

# **Project Proposal**

## **LEAVE MANAGEMENT WEB APPLICATION**

### **Take A Day Off (T.A.D.O.)**

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**Higher Diploma in Science in Computing**

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## **Table of Contents**

1. Project Overview	5
1.1. Background	5
1.2. Objectives	5
2. Project Expected Deliverables	6
2.1. Documentation and Deadlines	6
2.2. Application Functionalities	7
2.2.1. Access to Main Page	7
2.2.2. User Login	7
2.2.3. Employee Functionalities	8
2.2.3.1. Employee Dashboard	8
2.2.3.2. Leave Request Submission	8
2.2.3.3. Leave Balances View	8
2.2.3.4. Notification Alerts	8
2.2.3.5. Real-time Calendar	8
2.2.4. Manager/ HR Functionalities	8
2.2.4.1. Manager/ HR Dashboard	8
2.2.4.2. Leave Request Management	9
2.2.4.3. Leave Balances Review	9
2.2.4.4. Notifications Management	9
3. Project Actual Targets Met	9
3.1. Completed Documentation	9
3.2. Planning and Requirements Gathering	9
3.2.1. Market Research	9
3.2.2. Defining the Web Application's Functionalities	10
3.3. System Architecture Development	10
3.4. Database Design	10
3.5. Graphical User Interface (GUI) - Completed	11
4. Deliverables Yet to be Reached	11
4.1. Graphical User Interface (GUI) - In Progress/ Yet to be Started	11
4.2. Application Development	12
5. Main Problems Encountered	14
5.1. Planning the Project Development and Understanding the Frameworks Required	14
5.2. Time Constraints	14

6. Expected Stumbling Blocks	14
6.1. Time Constraints	15
6.2. Backend, Frontend and Database Integration	15
7. Focus on Rubric	15
7.1. Communication	15
7.2. Writing & Presentation of Results	15
7.3. Complexity/ Coding Skills	15
7.4. Innovation	15
7.5. Technology	16
7.6. Completeness	16
7.7. Testing/ Evaluation	16
7.8. Project Management	17
8. Summary of Project Progression	17
9. Definitions, Acronyms and Abbreviations	17
10. References	18

## **1. Project Overview**

### **1.1. Background**

According to Strategic Insights Trends, the market for Leave Management System (LMS) is on its path for growth between 2024 and 2031. The demand for leave management systems comes from continuous technological advancements, regulatory government support and the increasing demand for leave management system services and products due to market and population growth, consumer preferences, etc. Cost reduction and environmental awareness also comes into place to reduce carbon emissions by going paperless from the traditional approach (Strategic Insights Trend, 2024). This project was inspired from first-hand experience of working in companies where employee leave tracking is reliant on the traditional approach of paper forms, spreadsheets and complicated, time-consuming and very manual labour way of tracking.

### **1.2. Objectives**

The main objective of developing the Take A Day Off (T.A.D.O.) leave management system web application is to create an efficient and centralised platform for organisations to manage employee leave requests and approvals. The goal of this project is to streamline the leave management process through digitising it in order to reduce manual effort therefore minimising human errors and enhancing the overall efficiency of the operations.

Through the T.A.D.O. web application, the employees are able to login to access their employee dashboard where they can easily submit leave requests and track its progress, view their leave balances and their real-time schedules by calendar, and view their companies' leave policies and regulations. Managers/ HR personnel are able to access a comprehensive dashboard where they can view and action any pending leave requests. The system also provides a notifications feature where the managers/ HR personnel are notified of any pending leave requests and employees are notified when they have successfully submitted the request, it has been approved or declined, and when a leave balance is reaching a threshold. Through automating routine tasks that are associated with the leave management process, such as calculating leave balances and processing approvals, the T.A.D.O. web application helps save time and resources for both employees and the management/ HR teams.

Additionally, the T.A.D.O. web application aims to facilitate data analysis and reporting by implementing a system that allows for audit trail of leave approvals along with being able to generate reports regarding historical leave trends and patterns to allow for better leave approval

decision making. The implementation of this feature is dependent on the time frame given for this project and may be implemented post the deadline if time restricts.

Ultimately, the objective of developing this Leave Management System project is to enhance operational productivity by providing a user-friendly and scalable web application for efficiently managing employee leaves, promoting transparency and improving employee satisfaction.

## **2. Project Expected Deliverables**

This section of the report outlines all project expected deliverables including any documentation and deadlines and the list of the web application's functionalities.

### **2.1. Documentation and Deadlines**

The development of this project includes a set of requirements and documents to be submitted by a specified deadline. The project is at a halfway point of the development in which the required documents for this project are outlined in the table below (Fig. 2.1.) with their progress status.

<b>Required Documentation</b>	<b>Description</b>	<b>Due Date</b>	<b>Status</b>
Signed Project Module Brief	A signed document agreeing to understanding all project deliverables and deadlines required for the project module	Feb. 10th (Week 3)	Completed
Project Proposal	A document outlining the project scope	Feb. 10th (Week 3)	Completed
NCI Ethics Approval Form	A signed form outlining the ethical guidelines and procedures for research that involves any human participants and is required for review by the NCI ethics committee	Feb. 10th (Week 3)	Completed
Project Requirements Specification	List of specified requirements for the development and completion of the project	Feb. 24th (Week 5)	Completed
Interim Progress Report	A document that outlines the current progress/ state of the project	Mar. 2nd (Week 6)	Completed
Project Analysis and Documentation	A document outlining	Mar. 30th (Week 10)	In Progress

Live Presentation	Live presentation of the project via M.S. teams call (Duration 5 mins max.)	Apr. 24th (Week 14)	Pending
Project Final Video	A video presentation demonstrating the final web application	Apr. 27th (Week 14)	Pending
Project Final Report	A document that provides and outline the final project report	Apr. 27th (Week 14)	Pending
Project Final Code	The final application code	Apr. 27th (Week 14)	Pending
Declaration Cover Sheet	A signed form that confirms all the work is completed by the student (Aira Mae Ogaco)	Apr. 27th (Week 14)	Pending

*Fig. 2.1. Required Project Documentation Table*

## **2.2. Application Functionalities**

The application functionalities for the T.A.D.O. web applications will be outlined based on user roles within the system.

### **2.2.1. Access to Main Page**

The user will be able to access the T.A.D.O. web application's main page and navigate through the options such as viewing the benefits of the Leave Management Application system, company sign up forms, employee logins, etc. Any user will be able to access and fill out the company sign up form, however, this form will not be fully functional nor be included in the database upon completion of this project. This feature is planned to be implemented in the future pre-commercial release.

### **2.2.2. User Login**

The user will be able to log into the system securely through their unique email address and password. Upon successfully logging in, they will have access to their user specific dashboards where they can access the features provided by the LMS such as processing leave requests, real-time schedule calendar view, etc.

### **2.2.3. Employee Functionalities**

This section of the report outlines the application functionalities expected for user/ employee use upon completion of this project.

#### **2.2.3.1. Employee Dashboard**

When the employees login to their accounts, the system will bring them to their employee dashboard where they will be able to submit leave requests, view and track their leave balances, manage notification alerts, view their real time calendars and the company leave policies and regulations.

#### **2.2.3.2. Leave Request Submission**

The employees are able to submit leave requests and provide details such as start and end dates, leave types, comments and attachments. The system will send a notification to the manager/ HR personnel for leave approval and the employee will receive a confirmation that the request was successfully submitted.

#### **2.2.3.3. Leave Balances View**

The employees will be able to view a list of their leave balances for different types of leaves to allow them to make informed decisions when requesting for time off.

#### **2.2.3.4. Notification Alerts**

The employees will be able to receive notification alerts whenever they submit leave requests, get approval or rejection for their requests, or reach any leave balances threshold.

#### **2.2.3.5. Real-time Calendar**

The employees will be able to access a visual calendar displaying their approved leaves and daily time schedules while being able to filter for date and month.

### **2.2.4. Manager/ HR Functionalities**

This section of the report outlines the application functionalities expected for manager/ HR use upon completion of this project.

#### **2.2.4.1. Manager/ HR Dashboard**

The Manager/ HR personnel will be able to view their dashboard upon logging into the system. Their dashboard will provide them features to view notifications with leave request pending, submit their own leave request, view their and employee leave balances, view real-time calendars containing all employee schedules, and view the company leave policies and regulations.

#### **2.2.4.2. Leave Request Management**

Managers/ HR personnels will be able to approve or decline employee leave requests submitted by their teams and make the decision based on employee availability and headcount that can be viewed through the real-time calendar.

#### **2.2.4.3. Leave Balances Review**

Managers/ HR personnel will be able to view their own leave balances as well as their team members' to make informed decisions when approving or declining leave requests.

#### **2.2.4.4. Notifications Management**

Managers/ HR personnel will be able to receive notifications regarding any leave requests, any upcoming leaves and relevant leave updates.

### **3. Project Actual Targets Met**

This section of the report provides the list of completed action items to date.

#### **3.1. Completed Documentation**

The main documents that have been completed so far are outlined in the required project documentation table (*Fig. 2.1.*). The completed documents include the Project Proposal, Project Requirements Specification, Interim Progress Report and the signed documents - NCI Ethics Approval Form and Project Brief. As the project is still currently at the planning and initial development stage, most of the web application's structure is in progress.

#### **3.2. Planning and Requirements Gathering**

##### **3.2.1. Market Research**

The target audience aimed for this project include various stakeholders within an organisation. The T.A.D.O. web application caters to the needs of different users involved in the leave management process including organisational employees, HR personnel and managers. Understanding the user, their problem and the scope for the problem allow for structuring the project and the requirements.

Throughout the planning of this project, popular leave management platforms were looked into such as Workday and BambooHR. Both of these platforms are HR softwares that includes a leave management feature. Although the focus of the T.A.D.O. web application is employee leave management, it is crucial to get insights from commercial HR systems for future application improvements implementation. T.A.D.O. web application will also aim to expand to multiple locations, mobile responsiveness, customizable settings and HR and financial features which are attributes included in the popular HR softwares.



### 3.2.2. Defining the Web Application's Functionalities

The list of features and functionalities to be implemented in the web application are outlined in the Project Requirements document that has been previously submitted. The defined use case requirements include user access to the main page, use login, real-time calendar view, submit leave request, view leave balances, approve/ decline leave requests, user notifications and view company leave policies. These use cases are still in the progress to be implemented. None of the use cases have been completed to date.

### 3.3. System Architecture Development

The technical approach for this project will be full-stack JavaScript development in order to have a unified language that can simplify the development of the project, promote code reuse and allow other developers to work on both ends of the web application.

Node.js will be the backend framework for this project to allow efficient server-side applications and build scalability. As LMS requires multiple user access, Node.js is well suited for handling concurrent requests such as allowing multiple users interacting with the system simultaneously, therefore making it a viable choice as the backend framework for this project. The backend will handle all server-side logic and communication with the frontend.

React.js is to be implemented as the frontend framework to facilitate the development of interactive GUIs. The frontend will build and handle user interfaces and interactions while communicating with the backend API to retrieve and update relevant data.

### 3.4. Database Design

MySQL is the chosen database for this project due to its reliability, ease of use, robustness and strong community support. As MySQL is compatible with JavaScript and its frameworks, it will allow for seamless integration.

The database design includes defining tables to store information that are related to employees, leave requests and balances and other leave related entities. The tables defined up-to-date include an *employees* table, *leave\_requests* table and *leave\_balances* table. The table below (Fig.3.4.) outlines the table names and different attributes represented within them.

<i>employees table</i>	<i>leave_requests table</i>	<i>leave_balances table</i>
employee_id INT PRIMARY KEY	employee_id INT	balance_id INT PRIMARY KEY

first_name VARCHAR(50)	request_id INT PRIMARY KEY	employee_id INT
last_name VARCHAR(50)	start_date DATE	annual_leave_balance INT DEFAULT 20
email VARCHAR(100)	end_date DATE	sick_leave_balance INT DEFAULT 10
password VARCHAR(25)	request_type VARCHAR(50)	bereavement_leave_balance INT DEFAULT 0
employee_role VARCHAR(25)	request_status ENUM ('pending', 'approved', 'declined') DEFAULT 'pending'	parental_leave_balance INT DEFAULT 0
	FOREIGN KEY (employee_id) REFERENCES employees(employee_id)	FOREIGN KEY (employee_id) REFERENCES employees(employee_id)

*Fig. 3.4. Defined Database Tables up-to-date*

The simplified schema above is only the initial starting point and will be refined for the exact requirements for the project such as specific data types and lengths.

### **3.4. Graphical User Interface (GUI) - Completed**

I am currently in the process of refining the database design as well as developing the frontend design for the web application. The initial frontend designs have been completed including the main page, login page, employee and manager/ HR personnel dashboards and company sign-up form. The frontend designs are still in the initial stages and will be developed further before the project deadline.

## **4. Deliverables Yet to be Reached**

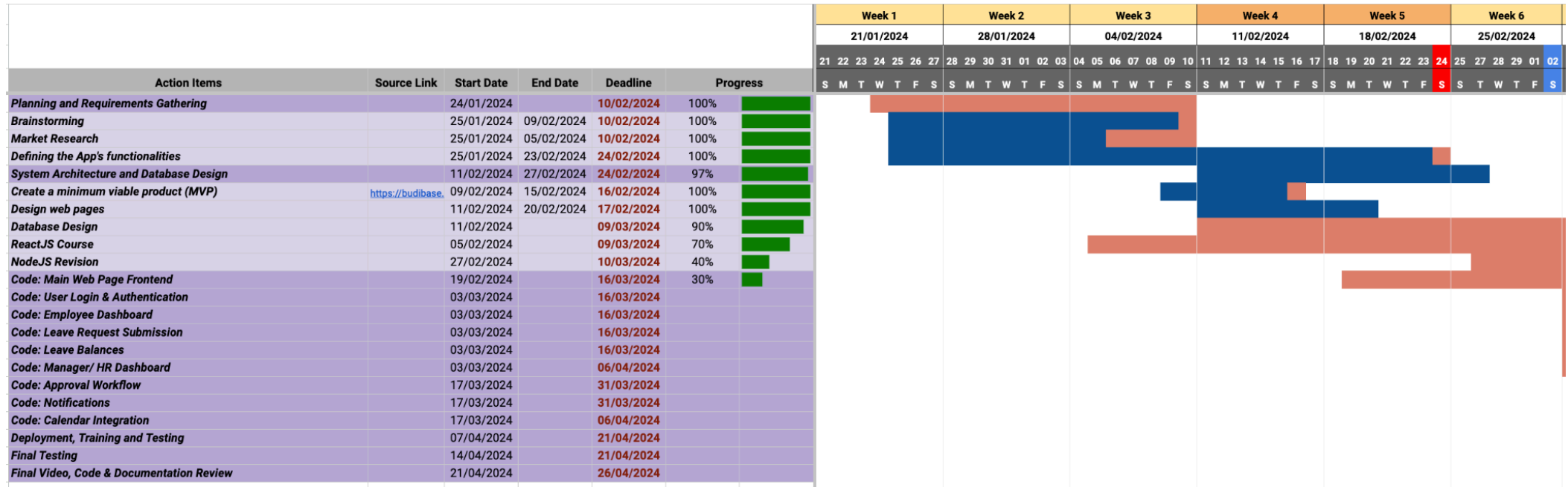
This section of the project outlines the deliverables of the project that is currently in progress or is yet to be started.

### **4.1. Graphical User Interface (GUI) - In Progress/ Yet to be Started**

As stated in section 3.4. *GUI - Completed*, the initial frontend design has been completed for the main page, login page, employee and manager/ HR personnel dashboards and company sign-up form. Since the designs are still in the initial stages, further development will incorporate React.js and the use of bootstrap. Some of the pages such as the real-time calendar view may require further revision in terms of timeline due to the short timeframe given for this project.

## 4.2. Application Development

The project plan follows a guideline for the development and implementation of the web application's specific features. The completed phases of the project development is outlined in *Fig. 4.2.1. Project Plan completed up-to-date*. Although some action items are still currently in progress including the Database design that is to be completed in week 7. The React.js course that I am undertaking is to be completed by week 7 and the Node.js revision by week 8.



*Fig. 4.2.1. Project Plan completed up-to-date*

						Week 7							Week 8							Week 9							Week 10							Week 11							Week 12							Week 13							Week 14						
						03/03/2024							10/03/2024							17/03/2024							24/03/2024							31/03/2024							07/04/2024							14/04/2024							21/04/2024						
						03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
						S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S							
Action Items	Source Link	Start Date	End Date	Deadline	Progress																																																								
Planning and Requirements Gathering		24/01/2024		10/02/2024	100%																																																								
Brainstorming		25/01/2024	09/02/2024	10/02/2024	100%																																																								
Market Research		25/01/2024	05/02/2024	10/02/2024	100%																																																								
Defining the App's functionalities		25/01/2024	23/02/2024	24/02/2024	100%																																																								
System Architecture and Database Design		11/02/2024	27/02/2024	24/02/2024	97%																																																								
Create a minimum viable product (MVP)	<a href="https://budibase.com">https://budibase.com</a>	09/02/2024	15/02/2024	16/02/2024	100%																																																								
Design web pages		11/02/2024	20/02/2024	17/02/2024	100%																																																								
Database Design		11/02/2024		09/03/2024	90%																																																								
ReactJS Course		05/02/2024		09/03/2024	70%																																																								
NodeJS Revision		27/02/2024		10/03/2024	40%																																																								
Code: Main Web Page Frontend		19/02/2024		16/03/2024	30%																																																								
Code: User Login & Authentication		03/03/2024		16/03/2024																																																									
Code: Employee Dashboard		03/03/2024		16/03/2024																																																									
Code: Leave Request Submission		03/03/2024		16/03/2024																																																									
Code: Leave Balances		03/03/2024		16/03/2024																																																									
Code: Manager/ HR Dashboard		03/03/2024		06/04/2024																																																									
Code: Approval Workflow		17/03/2024		31/03/2024																																																									
Code: Notifications		17/03/2024		31/03/2024																																																									
Code: Calendar Integration		17/03/2024		06/04/2024																																																									
Deployment, Training and Testing		07/04/2024		21/04/2024																																																									
Final Testing		14/04/2024		21/04/2024																																																									
Final Video, Code & Documentation Review		21/04/2024		26/04/2024																																																									

The table above (*Fig. 4.2.2.*) highlights what is yet to be completed for the development of this project. The web application's key components will be developed between weeks 5 to 11. While the web application testing, training and deployment will be conducted from week 12 with the aim of completion by week 14. The final video, presentation, and code and documentation review will be completed on week 14 prior to the project deadline date.

## **5. Main Problems Encountered**

### **5.1. Planning the Project Development and Understanding the Frameworks Required**

While the project is still in the later stages of the planning phase, I have faced difficulties in planning out the best approach for developing the web application. Although the two-year higher diploma course has covered different modules, such as software development, web development, databases, algorithms, etc., the structure and approach of how to build a full stack web application was not fully covered. I have looked into different approaches to building a web application considering various factors such as project requirements, personal preferences and application knowledge.

As previously stated in section 3.3. *System Architecture Development*, the chosen technical approach for this project will be a full-stack JavaScript development to streamline the process, promote code reuse and enable other developers to work on both ends of the web application using a unified language, in the assumption that it will be commercially released in the future. Initially I have considered developing the web application in Java using Spring for the backend framework and React.js for frontend, however, I do not have much knowledge of either frameworks and with the time constraints I felt that learning both will not be feasible hence the decision to go for a full-stack JavaScript development. I have also started learning the React.js framework during my personal time to aid in the development of this project. The implementation of React.js to specific components of the web application is still under review and could change as the project progresses.

In addition, I have found difficulties in understanding how the backend, frontend and database workflows will be connected together as this has not been covered in the course. I am in the process of researching this and looking into libraries that could help with this aspect of the project.

### **5.2. Time Constraints**

The primary challenge in this project revolves around time constraints, with the development of a full stack web application being a time intensive process that is contingent on project requirements. As someone new to technologies like React.js framework and the integration of backend, frontend, and database components, dealing with the learning curve while attempting to meet documentation deadlines have proven to be a significant struggle.

## **6. Expected Stumbling Blocks**

## **6.1. Time Constraints**

As mentioned in 5.2. *Time Constraints*, due to the allocated time frame for the project completion, certain components may require further revision and simplification to ensure the development of a fully operational web application.

## **6.2. Backend, Frontend and Database Integration**

As previously mentioned, I anticipate challenges in navigating the intricacies of communication between the backend, frontend and database components. Difficulties may arise in understanding and implementing effective communication protocols and learning is required to ensure seamless interactions throughout the web application development. I am researching methods to connect the backend, frontend and database components while exploring various libraries that can assist in addressing this aspect of the project.

## **7. Focus on Rubric**

### **7.1. Communication**

In regards to the presentation of the project, I believe that I will be prepared to outline the project comprehensively and answer any questions in relation to the development and the final product. Having experience in closely dealing with stakeholders at work, I believe that this is one of my stronger suits and any feedback given will help me further develop my communication skills.

### **7.2. Writing & Presentation of Results**

For the documentation of this project, I am to articulate information in a clear and concise manner. Visual aids and references are added to demonstrate and back up relevant points and information using the Harvard Referencing Style as per project requirements.

### **7.3. Complexity/ Coding Skills**

The integration of the different frameworks Node.js and React.js to develop the web application is a great personal challenge as it requires a learning curve in a limited time. I believe the project demands extensive research and will be executed with a high degree of complexity based on the project requirements that I have previously outlined.

### **7.4. Innovation**

I aim to make this project innovative through the User Experience (UX) Design. The UX design goal for this project is to create a user interface that simplifies the leave request process by making it easily accessible and user-friendly. The plan is to implement a real-time calendar view to enhance

the user experience. Additionally, if the given time allows, I plan to make the calendar interactive by adding filters such as role type, supervisors, etc.

### **7.5. Technology**

As previously mentioned, the project is being developed through Node.js framework for backend, React.js framework for frontend and MySQL for databases. I believe this foundation is a robust choice and provides a solid framework for the project.

On the backend, Node.js allows for handling and managing multiple tasks at the same time and is crucial for the system that deals with multiple user actions and data exchanges such as user logins, leave request submissions, approvals and updates.

For the frontend, React.js allows for creating interactive and dynamic user experiences which is an important key for navigating through dashboards, managing leave requests, receiving updates and viewing calendars within the web application. React.js also allows for efficient rendering of UI components which can be useful as the interface grows.

Whilst integrating MySQL as the database management system makes it easy for data storage and retrieving data such as employee profiles, leave balances, etc. MySQL also comes with strong security features and supports transactions required to protect confidential employee details.

### **7.6. Completeness**

The aim for the completion of this project is to have a leave management system web application that is fully operational and close to launch for commercial use. The employees will be able to navigate through their dashboard profiles, submit leave requests, view leave balances, receive prompt notifications, view real-time calendars and company leave policies and regulations. While managers/ HR personnel, in addition, will be able to access and navigate through their dashboards, manage leave requests and view real-time calendar schedules for all employees. Further revisions and enhancements will be made post-project deadline with feedback taken into consideration.

### **7.7. Testing/ Evaluation**

The web application will be evaluated through various testing which include systems tests, user acceptance tests and integration tests. Systems and performance tests will assess individual components of the project for responsiveness, functionality, scalability and performance using real-life scenarios in order to identify and address any potential issues. Integration testing will be conducted to review the compatibility between the different system components, ensuring seamless

operation between frontend and backend frameworks. Evidence of the evaluation and user testing will be included in the final report.

### **7.8. Project Management**

The updated project plan highlights the planning of the project development. As previously mentioned, the project plan is divided into different phases to focus on specific components to ensure the web application is built in an effective manner.

## **8. Summary of the Project Progression**

The project aims to develop the Take A Day Off (T.A.D.O.) leave management system web application in response to the growing demand for an efficient leave management process. The main objective for developing the web application is to create a streamlined platform for managing employee leave request processes. Through the T.A.D.O. web application, employees will be able to easily submit leave requests, view leave balances and real time schedules, and receive notifications. Managers/ HR personnel are able to navigate through a comprehensive dashboard where they can manage leave employee requests, view and track employee schedules and availability. The project strongly emphasises on enhancing operational productivity and employee satisfaction through user-friendly features and scalable designs.

The project adopts a structured approach for documentation and meeting specific project deadlines such as the Project Proposal, Requirements and Reports. The application's functionalities are outlined based on user roles which include features such as user login, leave request submission, leave balance viewing and notification alerts. The expected challenges outlined in this report include navigating through the complexities of full stack JavaScript developments along with the completion of the project with time constraints. The integration of frontend backend and database components remains a crucial focus for this project along with performing testing and evaluation to ensure the application's functionality and user experience satisfaction. The project plan outlines the phased development to ensure completion of the web application.

## **9. Definitions, Acronyms and Abbreviations**

LMS - Leave Management System

T.A.D.O. - Take A Day Off, the leave management system web application title

UX - User Experience Design

React.js - Frontend framework to be used for this project



Node.js - Backend framework to be used for this project

MySQL - Database system used for this project

Full-stack JavaScript Development - The use of JavaScript frameworks for both frontend and backend

## 10. References

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