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TechTrek 2023 Challenge Statement

6th May 2023

Introduction

Best Consultancy is a consultancy company with over 1000 employees, specializing in financial and payments solutions. Our clients are based across the Asia Pacific region. When required, our consultants are required to travel to countries where our clients are based to service their needs. During these business trips, employees will incur expenses which they can claim from the company.

Challenge Statement

You are tasked to create a Proof-of-Concept expense claim web application that allows employees of Best Consultancy to **create** a new expense claim, **edit** or **cancel** an existing claim. The application should allow the employees to file their expense claims in a clear and secured manner with consideration to the usability of the application. **This must be a web application.**

All requirements included below are meant to serve as guidelines to guide your team on how to tackle this challenge statement. You should treat this challenge like an actual work project, and not as a test. Do communicate actively with your assessors for any other additional areas to consider.

*For each module, there will be a Frontend task and an accompanying Backend task as illustrated by the table below.

Module		Basic Requirements (Frontend)	Basic Requirements (Backend)
Login	**[1]**	Employees must be able to login	Server must be able to authenticate an Employee's identity
Dashboard	**[2]**	Display Employee's claim records: - Status of Claim: Pending/ Approved/ Rejected - Project ID - Claim ID - Currency	Return a list of expenses records of an Employee from the ***Employee, Employee Project, Project Expense Claims and Currency ID*** table - Status of Claim: Pending/ Approved/ Rejected - Project ID - Claim ID - Currency
Transactions	**[3]**	Create new claim	Insert claim record created from frontend into ***Project Expense Claims*** table
	[4]	Edit pending/ rejected claims	Edit claim record from the ***Project Expense Claims*** table
	[5]	Remove pending/ rejected claims	Delete claim record from the ***Project Expense Claims*** table

Basic Application Requirements (Frontend):

- You must render a login page
    - Employee must be able to login **[1]**.
- You must render a dashboard
    - Display Employee's claiming records **[2]**
        - Status of Claim: Pending/ Approved/ Rejected
        - Project ID
        - Claim ID
        - Currency
- Customers must be able to:
    - Create new claim record **[3]**
        - Enter Employee's First Name and Last Name.
        - Enter or select a date value.
        - Enter a claim amount in the original currency as per invoice
        - Enter a purpose for claim (Project ID)
        - Upload an image of the invoice
        - Select whether this claim is a follow up from another claim[1]
        - Enter a previous Claim Id[2]
    - Edit a Pending or Rejected claim record **[4]**.
        - Edit one or more of the records shown above.
    - Delete a Pending claim record **[5]**.

Basic Application Requirements (Backend):

- You must set up a valid authentication API
    - Server must be able to authenticate an Employee's identity **[1]**.
- You must set up the respective API with the following functionalities:
    - Return a list of claim records of an Employee from the ***Insurance Claims*** table **[2]**.
    - Insert claims created from frontend into ***Insurance Claims*** table **[3]**.
    - Edit a claim record from the ***Insurance Claims*** table **[4]**.

[1] For cases where the employee goes for multiple sessions/medical checkups, they will need to file their claim as a follow up.
[2] If the claim is a follow up, a previous claim id will need to be included.

- Delete a claim record from the ***Insurance Claims*** table **[5]**.

Basic Application Requirements (Integrate):

Integration is a crucial requirement for this hackathon. The front end and back end should be ***integrated*** seamlessly.

Data provided

You will be given:

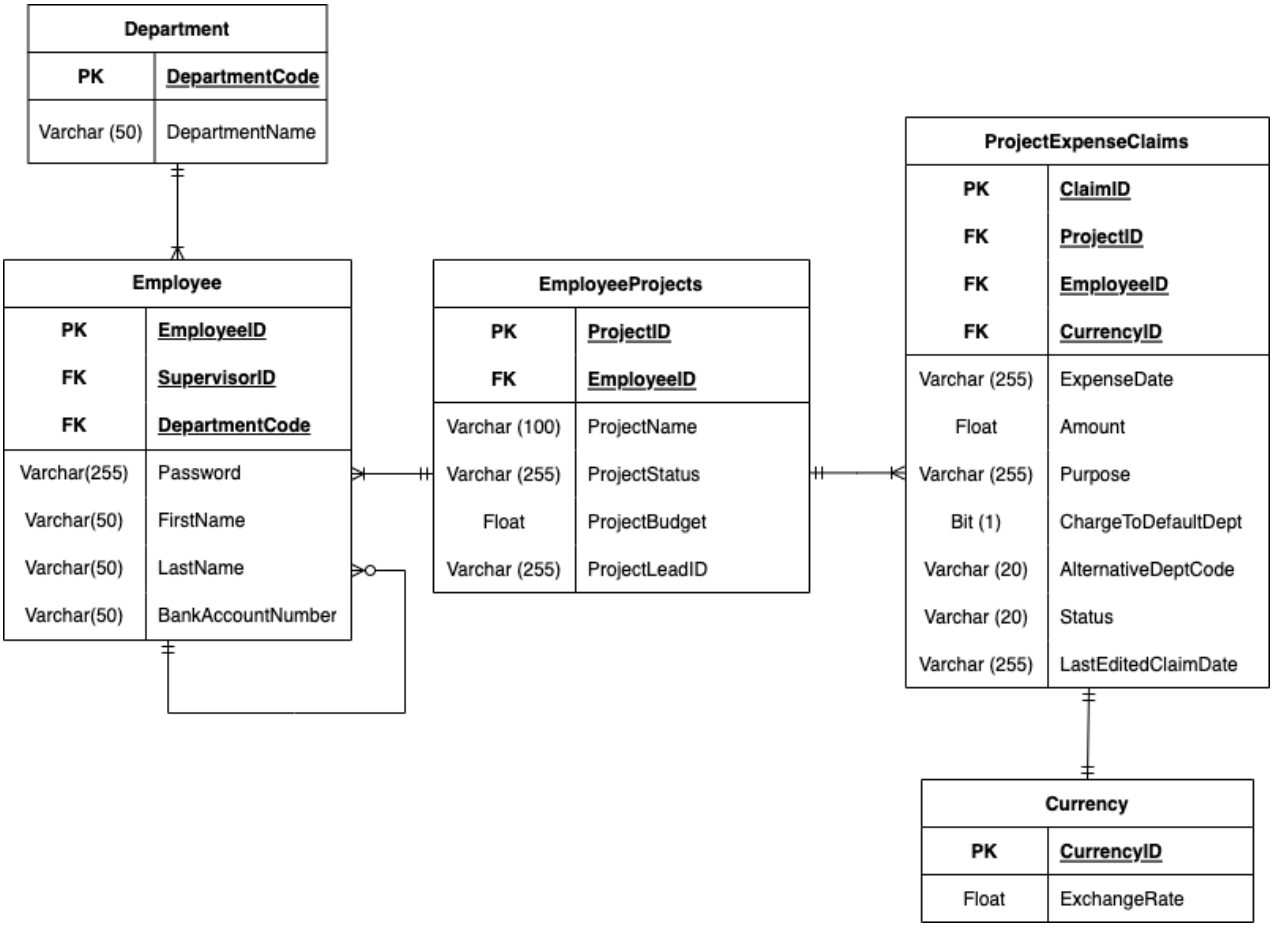
Data in *JSON* and *SQL* format

The entries provided are not exhaustive and you can add more to suit the needs of your application

Entity Relationship Diagram (ERD). The following ER diagram is provided as a reference. We have provided datasets for ***Department, Employee, EmployeeProjects***[3]***, ProjectExpenseClaims***[4] ***and Currency*** entities.

The ***ProjectExpenseClaims*** table provided can be used to show how the CRUD is being implemented. These tables are part of the requirements **[2-5]**. You are free to add new attributes to match any new features you wish to introduce; teams **MAY** make changes so long as tasks requirements are met.

ERD Diagram



[3] ProjectBudget refers to the total budget allocated for the project. The EmployeeID in this table is to keep track of the employees in the project.

[4] Employees from other departments may sometimes be assigned to help other department's projects. In such scenarios, their claims have to be charged to the other department's department code instead.

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Database Example

Department Table

DepartmentCode	102
DepartmentName	Marketing

Employee Table

EmployeeID	10001
SupervisorID	10003
DepartmentCode	102
Password	DBSBestBank2022
FirstName	Tom
LastName	Lim
BankAccountNumber	266177888

EmployeeProjects Table

ProjectID	10005
EmployeeID	10001
ProjectName	DBS Product Launch Showcase
ProjectStatus	In Progress
ProjectBudget	500000.00
ProjectLeadID	10003

ProjectExpenseClaims Table

ClaimID	11147
ProjectID	10005
EmployeeID	10001
CurrencyID	MYR
ExpenseDate	2023-01-12T16:53:00+0800
Amount	20000.00
Purpose	Venue Procurement
ChargeToDefaultDept	1
AlternativeDeptCode	103
Status	Pending
LastEditedClaimDate	2023-01-16T20:50:00+0800

Currency Table

CurrencyID	MYR
ExchangeRate	3.30

Extension Modules

The following modules are extensions and are fully optional. You should tackle these extensions individually and showcase your knowledge in the relevant pillars. To recap, the pillars are:

1) Application Development and Support
2) DevOps and Site-Reliability Engineering
3) Data Engineering & Artificial Intelligence/Machine Learning
4) ICT Infrastructure

You may showcase your work in these modules together with the main challenge during the presentation segment of TechTrek. Each of the extension modules are separate from the Main Challenge. Do remember to highlight the pillar you are showcasing your skills in.

Do remember that these Extension Modules are meant for you to showcase your domain knowledge. You will be presenting your thoughts and decisions to the assessors, so remember to take into account their suggestions/clarifications.

Pillars	Modules	Requirements
Application Development and Support	**DEV 1**	Project Planning
	DEV 2	Application Support
DevOps and Site-Reliability Engineering	**SRE 1**	Availability and Mean Downtime
	SRE 2	SRE Principles

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Application Development and Support Modules

[DEV 1]

As an Application Developer, there is a need for proper planning of how the project should progress. For this challenge, you are an Application Lead in charge of this project. You are required to come up with a timeline required to develop the Main Challenge Statement into a working product for DBS.

Things to Consider:
Some things to consider includes (and are not limited to):

1. Security concerns
2. Manpower requirements
3. Cost of production
4. Timeline

Remember to justify your thought processes clearly and to the best of your ability.

[DEV 2]
As an Application Developer, there is a need to consider how best to support an application post production. For this challenge, you are an Application Support Lead, and highlight methods for the support and improvement of the application described by the Main Challenge Statement.

Things to Consider:
Some things to consider includes (and are not limited to):

1. How to push out improvements
2. Managing Downtime
3. Managing Manpower requirements
4. How to handle fallbacks

Remember to justify your thought processes clearly and to the best of your ability.

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DevOps and Site-Reliability Engineering Modules

[SRE 1]

Downtime is a common challenge for development of any software. For this challenge, you are a Senior Site-Reliability Engineer. You are tasked to consider the issues of Accessibility and Mean Downtime for the application described in the Main Challenge.

Things to Consider:
Some things to consider includes (and are not limited to):

1. How to measure Accessibility
2. How to measure Mean Downtime
3. Factors to decrease Mean Downtime

Remember to justify your thought processes clearly and to the best of your ability.

[SRE 2]

To build a functional application, it is important to design and promote a service management strategy that works for your developed product. For this challenge, you are a Senior Site-Reliability Engineer. You are tasked to apply Site-Reliability Engineering (SRE) principles for an application described in the Main Challenge.

Things to Consider:
Some things to consider includes (and are not limited to):

1. Identify Service Level Objectives and Indicators
2. Develop risk acceptance and mitigation plan

Remember to justify your thought processes clearly and to the best of your ability.