# Assumptions

Some requirement is not clear so I make some assumptions to clarify the ambiguity.

**Landing Page**

When the user visit the system, the system will display Dashbaord page.

When the user has login, the system will redirect the user to My Profile page.

**Login**

Login page header does not show current time, so will not display current time in the login page header.

If login failed, display error message in the login page.

The system does not have sign up page, so the system is not able to register new user. There is some existing user in the system, only these users are able to login into the system.

**forget password**

If username not exist, display error message.

If username exist, tell user to check their email for the temporary password.

If the user forgot their username, no other way to recovery their account.

The backend api will generate a random password, every time the password is different.

**My Profile**

The requirement does not mention user email is a link, so it will be type text

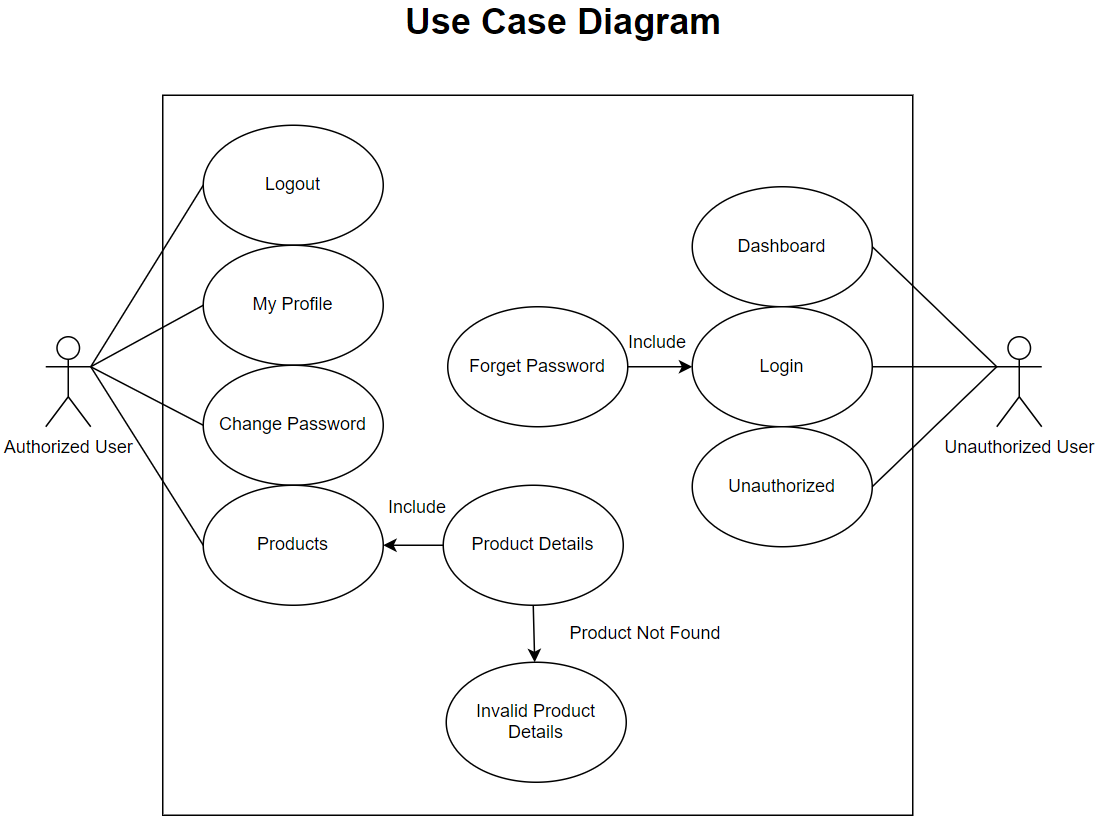
**Change Password**

If the old password is incorrect, frontend display error message.

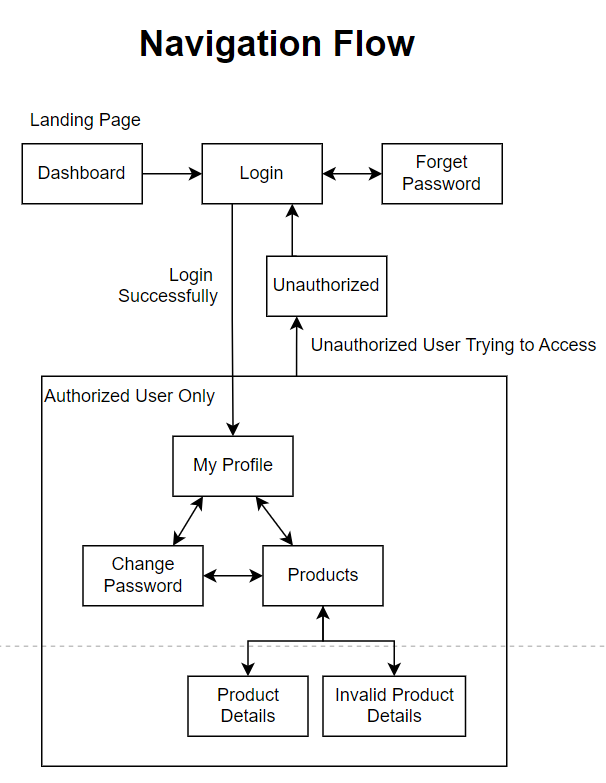
If the old password is correct, tell user the password has change successfully.

The requirement does not mention password needs to be strong, so will not verify the password is strong or not.

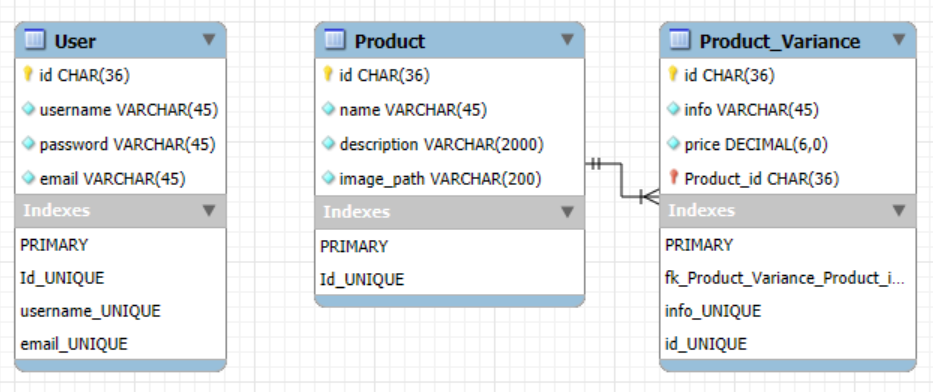
# Use Case Diagram



# Navigation Flow



# Database Design



**User**

Id: char(36) (PK)

Username: varchar(45) (not null, unique)

Password: varchar(45) (not null)

Email: varchar(45) (not null, unique)

**Product**

Id: char(36) (PK)

Name: varchar(45) (not null)

Description: varchar(2000) (not null)

image\_path: varchar(200) (not null)

\* Product picture will be retrieved from internet.

**Product\_Variance**

Id: char(36) (PK)

Info: varchar(45) (not null, unique)

Price: decimal(6,0) (not null)

Product\_id: char(36) (FK) (not null)

# Database Migration

## Create Table

-- MySQL Script generated by MySQL Workbench

-- Wed Aug 14 15:17:08 2024

-- Model: New Model Version: 1.0

-- MySQL Workbench Forward Engineering

SET @OLD\_UNIQUE\_CHECKS=@@UNIQUE\_CHECKS, UNIQUE\_CHECKS=0;

SET @OLD\_FOREIGN\_KEY\_CHECKS=@@FOREIGN\_KEY\_CHECKS, FOREIGN\_KEY\_CHECKS=0;

SET @OLD\_SQL\_MODE=@@SQL\_MODE, SQL\_MODE='ONLY\_FULL\_GROUP\_BY,STRICT\_TRANS\_TABLES,NO\_ZERO\_IN\_DATE,NO\_ZERO\_DATE,ERROR\_FOR\_DIVISION\_BY\_ZERO,NO\_ENGINE\_SUBSTITUTION';

-- -----------------------------------------------------

-- Schema angular-test

-- -----------------------------------------------------

-- -----------------------------------------------------

-- Schema angular-test

-- -----------------------------------------------------

CREATE SCHEMA IF NOT EXISTS `angular-test` DEFAULT CHARACTER SET utf8 ;

USE `angular-test` ;

-- -----------------------------------------------------

-- Table `angular-test`.`User`

-- -----------------------------------------------------

DROP TABLE IF EXISTS `angular-test`.`User` ;

CREATE TABLE IF NOT EXISTS `angular-test`.`User` (

`id` CHAR(36) NOT NULL,

`username` VARCHAR(45) NOT NULL,

`password` VARCHAR(45) NOT NULL,

`email` VARCHAR(45) NOT NULL,

PRIMARY KEY (`id`),

UNIQUE INDEX `Id\_UNIQUE` (`id` ASC) VISIBLE,

UNIQUE INDEX `username\_UNIQUE` (`username` ASC) VISIBLE,

UNIQUE INDEX `email\_UNIQUE` (`email` ASC) VISIBLE)

ENGINE = InnoDB;

-- -----------------------------------------------------

-- Table `angular-test`.`Product`

-- -----------------------------------------------------

DROP TABLE IF EXISTS `angular-test`.`Product` ;

CREATE TABLE IF NOT EXISTS `angular-test`.`Product` (

`id` CHAR(36) NOT NULL,

`name` VARCHAR(45) NOT NULL,

`description` VARCHAR(2000) NOT NULL,

`image\_path` VARCHAR(200) NOT NULL,

PRIMARY KEY (`id`),

UNIQUE INDEX `Id\_UNIQUE` (`id` ASC) VISIBLE)

ENGINE = InnoDB;

-- -----------------------------------------------------

-- Table `angular-test`.`Product\_Variance`

-- -----------------------------------------------------

DROP TABLE IF EXISTS `angular-test`.`Product\_Variance` ;

CREATE TABLE IF NOT EXISTS `angular-test`.`Product\_Variance` (

`id` CHAR(36) NOT NULL,

`info` VARCHAR(45) NOT NULL,

`price` DECIMAL(6,0) NOT NULL,

`Product\_id` CHAR(36) NOT NULL,

PRIMARY KEY (`id`, `Product\_id`),

INDEX `fk\_Product\_Variance\_Product\_idx` (`Product\_id` ASC) VISIBLE,

UNIQUE INDEX `info\_UNIQUE` (`info` ASC) VISIBLE,

UNIQUE INDEX `id\_UNIQUE` (`id` ASC) VISIBLE,

CONSTRAINT `fk\_Product\_Variance\_Product`

FOREIGN KEY (`Product\_id`)

REFERENCES `angular-test`.`Product` (`id`)

ON DELETE NO ACTION

ON UPDATE NO ACTION)

ENGINE = InnoDB;

SET SQL\_MODE=@OLD\_SQL\_MODE;

SET FOREIGN\_KEY\_CHECKS=@OLD\_FOREIGN\_KEY\_CHECKS;

SET UNIQUE\_CHECKS=@OLD\_UNIQUE\_CHECKS;

## Insert Sample Data

-- Truncate tables

SET FOREIGN\_KEY\_CHECKS = 0;

TRUNCATE TABLE product\_variance;

TRUNCATE TABLE Product;

TRUNCATE TABLE User;

SET FOREIGN\_KEY\_CHECKS = 1;

-- Insert sample data into the User table

INSERT INTO User (Id, Username, Password, Email)

VALUES

('81dc9bdb-52d4-4dbd-96d4-3b58eeda440a', 'johndoe', 'password123', 'john.doe@example.com'),

('67f733ea-bf8c-4f6a-8e1f-8e8b8a42b22c', 'janedoe', 'password456', 'jane.doe@example.com'),

('a4aede7f-0f6a-41b1-bc3b-1e29ee80b24d', 'adminuser', 'admin123', 'admin@example.com'),

('c1a5b5a0-6b6a-46df-a15c-1911e626b32c', 'moderator', 'moderator456', 'moderator@example.com'),

('81e3b4b5-c7c6-4d47-98cd-5f8b6b7d89e0', 'testuser', 'test123', 'test.user@example.com');

-- Insert sample data into the Product table

-- Insert car products

INSERT INTO Product(Id, Name, Description, image\_path)

VALUES

('daa57e8d-1111-40b2-80ab-31a52dbd7f83', 'Tesla Model S', 'The Tesla Model S is a full-size luxury sedan that is known for its exceptional performance, impressive range, and advanced technology features. With a range of up to 373 miles on a single charge, the Model S is a great option for those who want to go electric without sacrificing on performance. The car features a sleek and modern design, with a spacious interior and a massive touchscreen display that controls everything from the navigation system to the climate control. The Model S also boasts a range of advanced safety features, including Autopilot, which enables semi-autonomous driving. With its impressive acceleration and smooth ride, the Tesla Model S is a great option for those who want a luxurious and environmentally friendly driving experience.', 'https://www.tesla.com/ownersmanual/images/GUID-5543BA62-932F-46C5-B1EF-44707D4726B2-online-en-US.png'),

('9a9e1f5c-2222-49d8-a2a9-c5b6d7e8f9a', 'BMW 3 Series', 'The BMW 3 Series is a compact luxury sedan that is known for its exceptional handling, impressive performance, and premium features. With a range of engine options, including a powerful inline-6 and a efficient 4-cylinder, the 3 Series has something for everyone. The car features a sleek and sporty design, with a spacious interior and a range of advanced technology features, including a touchscreen display and a premium sound system. The 3 Series also boasts a range of advanced safety features, including adaptive cruise control and lane departure warning. With its exceptional handling and impressive performance, the BMW 3 Series is a great option for those who want a fun and luxurious driving experience.', 'https://www.bmw.com.my/content/dam/bmw/common/all-models/3-series/sedan/2022/navigation/bmw-3-series-sedan-lci-phev-modelfinder.png'),

('45c6e7d8-3333-55ab-66cd-77e8f9a0b1cc', 'Ford Mustang', 'The Ford Mustang is a iconic American muscle car that is known for its powerful engine, aggressive styling, and exceptional performance. With a range of engine options, including a powerful V8 and a efficient 4-cylinder, the Mustang has something for everyone. The car features a sleek and sporty design, with a spacious interior and a range of advanced technology features, including a touchscreen display and a premium sound system. The Mustang also boasts a range of advanced safety features, including blind spot monitoring and forward collision warning. With its exceptional acceleration and smooth ride, the Ford Mustang is a great option for those who want a fun and exciting driving experience.', 'https://platform.cstatic-images.com/in/v2/stock\_photos/90884105-7fd5-4da9-8479-27e482a4e479/2b678835-3279-4de7-8047-36484d4e2900.png'),

('98f7e6d5-4444-66df-77e8-88f9a0b1c2d', 'Audi A4', 'The Audi A4 is a compact luxury sedan that is known for its exceptional comfort, impressive performance, and premium features. With a range of engine options, including a powerful 4-cylinder and a efficient 2.0-liter turbo, the A4 has something for everyone. The car features a sleek and modern design, with a spacious interior and a range of advanced technology features, including a touchscreen display and a premium sound system. The A4 also boasts a range of advanced safety features, including adaptive cruise control and lane departure warning. With its exceptional comfort and impressive performance, the Audi A4 is a great option for those who want a luxurious and practical driving experience.', 'https://crdms.images.consumerreports.org/c\_lfill,w\_470,q\_auto,f\_auto/prod/cars/cr/model-years/15099-2023-audi-a4'),

('7e6f5d4c-5555-77e8-88f9-99a0b1c2d3e', 'Mercedes-Benz C-Class', 'The Mercedes-Benz C-Class is a compact luxury sedan that is known for its exceptional comfort, impressive performance, and premium features. With a range of engine options, including a powerful V6 and a efficient 4-cylinder, the C-Class has something for everyone. The car features a sleek and modern design, with a spacious interior and a range of advanced technology features, including a touchscreen display and a premium sound system. The C-Class also boasts a range of advanced safety features, including adaptive cruise control and lane departure warning. With its exceptional comfort and impressive performance, the Mercedes-Benz C-Class is a great option for those who want a luxurious and practical driving experience.', 'https://www.mercedes-benz.com.my/content/dam/hq/passengercars/cars/c-class/c-class-saloon-w206-pi/modeloverview/06-2022/images/mercedes-amg-c-class-w206-modeloverview-696x392-06-2022.png'),

('3c2b1a0d-6666-77e8-88f9-99a0b1c2d4ee', 'Lexus IS', 'The Lexus IS is a compact luxury sedan that is known for its exceptional performance, impressive handling, and premium features. With a range of engine options, including a powerful V6 and a efficient 4-cylinder, the IS has something for everyone. The car features a sleek and sporty design, with a spacious interior and a range of advanced technology features, including a touchscreen display and a premium sound system. The IS also boasts a range of advanced safety features, including adaptive cruise control and lane departure warning. With its exceptional handling and impressive performance, the Lexus IS is a great option for those who want a fun and luxurious driving experience.', 'https://www.cars.com/i/xlarge/in/v2/stock\_photos/a79709e7-d4d3-4f23-a8c9-e7d56dc1d710/641e5637-7f92-4dbc-9eb1-efdca008ee02.png');

-- Insert sample data into the Product\_Variance table

INSERT INTO Product\_Variance(Id, Info, Price, Product\_id)

VALUES

('1a2b3c4d-1111-40b2-80ab-31a52dbd7f83', 'Tesla Model S Long Range', 79990, 'daa57e8d-1111-40b2-80ab-31a52dbd7f83'),

('5e4d3c2b-2222-49d8-a2a9-c5b6d7e8f9a', 'Tesla Model S Plaid', 119990, 'daa57e8d-1111-40b2-80ab-31a52dbd7f83'),

('2b1a0c9d-3333-55ab-66cd-77e8f9a0b1c', 'BMW 3 Series Sedan', 41000, '9a9e1f5c-2222-49d8-a2a9-c5b6d7e8f9a'),

('9d8c7b6a-4444-66df-77e8-88f9a0b1c2d', 'BMW 3 Series M340i xDrive', 54600, '9a9e1f5c-2222-49d8-a2a9-c5b6d7e8f9a'),

('6a5b4c3d-5555-77e8-88f9-99a0b1c2d3e', 'Ford Mustang EcoBoost', 27155, '45c6e7d8-3333-55ab-66cd-77e8f9a0b1c'),

('3c2b1a0d-6666-77e8-88f9-99a0b1c2d4e', 'Ford Mustang GT Premium', 39685, '45c6e7d8-3333-55ab-66cd-77e8f9a0b1c'),

('0c9d8b7a-7777-88e8-99f9-00a0b1c2d5e', 'Audi A4 Premium', 39300, '98f7e6d5-4444-66df-77e8-88f9a0b1c2d'),

('4d3c2b1a-8888-99e8-00f9-11a0b1c2d6e', 'Audi A4 Prestige', 47500, '98f7e6d5-4444-66df-77e8-88f9a0b1c2d'),

('8f7e6d5c-9999-00e8-11f9-22a0b1c2d7e', 'Mercedes-Benz C-Class C 300', 41400, '7e6f5d4c-5555-77e8-88f9-99a0b1c2d3e'),

('7e6f5d4c-0000-11e8-22f9-33a0b1c2d8e', 'Mercedes-Benz C-Class AMG C 43', 56900, '7e6f5d4c-5555-77e8-88f9-99a0b1c2d3e'),

('6a5b4c3d-1111-22e8-33f9-44a0b1c2d9ee', 'Lexus IS 300', 39850, '3c2b1a0d-6666-77e8-88f9-99a0b1c2d4ee'),

('5e4d3c2b-2222-33e8-44f9-55a0b1c2a0ee', 'Lexus IS 350 F Sport', 44275, '3c2b1a0d-6666-77e8-88f9-99a0b1c2d4ee');

# API Design

Frontend URL:

Backend URL: https://localhost:7046/api

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Feature** | **Frontend Route** | **API end point** | **API Description** | **Request Body** | **Response Body** |
| Home | /Dashboard | - |  | - | - |
| Login | /Login | POST /user/login | Check the username and password are correct. | {  username: string,  password: string  } | If username and password match:  {  user\_id: string,  username: string  }  else {  "status": 404,  Error: Not Found  "message": "The username or password is wrong."  } |
| Forget Password | /ForgetPwsd | POST /user/forgetpassword | Send temporary password to user's email. | {  username: string  } | If user name was found  {  Status: 204  }  Else if user name was found but unable to send email  {  Status: 500  Error: internal server error  Message: Username [username] was found but the server was unable to send the temporary password to user’s email.  }  Else if user name was no found  {  Status: 404  Error: Not Found  Message: ‘username [username] not found’  } |
| My Profile | /MyProfile | GET /user/[id] | Retrieve user info. | - | If user id was found  {  username: string,  email: string  }  Else  {  "status": 404,  Error: Not Found  "message": "user with id [id] no found."  } |
| Change Password | /ChangePwsd | POST /user/changepassword | Verify current password and change to new password. | {  user\_id: string,  current\_password: string,  new\_password: string  } | If current password is correct and new password is valid  {  Status: 204  }  Else if current password is incorrect  {  Status: 400  Error: bad request  Message: ‘Incorrect password.’  }  Else if current password is correct but new password is invalid  {  Status: 400  Error: bad request  Message: ‘New password is invalid.’  } |
| Products | /Product | GET /product | Retrieve list of products and find price range of each product | - | {  {  id: string,  name: string,  description: string,  image\_path: string,  lower\_price\_range: number,  upper\_price\_range: number  },  {  id: string,  name: string,  description: string,  image\_path: string,  lower\_price\_range: number,  upper\_price\_range: number  },  {  id: string,  name: string,  description: string,  image\_path: string,  lower\_price\_range: number,  upper\_price\_range: number  }  } |
| Product Details  Invalid Product Details | /Product/[id] | GET /product/[id] | Retrieve product details by id. | - | If product was found  {  Id: string  Name: string  Description: string  image\_path: string  product\_variance\_list: {  {  Id: string  Info: string  Price: number  },  {  Id: string  Info: string  Price: number  },  }  }  else  {  "status": 404,  "error": "Not Found",  "message": "product with id [id] no found."  } |
| Unauthorized | /Unauthorized | - |  | - | - |

# Technology Used

Frontend: Angular

Backend: .NET

Database: MySQL

Database first approach

# Class Diagram

**User**

Id: Guid (PK)

Username: string (not null, unique, max 45 char)

Password: string (not null, max 45 char)

Email: string (not null, email format, max 45 char)

**Product**

Id: Guid (PK)

Name: string (max 45 char, not null)

Description: string (max 2000 char, not null)

image\_path: string (max 200 char, not null)

variance: List<ProductVariance>

**ProductVariance**

Id: Guid (PK)

Info: string (max 45 char, not null)

Price: int (max 6 decimal, not null)

# Data Transfer Object Design

**LoginRequestDTO**

Username

Password

**LoginResponseDTO**

User\_id

Username

**AccountRecoveryRequestDTO**

Username

**MyProfileDTO**

Username

email

**ChangePasswordRequestDTO**

User\_id

Current\_password

New\_password

**ProductDTO**

Id: string

Name: string

Description: string

image\_path: string

lower\_price\_range: number

upper\_price\_range: number

**ProductDetailsDTO**

Id: string

Name: string

Description: string

image\_path: string

product\_variance: ProductVarianceDTO[]

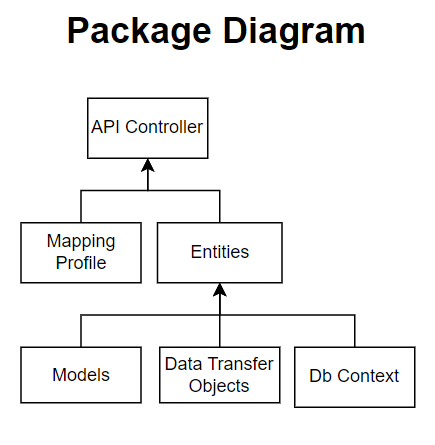
**ProductVarianceDTO** (inside ProductDetailsDTO class)

Id: sting

Info: string

Price: number

# Backend Package Diagram



\* I did not implement repository pattern because it is just a simple application, using repository pattern might be over design.

# Effort

Validate input from frontend

Database limit the password to maximum 45 character, also implement input validation in front end.

Use dto to avoid circular reference in json

# Future Improvement

* Hash the password in database.
* Download the product image and save them in an online drive. So no need to get the image from external site we don’t have control, reduce risks.
* Add a custom validation to validate uniqueness in model, rather than validate the input in the controller.
* Implement send temporary password to user’s email for Forget Password feature.