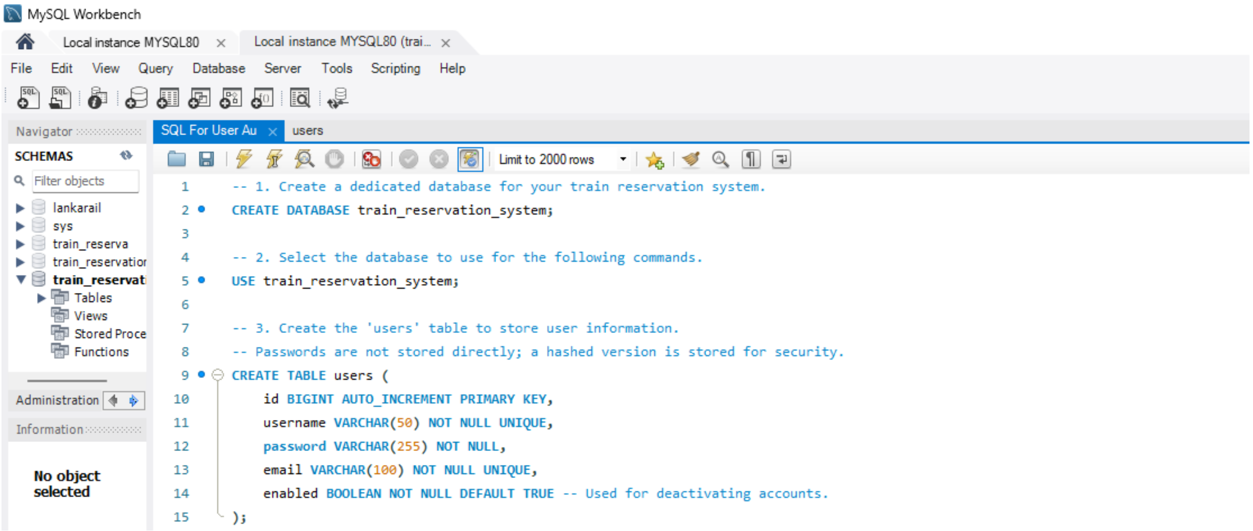
Web-based Train reservation system

Design by under Software Engineering Module & Data Base Design Module.

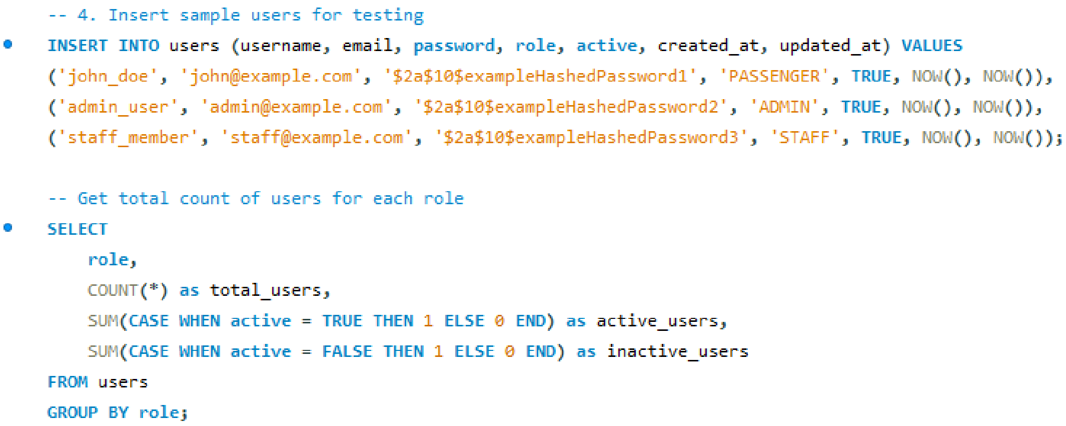
15-10-2025

Under this topic I create web pages for users to log their own way. If the user can be passenger, admin member or staff member they can access their own page using their own correct credentials. I designed this login page using two design patterns. Factory & singleton are the design patterns that I use for here. For the backend implementation I used Java language. For the frontend I use bootstrap with HTML for better UI design. For the data connection I used SQL workbench. In here all the validations are working properly. Without any trouble users can login to this page and do their tickets booking, cancellations, view tarin details etc.

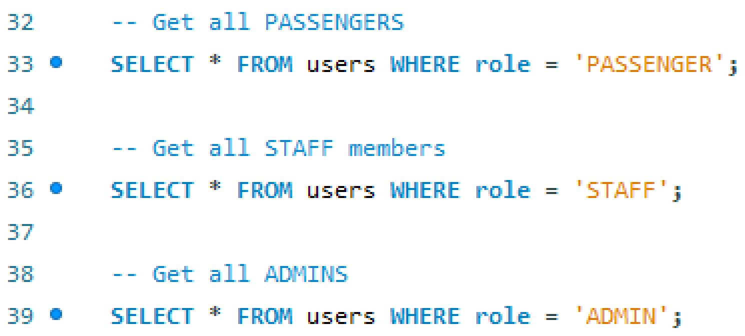
These are workbench codes that I developed



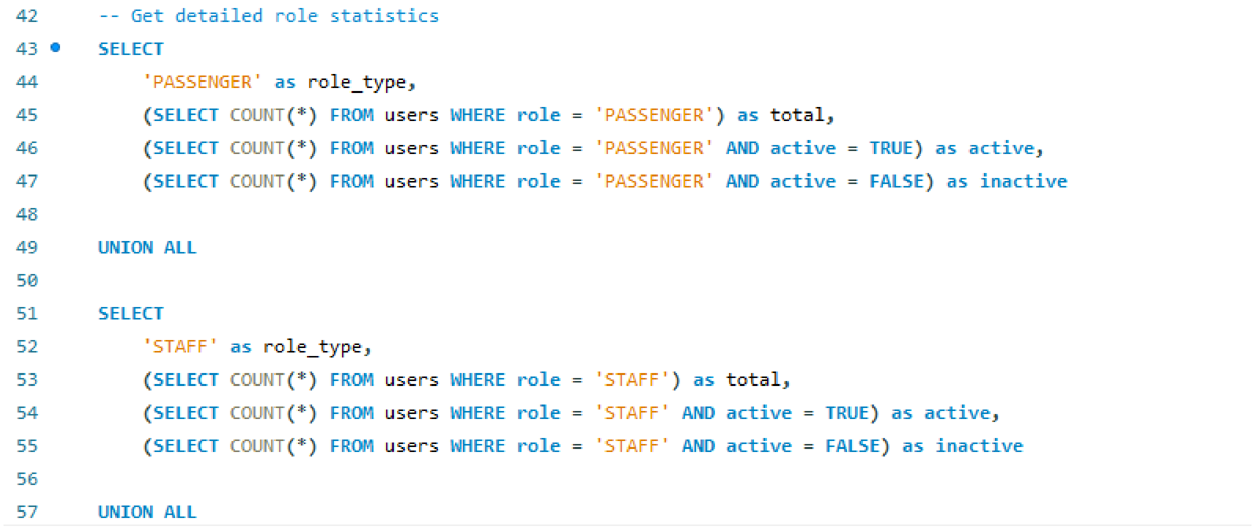
```sql
-- 1. Create a dedicated database for your train reservation system.
CREATE DATABASE train_reservation_system;

-- 2. Select the database to use for the following commands.
USE train_reservation_system;

-- 3. Create the 'users' table to store user information.
-- Passwords are not stored directly; a hashed version is stored for security.
CREATE TABLE users (
    id BIGINT AUTO_INCREMENT PRIMARY KEY,
    username VARCHAR(50) NOT NULL UNIQUE,
    password VARCHAR(255) NOT NULL,
    email VARCHAR(100) NOT NULL UNIQUE,
    enabled BOOLEAN NOT NULL DEFAULT TRUE -- Used for deactivating accounts.
);
```



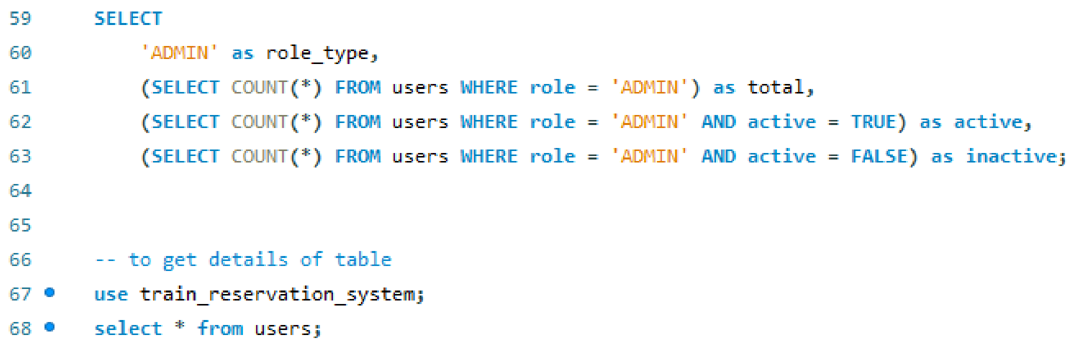
```sql
-- 4. Insert sample users for testing
INSERT INTO users (username, email, password, role, active, created_at, updated_at) VALUES
('john_doe', 'john@example.com', '$2a$10$exampleHashedPassword1', 'PASSENGER', TRUE, NOW(), NOW()),
('admin_user', 'admin@example.com', '$2a$10$exampleHashedPassword2', 'ADMIN', TRUE, NOW(), NOW()),
('staff_member', 'staff@example.com', '$2a$10$exampleHashedPassword3', 'STAFF', TRUE, NOW(), NOW());

-- Get total count of users for each role
SELECT
    role,
    COUNT(*) as total_users,
    SUM(CASE WHEN active = TRUE THEN 1 ELSE 0 END) as active_users,
    SUM(CASE WHEN active = FALSE THEN 1 ELSE 0 END) as inactive_users
FROM users
GROUP BY role;
```



```sql
-- Get all PASSENGERS
SELECT * FROM users WHERE role = 'PASSENGER';

-- Get all STAFF members
SELECT * FROM users WHERE role = 'STAFF';

-- Get all ADMINS
SELECT * FROM users WHERE role = 'ADMIN';
```

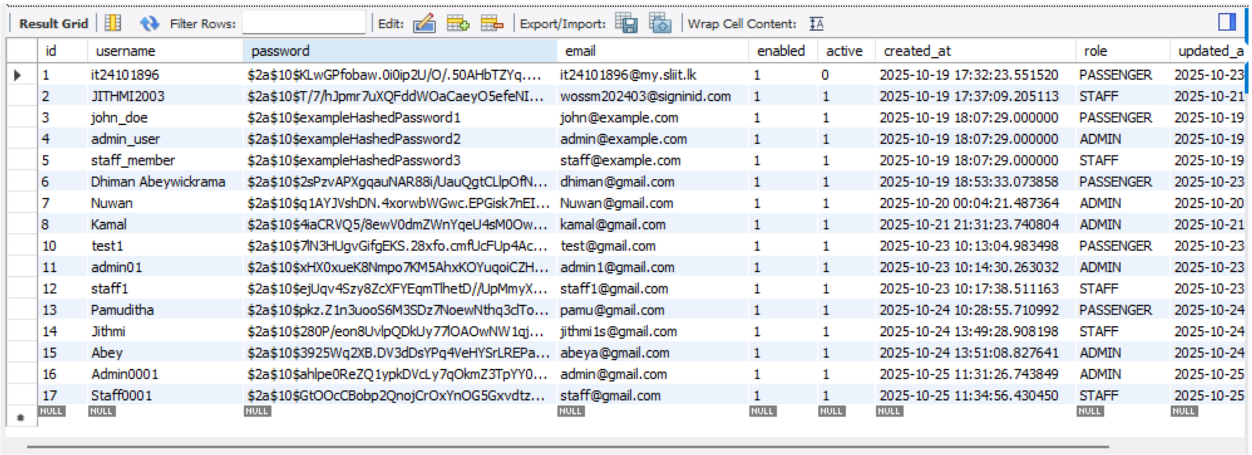


```sql
-- Get detailed role statistics
SELECT
    'PASSENGER' as role_type,
    (SELECT COUNT(*) FROM users WHERE role = 'PASSENGER') as total,
    (SELECT COUNT(*) FROM users WHERE role = 'PASSENGER' AND active = TRUE) as active,
    (SELECT COUNT(*) FROM users WHERE role = 'PASSENGER' AND active = FALSE) as inactive

UNION ALL

SELECT
    'STAFF' as role_type,
    (SELECT COUNT(*) FROM users WHERE role = 'STAFF') as total,
    (SELECT COUNT(*) FROM users WHERE role = 'STAFF' AND active = TRUE) as active,
    (SELECT COUNT(*) FROM users WHERE role = 'STAFF' AND active = FALSE) as inactive

UNION ALL
```



```sql
SELECT
    'ADMIN' as role_type,
    (SELECT COUNT(*) FROM users WHERE role = 'ADMIN') as total,
    (SELECT COUNT(*) FROM users WHERE role = 'ADMIN' AND active = TRUE) as active,
    (SELECT COUNT(*) FROM users WHERE role = 'ADMIN' AND active = FALSE) as inactive;


-- to get details of table
use train_reservation_system;
select * from users;
```

Outputs:



id	username	password	email	enabled	active	created_at	role	updated_a
1	it24101896	$2a$10$KLwGPfobaw.0i0ip2U/O/.50AHbTZYq....	it24101896@my.sliit.lk	1	0	2025-10-19 17:32:23.551520	PASSENGER	2025-10-23
2	JITHMI2003	$2a$10$T/7/hJpmr7uXQFddWOaCaeyO5efeNI...	wossm202403@signinid.com	1	1	2025-10-19 17:37:09.205113	STAFF	2025-10-21
3	john_doe	$2a$10$exampleHashedPassword1	john@example.com	1	1	2025-10-19 18:07:29.000000	PASSENGER	2025-10-19
4	admin_user	$2a$10$exampleHashedPassword2	admin@example.com	1	1	2025-10-19 18:07:29.000000	ADMIN	2025-10-19
5	staff_member	$2a$10$exampleHashedPassword3	staff@example.com	1	1	2025-10-19 18:07:29.000000	STAFF	2025-10-19
6	Dhiman Abeywickrama	$2a$10$2sPzvAPXgqauNAR88i/UauQgtCLlpOfN...	dhiman@gmail.com	1	1	2025-10-19 18:53:33.073858	PASSENGER	2025-10-23
7	Nuwan	$2a$10$q1AYJVshDN.4xorwbWGwc.EPGisk7nEI...	Nuwan@gmail.com	1	1	2025-10-20 00:04:21.487364	ADMIN	2025-10-20
8	Kamal	$2a$10$4iaCRVQ5/8ewV0dmZWnYqeU4sM0Ow...	kamal@gmail.com	1	1	2025-10-21 21:31:23.740804	ADMIN	2025-10-21
10	test1	$2a$10$7lN3HUgvGifgEKS.28xfo.cmfUcFUp4Ac...	test@gmail.com	1	1	2025-10-23 10:13:04.983498	PASSENGER	2025-10-23
11	admin01	$2a$10$xHX0xueK8Nmpo7KM5AhxKOYuqoiCZH...	admin1@gmail.com	1	1	2025-10-23 10:14:30.263032	ADMIN	2025-10-23
12	staff1	$2a$10$ejUqv4Szy8ZcXFYEqmTlhetD//UpMmyX...	staff1@gmail.com	1	1	2025-10-23 10:17:38.511163	STAFF	2025-10-23
13	Pamuditha	$2a$10$pkz.Z1n3uooS6M3SDz7NoewNthq3dTo...	pamu@gmail.com	1	1	2025-10-24 10:28:55.710992	PASSENGER	2025-10-24
14	Jithmi	$2a$10$280P/eon8UvlpQDkUy77lOAOwNW1qj...	jithmi1s@gmail.com	1	1	2025-10-24 13:49:28.908198	STAFF	2025-10-24
15	Abey	$2a$10$3925Wq2XB.DV3dDsYPq4VeHYSrLREPa...	abeya@gmail.com	1	1	2025-10-24 13:51:08.827641	ADMIN	2025-10-24
16	Admin0001	$2a$10$ahlpe0ReZQ1ypkDVcLy7qOkmZ3TpYY0...	admin@gmail.com	1	1	2025-10-25 11:31:26.743849	ADMIN	2025-10-25
17	Staff0001	$2a$10$GtOOcCBobp2QnojCrOxYnOG5Gxvdtz...	staff@gmail.com	1	1	2025-10-25 11:34:56.430450	STAFF	2025-10-25
NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL