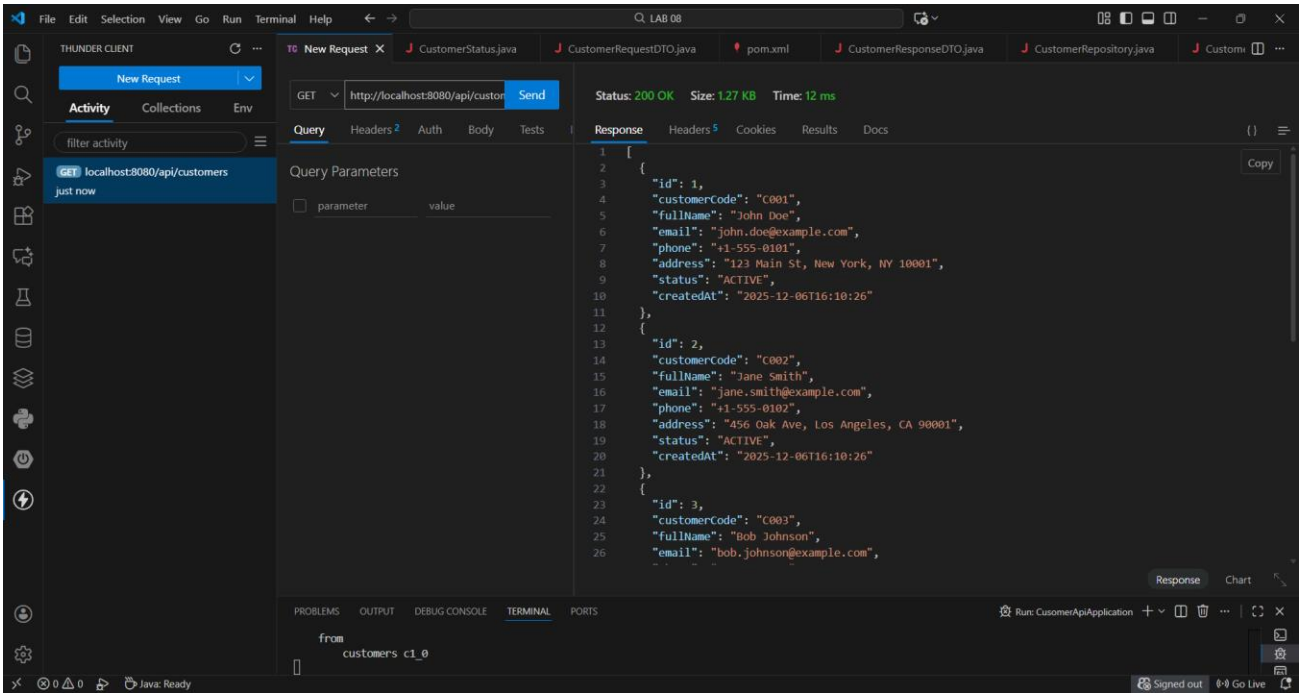
Web Application Development Lab 08

REST API & DTO PATTERN

Part A – INCLASS EXERCISES

I. RESULTS & CODE FLOW



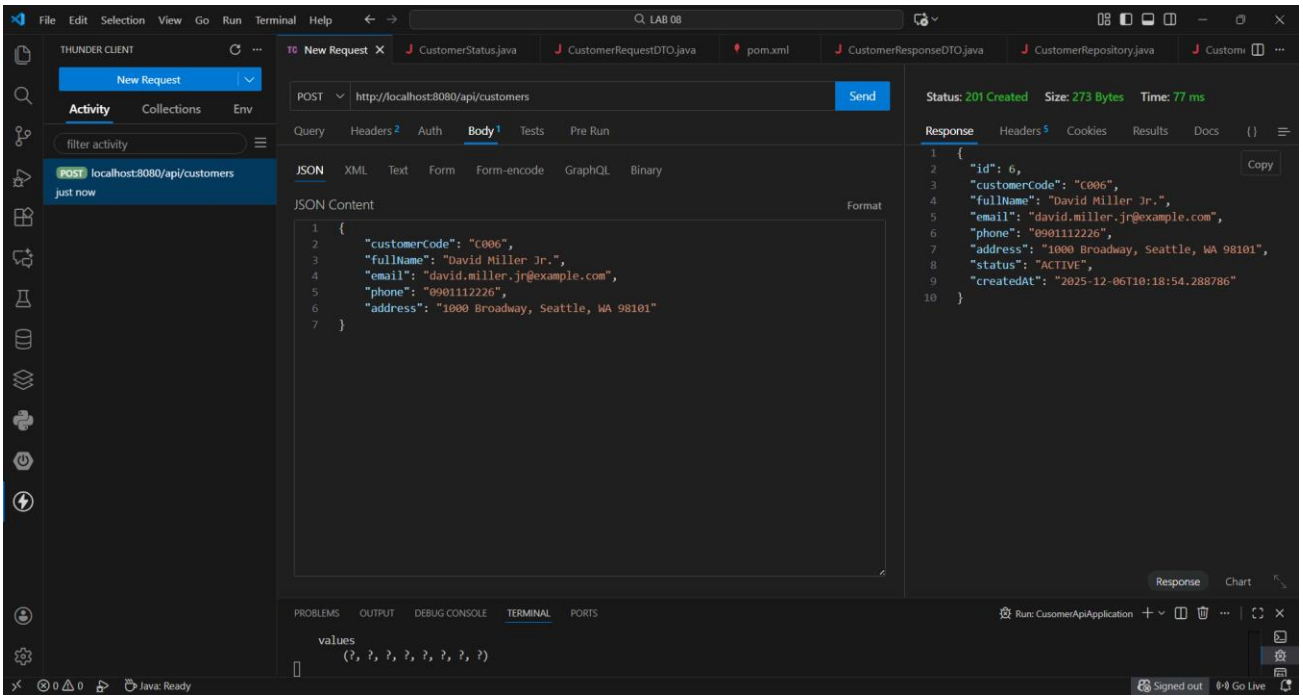
API Testing 'getAllCustomers'

```java
@RestController
@RequestMapping("/api/customers")
@CrossOrigin(origins = "*")  // Allow CORS for frontend
public class CustomerRestController {

    private final CustomerService customerService;

    @Autowired
    public CustomerRestController(CustomerService customerService) {
        this.customerService = customerService;
    }

    // GET all customers
    @GetMapping
    public ResponseEntity<List<CustomerResponseDTO>> getAllCustomers() {
        List<CustomerResponseDTO> customers = customerService.getAllCustomers();
        return ResponseEntity.ok(customers);
    }
```

‘/api/customers’ invoke getAllCustomers(), which returns in a form of a response JSON file. The @RequestMapping and @GetMapping let us know what /api/customers does.

CustomerService maps to CustomerRepository function, which performs the necessary query on the database. findAll() is a basic CRUD function from JPA.

```java
@Override
public List<CustomerResponseDTO> getAllCustomers() {
    return customerRepository.findAll()
            .stream()
            .map(this::convertToResponseDTO)
            .collect(Collectors.toList());
}
```



Adding a customer

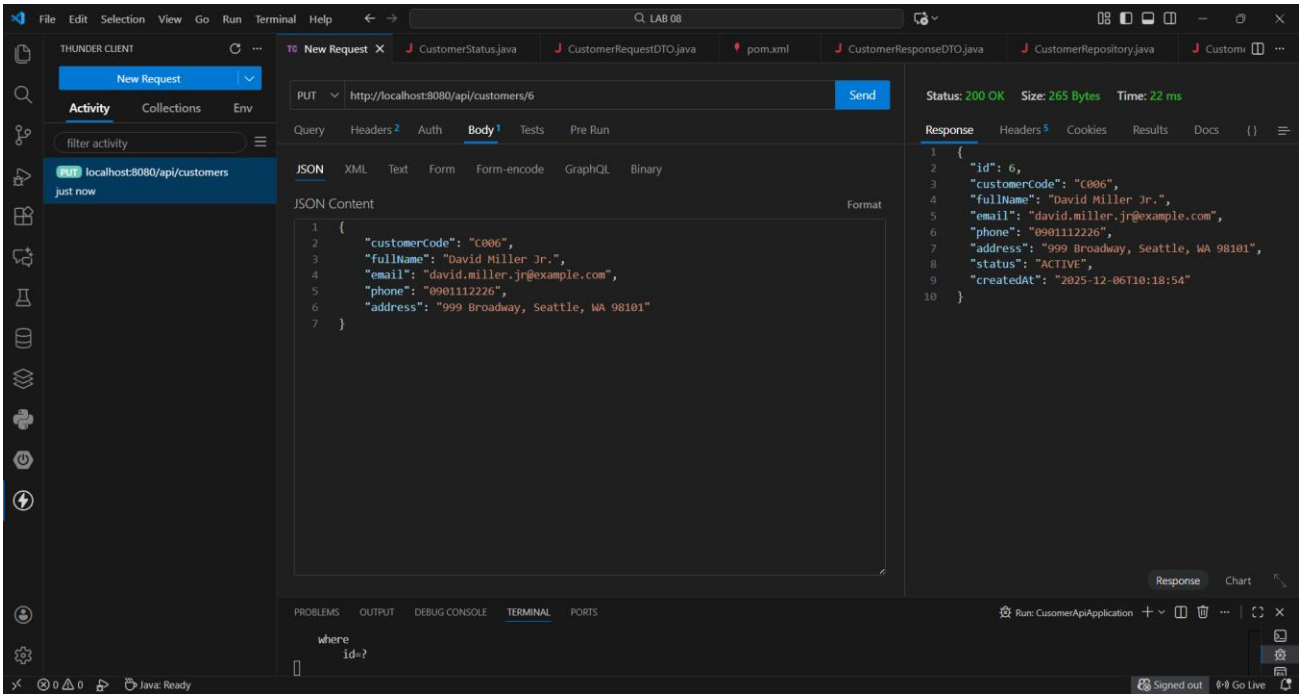
```java
// POST create new customer
@PostMapping
public ResponseEntity<CustomerResponseDTO> createCustomer(@Valid @RequestBody CustomerRequestDTO requestDTO) {
    CustomerResponseDTO createdCustomer = customerService.createCustomer(requestDTO);
    return ResponseEntity.status(HttpStatus.CREATED).body(createdCustomer);
}
```

@PostMapping handles POST methods made to the @RequestMapping(‘/api/customers’), when a POST method is called, it invokes createCustomer(), which return a JSON response file.

Similarly, CustomerService maps to CustomerRepository function. Some validation is in place.

```java
@Override
public CustomerResponseDTO createCustomer(CustomerRequestDTO requestDTO) {
    // Check for duplicates
    if (customerRepository.existsByCustomerCode(requestDTO.getCustomerCode())) {
        throw new DuplicateResourceException("Customer code already exists: " + requestDTO.getCustomerCode());
    }

    if (customerRepository.existsByEmail(requestDTO.getEmail())) {
        throw new DuplicateResourceException("Email already exists: " + requestDTO.getEmail());
    }

    // Convert DTO to Entity
    Customer customer = convertToEntity(requestDTO);

    // Save to database
    Customer savedCustomer = customerRepository.save(customer);

    // Convert Entity to Response DTO
    return convertToResponseDTO(savedCustomer);
}
```

The converToEntity() method turn the request into a Customer in the database, then they are saved.

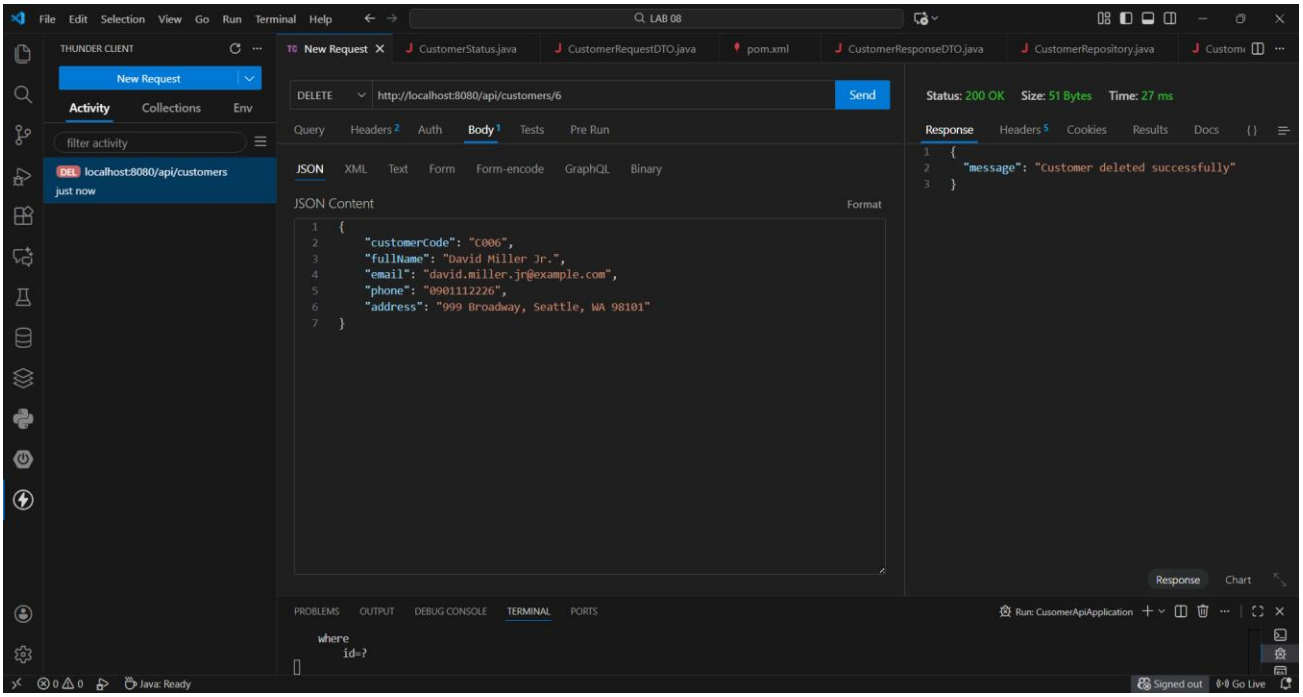


Updating a customer

```java
// PUT update customer
@PutMapping("/{id}")
public ResponseEntity<CustomerResponseDTO> updateCustomer(
        @PathVariable Long id,
        @Valid @RequestBody CustomerRequestDTO requestDTO) {
    CustomerResponseDTO updatedCustomer = customerService.updateCustomer(id, requestDTO);
    return ResponseEntity.ok(updatedCustomer);
}
```

In additional the api root url '/api/customers/', PUT requests need to have an addition '/id', where ID is an integer. Again, CustomerService maps to CustomerRepository function. updateCustomer() simply parse all the data necessary to the Repository and do some basic validation. Save() is a basic CRUD function from JPA.

```java
@Override
public CustomerResponseDTO updateCustomer(Long id, CustomerRequestDTO requestDTO) {
    Customer existingCustomer = customerRepository.findById(id)
            .orElseThrow(() -> new ResourceNotFoundException("Customer not found with id: " + id));

    // Check if email is being changed to an existing one
    if (!existingCustomer.getEmail().equals(requestDTO.getEmail())
        && customerRepository.existsByEmail(requestDTO.getEmail())) {
        throw new DuplicateResourceException("Email already exists: " + requestDTO.getEmail());
    }

    // Update fields
    existingCustomer.setFullName(requestDTO.getFullName());
    existingCustomer.setEmail(requestDTO.getEmail());
    existingCustomer.setPhone(requestDTO.getPhone());
    existingCustomer.setAddress(requestDTO.getAddress());

    // Don't update customerCode (immutable)

    Customer updatedCustomer = customerRepository.save(existingCustomer);
    return convertToResponseDTO(updatedCustomer);
}
```



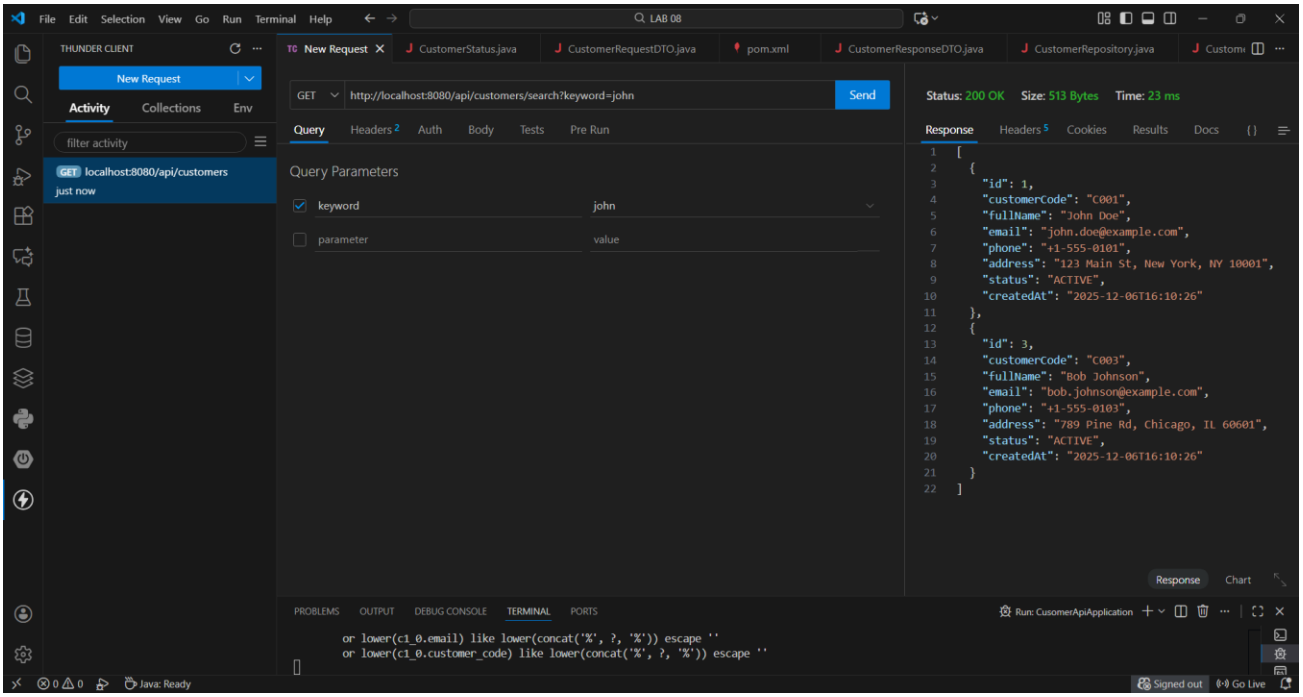
Delete user

The code flow is very similar to update

```
// DELETE customer
@DeleteMapping("/{id}")
public ResponseEntity<Map<String, String>> deleteCustomer(@PathVariable Long id) {
    customerService.deleteCustomer(id);
    Map<String, String> response = new HashMap<>();
    response.put("message", "Customer deleted successfully");
    return ResponseEntity.ok(response);
}
```

Instead of saving it to the database, we delete the user with the matching parameters.

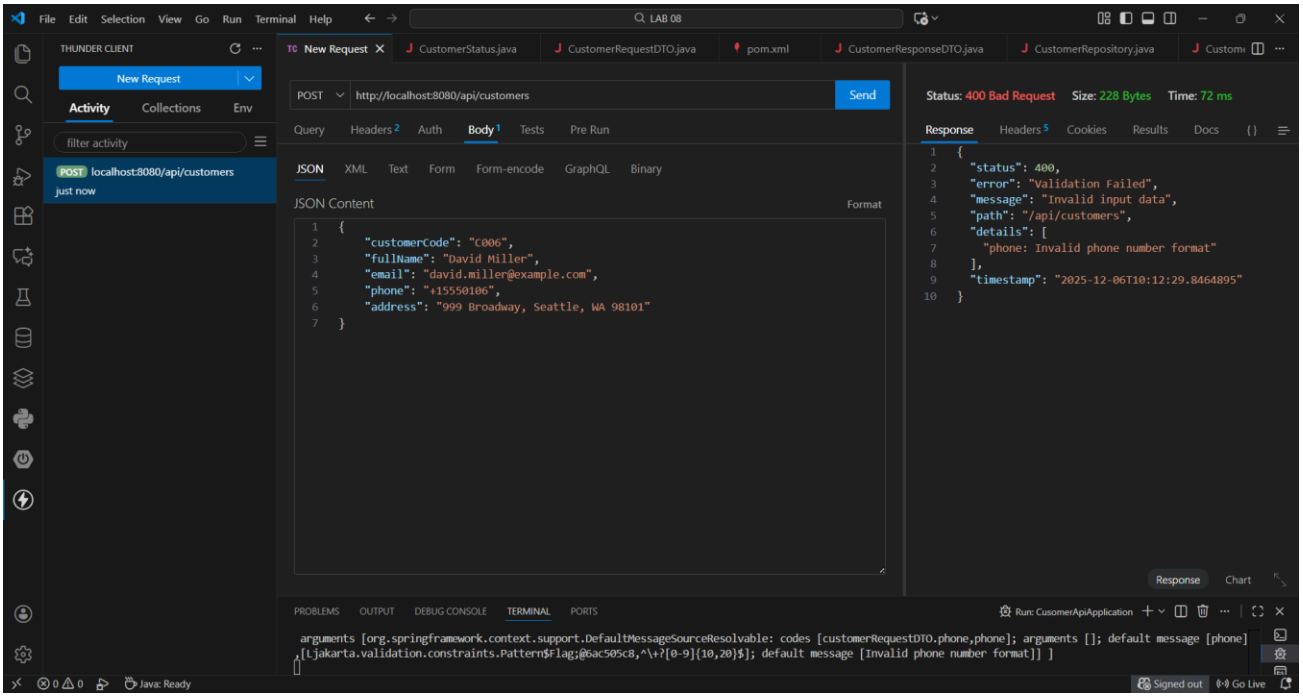
```
@Override
public void deleteCustomer(Long id) {
    if (!customerRepository.existsById(id)) {
        throw new ResourceNotFoundException("Customer not found with id: " + id);
    }
    customerRepository.deleteById(id);
}
```



Searching for 'john'

```java
// GET customer by ID
@GetMapping("/{id}")
public ResponseEntity<CustomerResponseDTO> getCustomerById(@PathVariable Long id) {
    CustomerResponseDTO customer = customerService.getCustomerById(id);
    return ResponseEntity.ok(customer);
}
```

Handles any GET method followed by /id. getCustomerByID maps to CustomerRepository, which is a findbyID() CRUD operation.



Validation

Validation is done through the DTO

```
@NotBlank(message = "Customer code is required")
@Size(min = 3, max = 20, message = "Customer code must be 3-20 characters")
@Pattern(regexp = "^C\\d{3,}$", message = "Customer code must start with C followed by numbers")
private String customerCode;

@NotBlank(message = "Full name is required")
@Size(min = 2, max = 100, message = "Name must be 2-100 characters")
private String fullName;

@NotBlank(message = "Email is required")
@Email(message = "Invalid email format")
private String email;

@Pattern(regexp = "^\\+?[0-9]{10,20}$", message = "Invalid phone number format")
private String phone;

@Size(max = 500, message = "Address too long")
private String address;

private String status;
```

If any of the parameters is violated, it returns a message

```java
// Handle Validation Errors (400)
@ExceptionHandler(MethodArgumentNotValidException.class)
public ResponseEntity<ErrorResponseDTO> handleValidationException(
        MethodArgumentNotValidException ex,
        WebRequest request) {

    List<String> details = new ArrayList<>();
    for (FieldError error : ex.getBindingResult().getFieldErrors()) {
        details.add(error.getField() + ": " + error.getDefaultMessage());
    }

    ErrorResponseDTO error = new ErrorResponseDTO(
        HttpStatus.BAD_REQUEST.value(),
        error: "Validation Failed",
        message: "Invalid input data",
        request.getDescription(false).replace("uri=", "")
    );
    error.setDetails(details);

    return new ResponseEntity<>(error, HttpStatus.BAD_REQUEST);
}
```

The message is used by the exception handler to build the response. That is all.