

Coding Assignment: Financial Assistance Scheme Management System

Introduction

This assignment involves building a backend solution for managing financial assistance schemes for needy individuals and families. This assessment will focus on the backend logic and design, and database design. Due to the limited amount of time given to complete the coding assignment, you are not required to build the frontend for this assignment.

Objective

The goal of this assignment is to build a system that

- Allows the management of a fictitious set of financial assistance schemes.
- Manage accounts of administrators in charge of management of schemes.
- Save and update records of applicants who applied for schemes.
- The system should advise users of schemes that each applicant can apply for.
- The system should also save the outcome of granting of schemes to applicants.

Requirements

Backend

1. Database Design

- a. Design a relational database to store the information about financial assistance schemes and the beneficiaries (individuals and families).
- b. The database should include, but is not limited to the following tables:

Table Name	Purpose
Administrators	Information about the users managing the system.
Applicants	Details of individuals who applied for financial assistance schemes.
Schemes	Information about different financial assistance schemes available.
Applications	Records and statuses of applications made by individuals for different schemes.

2. Database Design - Applicants and Schemes

Please take note of the following requirements when designing the **Applicants** and **Schemes** tables:

- a. Schemes available for an applicant to apply for depends on the following factors:
 - i. Marital status: Single, Married, Widowed, Divorced
 - ii. Employment status: Employed, Unemployed
 - iii. Household family members: Family members staying in the same household with applicant and their relationship with applicant
- b. For example, assuming that the following financial assistance schemes (for illustration purpose only) are available:

Scheme Name	Description	Eligibility Criteria	Benefits
Retrenchment assistance scheme	Financial assistance for retrenched workers	<ul style="list-style-type: none">• Citizens who are recently retrenched.• School meal vouchers are only for applicants with school-going children.	<ul style="list-style-type: none">• Additional SkillsFuture credits• Additional CDC vouchers• Daily school meal vouchers for applicants (for applicants with children attending primary school only)

And the following applicants are applying for financial assistance schemes:

Applicant	Background
James	Single. Recently retrenched and still on job search.
Mary	Married with 2 kids aged 8 and 6. Recently retrenched and still on job search.

- c. Both James and Mary are eligible for the retrenchment assistance scheme as they are recently retrenched.
- d. Mary’s eldest child is eligible to receive daily school meal vouchers since the child is attending primary school.

3. API Endpoints

- a. Implement RESTful API endpoints that can support the following:
 - i. API requests for managing Beneficiaries, Schemes and Applications.
 - ii. Authentication and authorization for managing frontend and API access to the system.
- b. Refer to the following table for required endpoints to build (you may add more endpoints where needed, but endpoints listed in the following table must be included in solution):

Method	Path	Purpose
GET	/api/applicants	Get all applicants.
POST	/api/applicants	Create a new applicant.
GET	/api/schemes	Get all schemes.
GET	/api/schemes/eligible?applicant={id}	Get all schemes that an applicant (represented by applicant query string parameter) is eligible to apply for.
GET	/api/applications	Get all applications.
POST	/api/applications	Create a new application.

User Stories

Your solution must fulfill the following user stories:

1. As a system administrator, I want to view all available financial assistance schemes.

System administrators should be able to view all available financial assistance schemes.

2. As a system administrator, I want to add new scheme applicants.

Before applying for a financial assistance scheme, the applicant's data should be saved into the system first.

3. As a system administrator, I want to view the schemes that an applicant is eligible to apply for.

Upon starting a new application for a financial assistance scheme applicant, the system administrator should be able to view the list of schemes that the applicant is eligible for based on their data.

Sample Data

The following are some samples of applicants and financial assistance schemes data in a JSON format. You may use them for reference purposes when designing the database schema designs and API responses. You may come up with your own schema designs and response formats, as long as the assignment requirements are met.

```
// Applicants
{
  "applicants": [
    {
      "id": "01913b7a-4493-74b2-93f8-e684c4ca935c",
      "name": "James",
      "employment_status": "unemployed",
      "sex": "male",
      "date_of_birth": "1990-07-01"
      "household": []
    },
    {
      "id": "01913b80-2c04-7f9d-86a4-497ef68cb3a0",
      "name": "Mary",
      "employment_status": "unemployed",
      "sex": "female",
      "date_of_birth": "1984-10-06"
      "household": [
        {
          "id": "01913b88-1d4d-7152-a7ce-75796a2e8ecf"
          "name": "Gwen",
          "employment_status": "unemployed",
          "sex": "female",
          "date_of_birth": "2016-02-01"
          "relation": "daughter"
        },
        {
          "id": "01913b88-65c6-7255-820f-9c4dd1e5ce79"
          "name": "Jayden",
          "employment_status": "unemployed",
          "sex": "male",
          "date_of_birth": "2018-03-15"
          "relation": "son"
        }
      ]
    }
  ]
}
```

```
// Schemes
{
  "schemes": [
    {
      "id": "01913b89-9a43-7163-8757-01cc254783f3",
      "name": "Retrenchment Assistance Scheme",
      "criteria": {
        "employment_status": "unemployed"
      },
      "benefits": [
        {
          "id": "01913b8b-9b12-7d2c-a1fa-ea613b802ebc"
          "name": "SkillsFuture Credits",
          "amount": 500.00
        }
      ]
    }
  ]
}
```

Deliverables

Code Repository

- Provide a link to a public or private code repository (GitHub, GitLab, etc.) with your complete codebase.
- Ensure the repository contains a clear README.md with instructions on how to set up and run the application in the local development environment.

API Documentation

- Include documentation for the API endpoints using a tool like Swagger or Postman.
- Ensure the documentation is clear and easy to follow.

Evaluation Criteria

- **Database Design:** Quality of the database schema design.
- **API Design:** Proper implementation of RESTful principles, clear and concise endpoints, proper endpoint authorisation checks in place and proper error handling logic in place.
- **Backend Logic:** Implementation of business logic, data validation, and security practices.
- **Code Quality:** Readability, maintainability, and use of best practices.
- **Documentation:** Clarity and completeness of the provided documentation.

Submission Deadline

Please submit your completed assignment within 1 week's time upon receiving this coding assignment document.

Contact

If you have any questions or need further clarification, please contact Huijie at wu_huijie@tech.gov.sg.