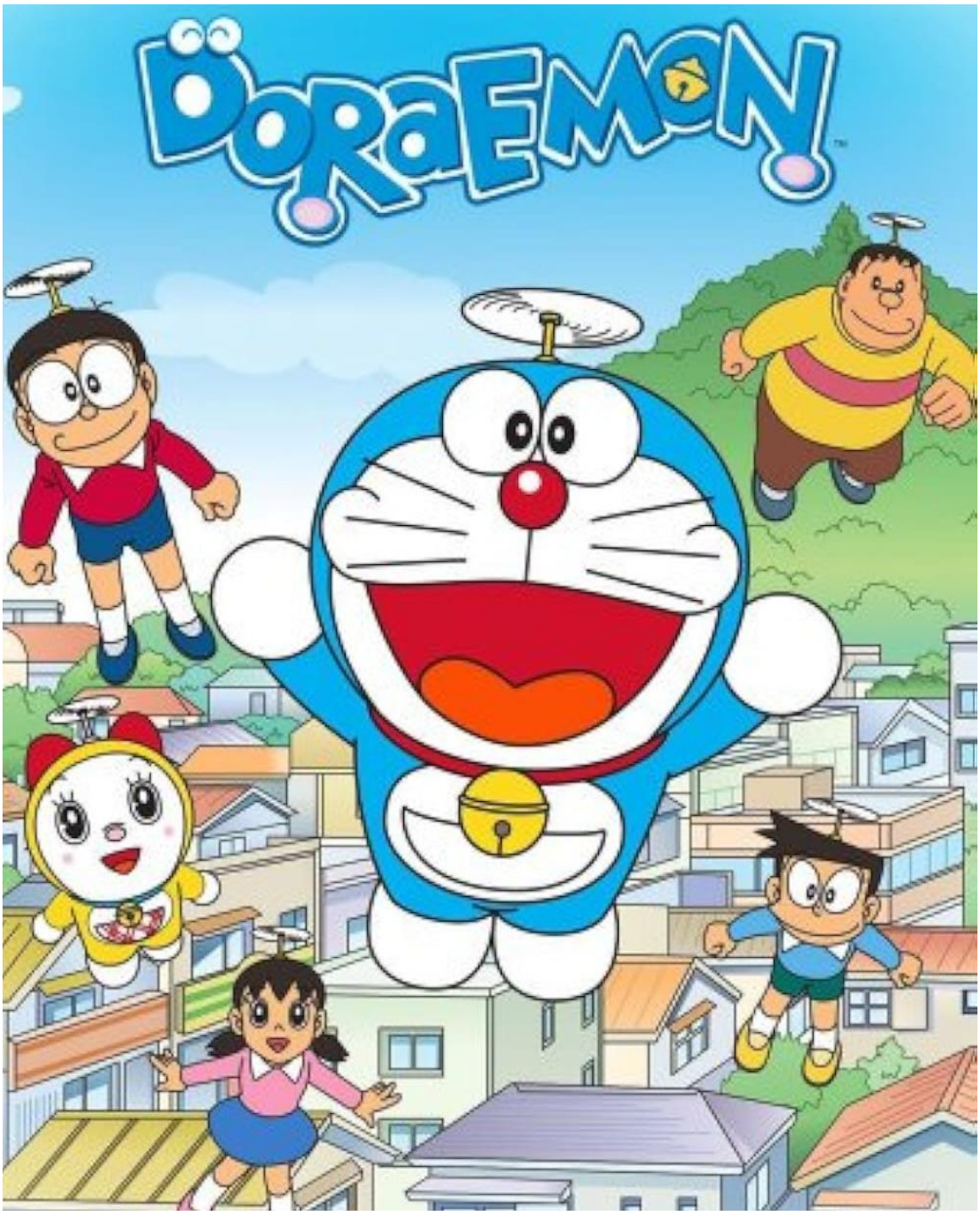
Lab 13 – Express JS APIs

Objectives

- Backend integration with MongoDB
- CRUD Operations (GET, POST, PATCH, PUT, DELETE)

Doraemon Gadget Center



Use following tools/soft wares:

- VS Code
- Postman

Setup your project:

- Firstly, setup node project: **npm i init –y**
- Now install express: **npm install express**
- For automatic restart of server after you save something after updating your code, you can install nodemon: **npm install --save-dev nodemon**

File structure of your project should be:

```
doraemon-gadget-lab/
├── models/
│   ├── Character.js            # object for characters (robot/human)
│   └── Gadget.js           # object for gadgets
│
├── routes/
│   ├── characterRoutes.js        # Character-related endpoints
│   └── gadgetRoutes.js       # Gadget-related endpoints
│
├── controllers/            # (Optional but clean for organizing logic)
│   ├── characterController.js     # Logic for handling characters
│   └── gadgetController.js   # Logic for handling gadgets
│
├── index.js                # Entry point - sets up server and routes
├── .env                    # MongoDB URI and config variables (if used)
├── package.json            # Project dependencies and scripts
└── README.md               # Lab instructions or documentation
```

Lab Tasks

Note:

- Test all your APIs on POSTMAN and attach screenshots also.

1. Create a character object with fields: id (auto-incremented), charactername and role (should be enum: "human" or "robot").

2. Create a gadgets object with fields: id (auto-incremented), name, description, use timestamps (for createdAt and updatedAt) and addedBy (character's _id).

3. Implement a route POST /character to register a new character (robot or human).

   Example: Add 2 robots: Dorami and Doraemon
   Add 2 humans: Nobita and Shizuka

4. Implement a route POST /gadgets (the addedBy field should be filled with the character's ID)

   Example: Add Doraemon's bamboo-copter and anywhere-door. (addedBy field should be character_id of Doraemon)

5. Implement a route GET /characters that returns all characters.

6. Implement a route GET /gadgets that returns all gadgets.

7. Implement a route GET /gadgets/:id that returns a single gadget.

8. Implement a route GET /character-gadgets/:id that returns all gadgets by a specific character. (in case of human character return error response that humans don't own gadgets)

9. Implement a route PATCH /gadgets/:id to update a gadget

10. Implement a route DELETE /gadgets/:id to delete a gadget

11. Implement GET /gadgets?name=bamboo to filter gadgets by name using req.query.

12. Use appropriate response types with correct codes

Code	Type	Meaning	When to Use
200	✓✓ Success	OK – Request succeeded	GET, PUT, PATCH, DELETE operations when everything is fine
201	✓✓ Created	Resource created	POST request when a new user or gadget is successfully created
204	✓✓ No Content	Success, no data to return	DELETE request when item is successfully removed
400	✕ Client Error	Bad Request	Invalid input, missing required fields
401	🔐 Unauthorized	Authentication required	Used when user is not logged in
403	⛔ Forbidden	Access denied	e.g. normal user tries to access admin functionalities
404	? Not Found	Resource not found	e.g. user ID doesn't exist
500	✹ Server Error	Internal server error	Uncaught error, DB failure, server crash