Module code: CM6211

Module Title: Database Systems

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Assessment Title: Database Systems Project Portfolio

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Group Submission

Part 1: PROJECT REQUIREMENTS AND DATABASE DESIGN

Our client proposed for us to design a system which allowed contracted staff to submit their timesheets, managers to approve or reject submitted timesheets and admins to be able to authorise and control any contribution to the system from the contractors and managers. This system is to be used by authorised Admiral staff users and any authorised contractors. The system will use the following entities:

ENTITIES	DESCRIPTION
Roles	Describes and stores possible access levels for each possible user. This contains user Id (Int), user role (string) and user description (string).
Users	Contains personal information for each user, purposes include logging on, record keeping and authorization. This table contains User Id(Int), first name(String), last name(String), email(String), password(String), role Id(Int), active(Bit).
Managers	Links the managers to users for the propose of filtering. This table includes manager Id(Int), user Id(Int).
Contractors	Links the contractor to users and managers for the propose of providing a

	link and filtering contractors. This table includes contractor Id(Int), user Id(Int), manager Id(Int).
Timesheets	Records information about a timesheet submission by a contractor. This table includes timesheet Id (Int), contractor Id(Int), number days(Int), overtime(Int), start date (Date), end date(Date), date submitted(Date), notes(String) and status(String).

The system requirements defined by the client were as followed:

- Logging and Registering under different types of users,
- Create, record, update and delete timesheet records,
  Details for a timesheet included number of days worked, overtime, start date, end date and notes,
- Weekly and monthly timesheet view,
- Filtering System by date or approved/rejected status,
- Teams notification integration.

The business rules applied to this system were as followed:

- Timesheets are only able to be submitted by contractors,
- Timesheets are not able to be submitted in the future,
- Only Administrators have access to all functionalities of the system,
- Contractors are only able to view and submit timesheets,
- Managers are only able to view submitted timesheets specifically for them.

Database Design (ER Diagram)

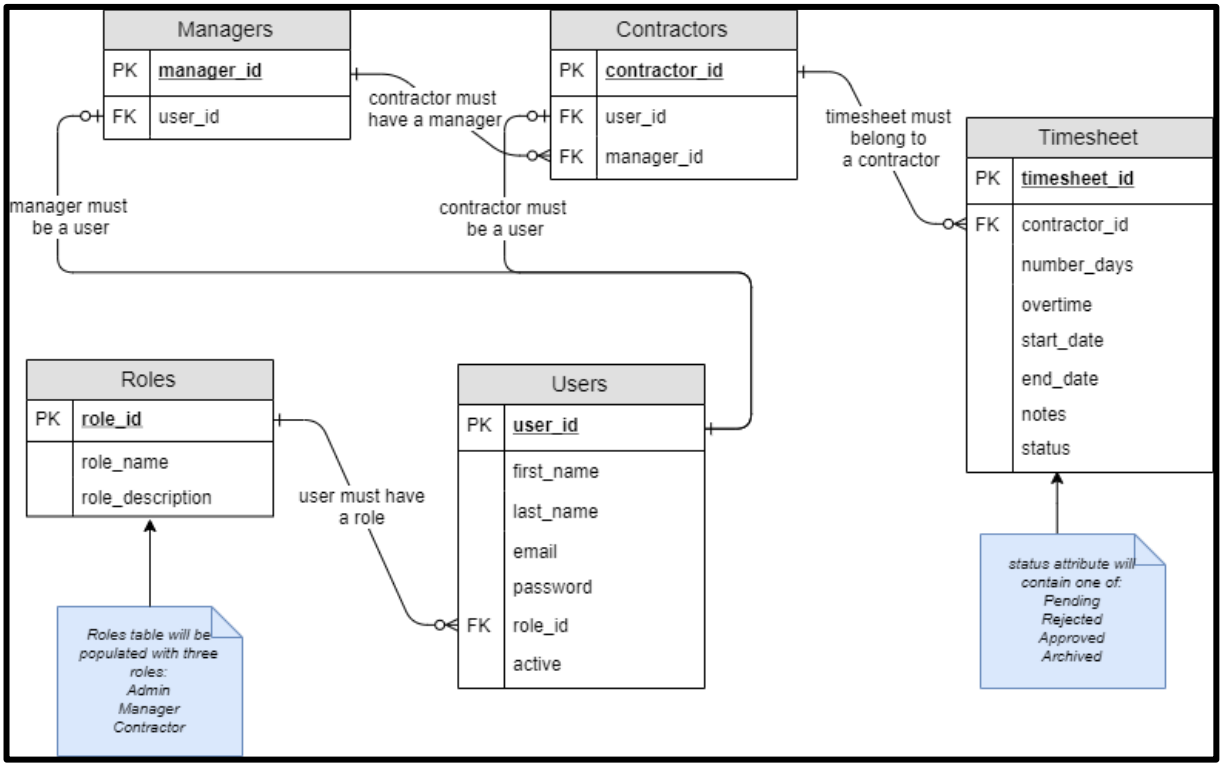

Figure 1: ER diagram

To achieve the project requirements, we initially created and designated 3 roles for the websites; Admins to manage users and archive timesheets that have been processed, Managers to review and approve/ reject timesheets submitted by contractors, Contractors to create and submit a timesheet. These roles are stored in our roles table and as a foreign key in our users table.

- To store and manage user's information we created a user's table. This table contains personal information such as name, email and password for purposes of login and to display meaningful information. Furthermore, it contains data relevant to authorisations such as role id and whether the user has the rights to access the website.
- The managers and contractors' tables are used together so that each contractor is assigned a manager and managers are assigned multiple contractors. This is used for permissions, so managers can only see the information's of assigned contractors and contractor can be filtered by their manager.

- The Timesheet entity is used to record the form submitted by a contractor; this data is as required from the client as seen in figure 1. This data is used at several points throughout this website by the admins and managers. The contractor Id is used to link each timesheet to a specific user, this is a necessity so the admiral staff can tell who need to be paid. The number of days worked as well as the overtime determine the amount the contractor needs to be paid and is reviewed by a manager. The start date and end date are used for filtering and the notes are for extra information, for example “worked 4 days because of bank holiday”. The status of the timesheet shows whether the application has been approved/ rejected by a manager and paid by an admin.

From our initial design we followed SQL naming conventions, such as the use of snake case, using meaningful headings otherwise follow from (Sarkuni, S. 2019).

For our degrees of relationships after normalizing our tables as much as possible, we had one to many or zero relationship for Roles to Users, as well as contractors to Timesheets. One to Zero or One for Users to managers and Users to contractors. (See figure 1.)

Logging and Registering under different types of users.

- For this requirement we use the Roles and Users table; for the login feature we used the email, password, role Id and active. The email and password are used as fields to login with the role Id determining which part of the website the user is routed to and the active determining whether they have permission to login.

Create, record, update and delete timesheet records.

- For this requirement we used the timesheet table. This records necessary information as number of days, overtime, start date, end date and notes. Upon submission links new timesheets to a specific contractor as well as set it status to pending. This information is updated from different views generally the status is changed by the managers and admins. Backlogs are archived

where they are generally hidden from view unless queried.

Weekly and monthly timesheet view and filtering System by date or approved/rejected status.

- For this requirement we used timesheet, managers, contractor and user tables. This was used to create a table that contains the timesheets and all relevant information for it to be meaningful, the use of managers and contractors tables was for filtering as well as determining what information can be seen by managers such as only their contractors information.

Teams notification integration.

- For this requirement we used timesheet and users tables. This was to retrieve the specific timesheet submitted by a contractor and posted a personalized message to Microsoft teams chat.

References

Sarkuni, S. (2019). How I Write SQL, Part 1: Naming Conventions. [online] Launchbylunch.com. Available at: https://launchbylunch.com/posts/2014/Feb/16/sql-naming-conventions/ [Accessed 6 Jan. 2020].