DECEMBER 16, 2024

University of East London
CN4000 Information Systems Modelling and Design

COURSEWORK: GROUP ASSIGNMENT

Word count: 2481

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TASK 1.A

BP UK Retail

BP UK Retail is part of **BP p.l.c.**, a British multinational energy company. Through its partnership with **M&S Food**, **BP UK Retail** provides advanced fuels and market-leading convenience across the UK.

Information Systems (IS)

Different Information Systems (IS) have been used to support its UK convenience retail business, which comprises over 300 company-owned retail sites.

StorePoint Back Office helps store managers manage daily business activities.

M&S Central Store Stock Management (CSSM) is a cloud-based M&S stock management solution integrated with the BP system.

The in-store transaction processing system, **Point of Sale (POS),** provides detailed data-driven insights to forecast future demands, such as buying trends.

Employee App is an employee scheduling app with a shift clocking functionality and a detailed timecard.

Resources

People:

Store managers and employees are the users of different Information Systems.

A team of Information Technology (IT) support professionals, both in-house and outsourced, provides 24/7 technical support across all BP retail stores.

Hardware:

Desktop computers, tablets, sensors, and laser printers support the stores' day-to-day activities.

Software:

A cloud computing model, Software as a Service (SaaS), provides different software solutions for all stores.

Data:

Data from different Information Systems are stored securely in a cloud-based database management system.

TASK 1.B

Employee Mobile App

An employee mobile app can foster productivity by streamlining communication between employees and managers.

By analysing the current employee app, we have identified the lack of features using different fact-finding techniques, interviewing, observations, and brainstorming, and we have created a requirements specification to make the system more efficient.

Requirements specification

Functional

1. **Accrual holiday balance**
   - 1.1 The system enables employees to view up-to-date accrual holiday balances.
   - 1.2 The system enables the calculation of the actual accrual holiday balance based on the employee's work in a week.
   - 1.3 The system enables managers to audit employee's accrual holiday balance.
   - 1.4 The system enables Human Resource (HR) personnel to audit employees' accrual holiday balance.
2. **Holiday requests**
   - 2.1 The system enables employees to book their holiday.
   - 2.2 The system enables employees to get their holiday booking confirmation.
   - 2.3 The system enables employees to see the available slots for holiday booking.
   - 2.4 The system enables managers to approve or decline employee's holiday bookings.
   - 2.5 The system enables employees to modify their holiday bookings.
   - 2.6 The system enables Human Resource (HR) personnel to audit approved holiday bookings for payment.
3. **Instant access to payslips**
   - 3.1 The system enables employees to view their payslips.
   - 3.2 The system enables employees to download payslips.
   - 3.3 The system enables the auto-generation of employee payslips.
   - 3.4 The system enables Human Resource (HR) personnel to audit employee payslips.

TASK 2

When adding features to an existing employee mobile app, the System Development Life Cycle (SDLC) ensures that the result meets employees' and employers' needs. Given the needs and the importance of end-user feedback, we have concluded that the Agile methodology is better suited for this project. Agile's flexibility makes it ideal for a project where requirements may shift.

System Development Life Cycle (SDLC) for the employee mobile application.

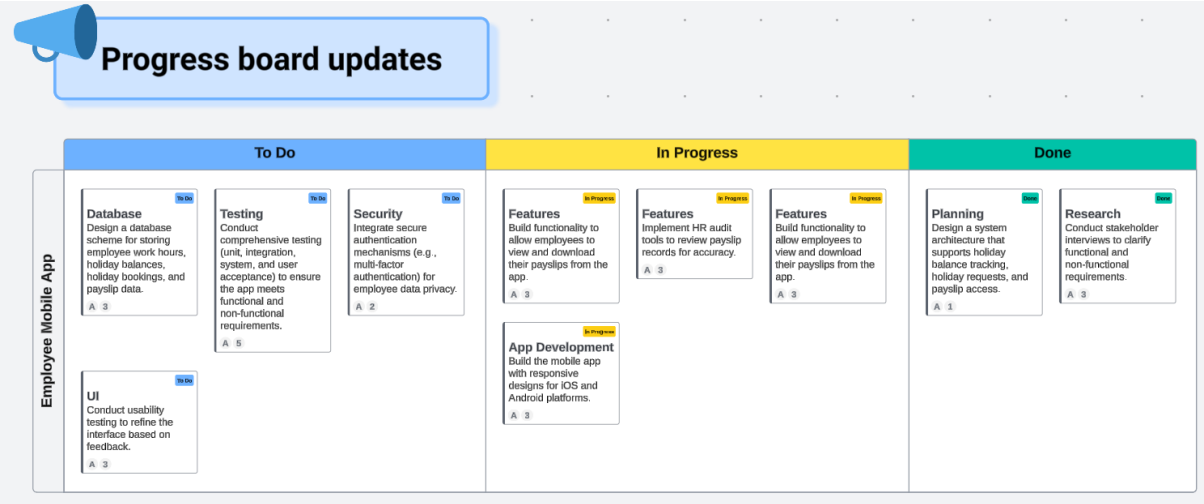
1. **Planning**: In this phase, we shall outline the app's objectives, identify resources, and assess the project's feasibility. Key aspects of this stage are defining system requirements, such as showing accrual holiday balance, holiday requests, and instance access to payslips. A timeline and budget should also be determined.
2. **Analysis**: This stage requires detailed requirement research, which involves consulting with stakeholders such as investors, long-term employees, regional managers, and corporate executives. In this stage, we clarify the project's specific needs.
3. **Design**: Based on the research, we shall create the architecture for our app. This phase involves defining the user interface, etc. We also have the social, ethical, and legal responsibility to protect sensitive data (e.g., payslip records).
4. **Development**: Using the Agile methodology, we break down the development process into sprints, each concentrating on building a particular component. By building in regular stages, we can quickly deliver usable features regularly.
5. **Testing**: After each sprint, thorough testing is performed to ensure that each feature functions as needed and to determine if any aspects need to be changed.
6. **Implementation**: Once the core components are completed and tested, we should consider starting with a sample store to gather initial feedback before the full launch.
7. **Maintenance**: After deployment, we maintain the system with regular updates, address issues, and make enhancements based on user feedback.

Key benefits of Agile in this context include:

- **More responsive to Feedback:** Agile's iterative sprints enable regular check-ins with stakeholders after each development cycle, ensuring that the project stays aligned with user expectations.
- **Increased room to pivot and experiment:** Agile's flexibility allows us to adapt to shifts quickly by adjusting priorities.

Why not use the Waterfall methodology?

Waterfall follows a strict sequence (requirements, design, development, testing, and deployment). Once a phase is completed, it is challenging to go back and adjust. Employee mobile apps often need changes based on feedback, new business needs, or unforeseen issues, which Waterfall needs help to accommodate efficiently. Also, testing usually occurs late in the waterfall development cycle, which makes it challenging to identify and resolve problems early.



TASK 3

Safeguarding data

BP's different Information Systems collect, process, transfer, and store sensitive data and information about its customers, employees, internal operations, and other critical matters. By protecting these data, information, and systems, the organisation must ensure that the three main goals of information security—**confidentiality**, **integrity**, and **availability**—are achieved.

There are three states of data: "**Data at rest**," "**Data in transit**," and "**Data in use**." The organisation safeguards data in each state using the following **security controls**:

- Data Encryption
- Data Loss Prevention (DLP)
- Data Minimisation
- Access Restrictions
- Segmentation and Isolation

Social, Ethical, and Legal issues associated with managing data to ensure data privacy

A data breach can affect BP, its customers, employees, and other stakeholders. It can impact the organisation's goodwill or reputation and its business continuity. By exposing Personally Identifiable Information (PII) of customers, employees, and other stakeholders, there is a risk of identity theft that can damage their social status.

BP acts ethically to ensure data privacy. Its internal code of ethics ensures all employees act honestly, responsibly, and ethically while handling sensitive data and information.

BP ensures data privacy to comply with data protection laws such as the UK **Data Protection Act 2018** or the European Union's **General Data Protection Regulation (GDPR)**.

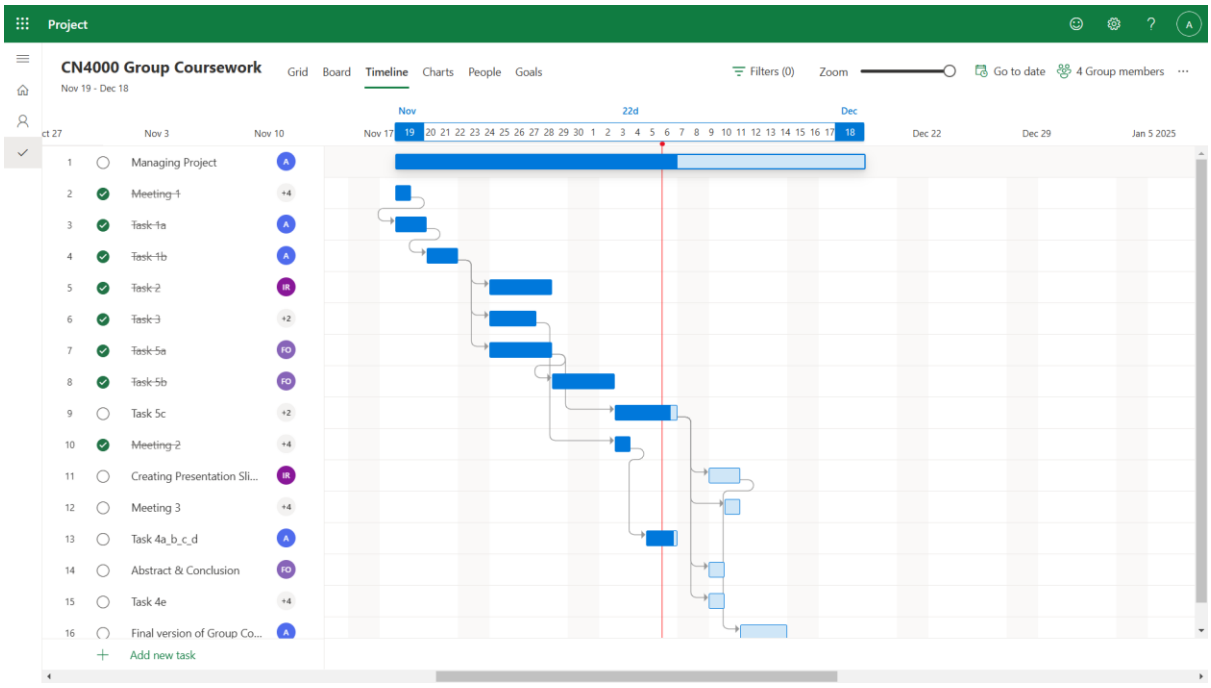
TASK 4.A

The software packages we used to complete this project as a group:

- **Microsoft Project** for Project Management
- **Microsoft Word** for Word Processing
- **Microsoft Excel** for tabulating schema attributes
- **Microsoft PowerPoint** for creating presentation slides
- **Draw.io** and **Lucidchart** for diagramming
- **Microsoft Teams** for Collaboration and File Sharing

TASK 4.B

To plan, control, and monitor our project, we created a **Work Breakdown Structure (WBS)** and **Gantt charts** using Microsoft Project.



TASK 4.C

Minutes of the Meetings:

Meeting 1	
Time and Date: 11:00 am 19/11/2024 Location: DL.1.05b, Docklands Library	Meeting Attendees: • Abul • Amrit • Fuad • Ishtiak
Agenda: • Selection of an Organisation • Selection of an Information System for System Analysis • Tasks Allocation • Academic writing and integrity	
Action Plan: • Complete Tasks 1.a,1.b, 2, 3, 5.a & 5.b by 03/12/2024	
Next Meeting: 11:00 am 03/12/2024	

Meeting 2	
Time and Date: 11:00 am 03/12/2024 Location: DL.1.05b, Docklands Library	Meeting Attendees: • Abul • Amrit • Fuad • Ishtiak
Agenda: • Tasks Evaluation • Tasks Allocation • Preparing for Presentation	
Action Plan: • Complete Tasks 4.a, 4.b, 4.c, 4.d, 4.e, 5.c & Creating Presentation Slides by 10/12/2024	
Next Meeting: 11:00 10/12/2024	

Meeting 3	
Time and Date: 11:00 am 10/12/2024 Location: DL.1.05a, Docklands Library	Meeting Attendees: • Abul • Amrit • Fuad • Ishtiak
Agenda: • Tasks Evaluation • Final Version of Group Coursework	
Action Plan: • Creating the Final Version of Group Coursework by 13/12/2024	
Next Meeting: None	

TASK 4.D

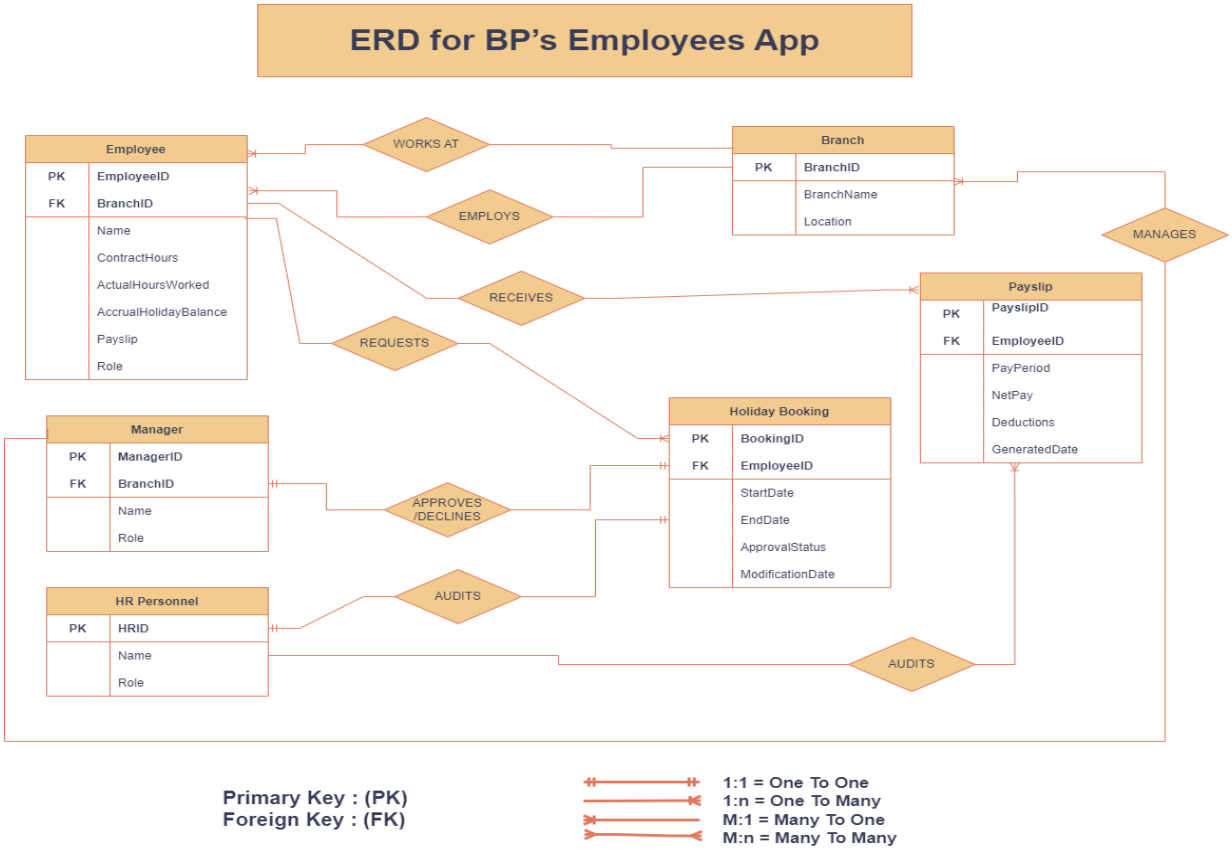
Tasks Distribution Table	
Tasks	**Assigned To**
Task 1.a	Abul
Task 1.b	Abul
Task 2	Ishtiak
Task 3	Abul & Amrit
Task 4.a, 4.b, 4.c & 4.d	Abul
Task 4.e	Amrit, Fuad, Ishtiak & Abul
Task 5.a	Fuad
Task 5.b	Fuad
Task 5.c	Ishtiak & Amrit
Creating Presentation Slides	Ishtiak
Finalising Group Coursework	Abul

TASK 4.E

Group Member	Responsibilities	Self-Evaluation
Abul Forhad Md Yousuf	• Project Management • Task 1 • Task 3 • Task 4 • Final version of group coursework	I managed our group project, created a Work Breakdown Structure (WBS) and Gantt charts to plan, control, and monitor, delegated tasks among group members, and met coursework deadlines and deliverables. I also researched and analysed the organisation, its information systems, information security, and data privacy and created a requirements specification for efficient system development.
Amrit Banstola	• Task 3 • Task 5.c	I created initial drafts of tasks 3 and 5.c and collaborated with other team members.
Fuad Adeoye Oyero	• Task 5.a • Task 5.b	I ensured that my deliverables were accurate, met the project's requirements, and contributed to the overall success of the system's modelling and design phase. I also worked collaboratively with the group to align my work with other tasks for a unified final output.
Ishtiak Rahman	• Task 2 • Task 5.c • Creating presentation slides	I ensured my deliverables were comprehensive and aligned with project requirements, contributing to the successful planning and design phases. My contributions helped create a transparent methodology, detailed system diagrams, and structured team coordination and fostering collaboration.

TASK 5.A

Modelling and Designing of the proposed system



Entities for Employee Mobile App System

1. Employee

   Represents BP store employees (part-time/full-time).

   Attributes: EmployeeID, Name, ContractHours, ActualHoursWorked, AccrualHolidayBalance, Payslip, Role.

2. Manager

   Represents managers responsible for approving holiday bookings and auditing balances.

   Attributes: ManagerID, Name, Role.

3. HR Personnel

   Represents HR staff auditing payslips and holiday balances.

   Attributes: HRID, Name, Role.

4. Holiday Booking

   Represents employee holiday requests.

   Attributes: BookingID, EmployeeID, StartDate, EndDate, ApprovalStatus, ModificationDate.

5. Payslip

   Represents employee payslips.

   Attributes: PayslipID, EmployeeID, PayPeriod, NetPay, Deductions, GeneratedDate.

6. Branch

   Represents BP store locations.

   Attributes: BranchID, BranchName, Location.

Relationships and Verbs

1. Branch ↔ Employee: *EMPLOYS*

   A branch employs employees; each employee works at one branch.

2. Employee ↔ Holiday Booking: *REQUESTS*

   Employees request holiday bookings; each booking belongs to one employee.

3. Manager ↔ Holiday Booking: *APPROVES/DECLINES*

   Managers approve/decline bookings; one manager reviews each booking.

4. HR Personnel ↔ Holiday Booking: *AUDITS*

   HR audits approved holiday bookings for payment.

5. Employee ↔ Payslip: *RECEIVES*

   Employees receive payslips; each payslip belongs to one employee.

6. HR Personnel ↔ Payslip: *AUDITS*

   HR audits payslips for compliance.

7. Employee ↔ Branch: *WORKS AT*

   Employees work at one branch; branches have multiple employees.

8. Manager ↔ Branch: *MANAGES*

   Managers manage one or more branches; each branch has a manager.

Scenario

1. Branch and Employee: Lisa works part-time at the BP London branch, exceeding her contract hours due to demand.
2. Accrual Balance: Lisa views her updated holiday balance via the app.
3. Holiday Request: Lisa requests two weeks off in December and sees real-time availability.
4. Manager Approval: Manager Mr. Taylor reviews and approves Lisa's request.
5. Payslip Generation: Lisa's November payslip is generated and available for download.
6. HR Audit: HR audits Lisa's payslip and holiday booking for accurate payouts.

Connections

- Lisa is *EMPLOYED* at BP London.
- She *REQUESTS* a holiday; Mr. Taylor *APPROVES*.
- Lisa *RECEIVES* a payslip, which HR *AUDITS*.

TASK 5.B

Employee

Attribute	Data Type	PK/FK	Null/Not Null
EmployeeID	INT	Primary Key (PK)	Not Null
Name	VARCHAR(100)		Not Null
ContractHours	INT		Not Null
ActualHoursWorked	INT		Not Null
AccrualHolidayBalance	FLOAT		Not Null
Role	VARCHAR(50)		Not Null
BranchID	INT	Foreign Key (FK)	Not Null

Manager

Attribute	Data Type	PK/FK	Null/Not Null
ManagerID	INT	Primary Key (PK)	Not Null
Name	VARCHAR(100)		Not Null
Role	VARCHAR(50)		Not Null
BranchID	INT	Foreign Key (FK)	Not Null

HR Personnel

Attribute	Data Type	PK/FK	Null/Not Null
HRID	INT	Primary Key (PK)	Not Null
Name	VARCHAR(100)		Not Null
Role	VARCHAR(50)		Not Null

Holiday Booking

Attribute	Data Type	PK/FK	Null/Not Null
BookingID	INT	Primary Key (PK)	Not Null
EmployeeID	INT	Foreign Key (FK)	Not Null
StartDate	DATE		Not Null
EndDate	DATE		Not Null
ApprovalStatus	VARCHAR(20)		Not Null
ModificationDate	DATE		Null Allowed

Payslip

Attribute	Data Type	PK/FK	Null/Not Null
PayslipID	INT	Primary Key (PK)	Not Null
EmployeeID	INT	Foreign Key (FK)	Not Null
PayPeriod	VARCHAR(50)		Not Null
NetPay	FLOAT		Not Null
Deductions	FLOAT		Null Allowed
GeneratedDate	DATE		Not Null

Branch

Attribute	Data Type	PK/FK	Null/Not Null
BranchID	INT	Primary Key (PK)	Not Null
BranchName	VARCHAR(100)		Not Null
Location	VARCHAR(150)		Not Null

TASK 5.C

Understanding the System Requirements

In this task, we will identify the app's functionalities, define the actors and their roles, and describe the functionalities. The app will address issues like holiday accrual, holiday requests, payslip access, and communication between employees and management.

Key Actors and their roles:

1. Employee: Ability to view holiday balances, submit requests, and access payslips.
2. Manager: Needs to be able to approve/reject holiday requests, view team schedules, and communicate with employees.
3. Admin/HR Personnel: Needs to manage user accounts and oversee app functionality.

Use Cases - Actions users need to perform using the app.

List of possible user actions:

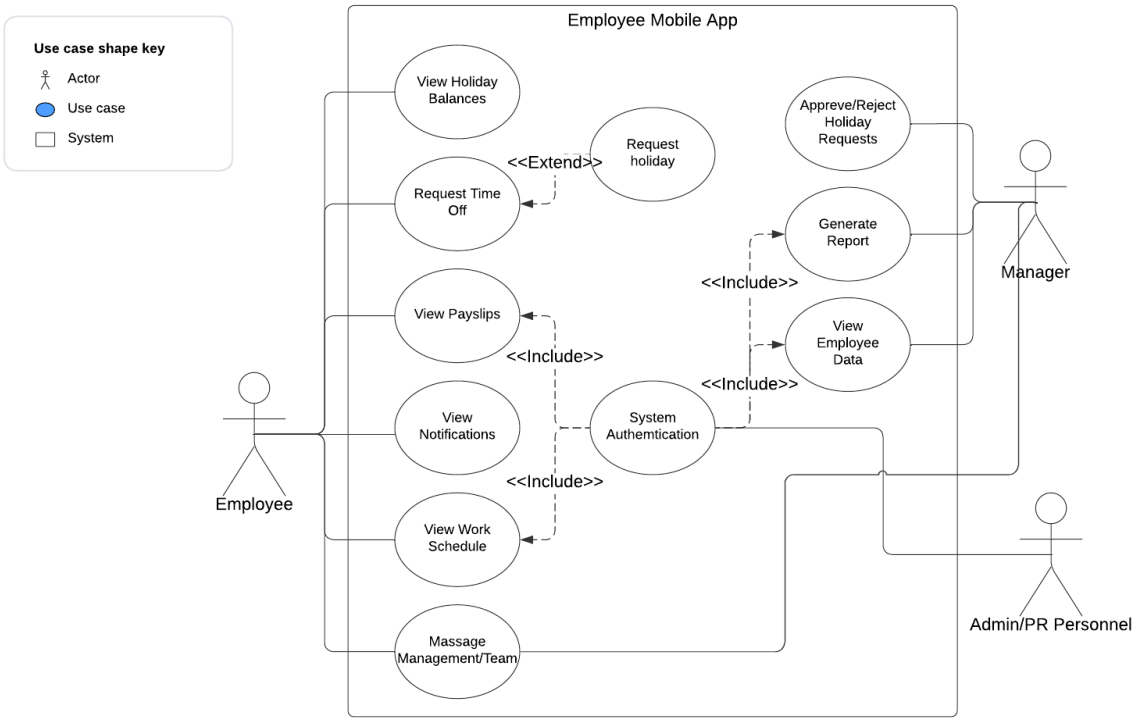
- Employee:
  - View holiday balance.
  - Submit holiday requests.
  - View/Download payslips.
- Manager:
  - Approve/reject holiday requests.
  - View team holiday schedules.
  - Send updates or announcements to employees.
- Admin/HP Personnel:
  - Add/remove users
  - Manage system.

Use Case Description - How a user interacts with a system to achieve a goal

1. Use Case Name: Submit Holiday Request
   Actor: Employee
   Steps:
   i) Log in.
   ii) Navigate to "Holiday Requests".
   iii) Select the desired dates and submit a request.
   iv) Receive confirmation that the request was sent.

2. Use Case Name: Approve Holiday Requests
   Actor: Manager
   Steps:
   i) Log in.
   ii) Navigate to “Team Holiday Requests.
   iii) Review the pending requests.
   iv) Approve or reject the request with an optional comment.

Use Case Diagram



Analyse Security Issues – Ensures users' confidential information is secure.

Define security privileges for each actor so that privileged information is secure. In this use case, the security measure will be the system authenticator.

Employee:

- View own holiday balance and payslips
- Submit holiday requests

Manager:

- Approve//reject requests for their team only
- View aggregated team schedules.

Admin/HR Personnel:

- Access all employee data for account management purposes.
- Oversee system configurations and troubleshoot issues

Security concerns

- Prevent employees from accessing other users' data.
- Ensure management cannot modify payslips.
- Require secure authentication (e.g., multi-factor authentication).

Level 0 DFD – A high-level view showing user interaction with the mobile app.

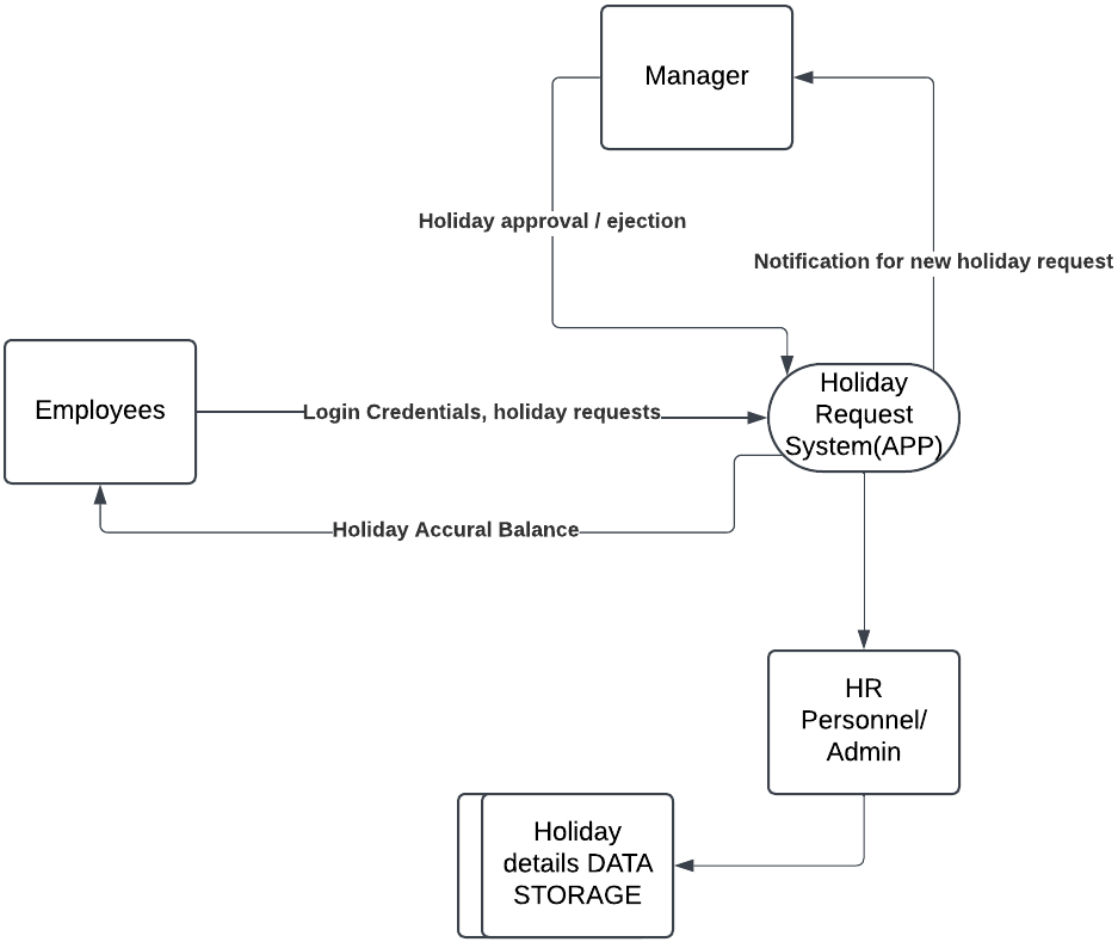
Identify external entities:

- Employee, Manager, HR Personnel/Admin

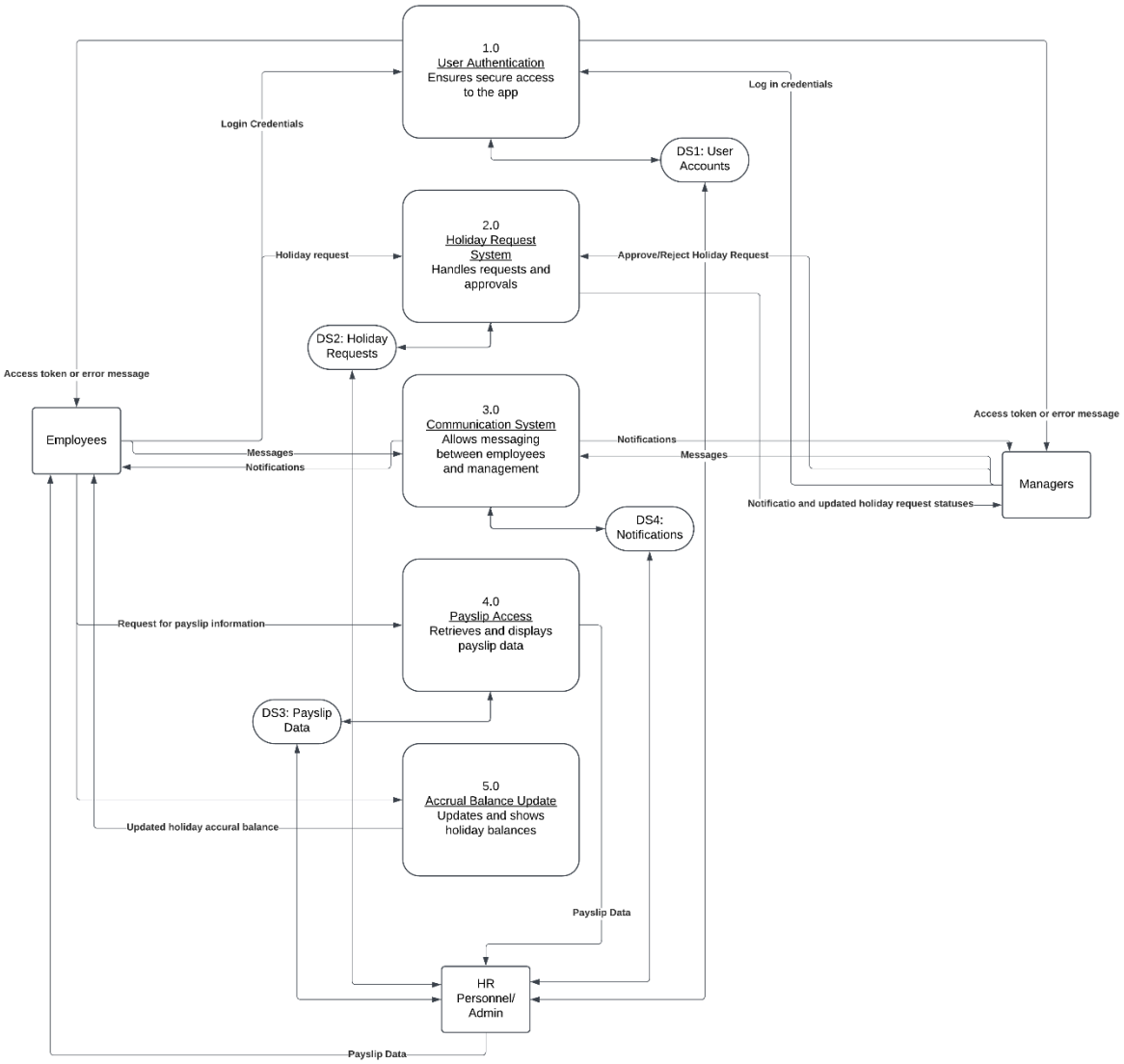
The main processes and data flow:

1. Employee → App (Log in, Holiday Credentials)
2. App → Manager (Notification for new holiday request)
3. Manager → App (Holiday Approval/Reject)
4. App → Employee (Holiday Accrual Balance)
5. App → Admin/HR Personnel (Update Holiday Request Data Storage)

Level 0 Data-Flow-Diagram (Context Diagram)



Level 1 Data-Flow-Diagram



Agreement of Participation – Group Assignment CN4000

We agree to work as a group (**a group of 4**) to complete the coursework for CN4000 and understand that the grade awarded will be the grade allocated to us individually as a result of our group work.

Student No.	**Name (block letters) and Email Address**	**Signature**
2824240	Name: ABUL FORHAD MD YOUSUF Email Address: u2824240@uel.ac.uk	Abul Forhad Md Yousuf
2757048	Name: AMRIT BANSTOLA Email Address: u2757048@uel.ac.uk	Amrit Banstola
2802316	Name: FUAD ADEOYE OYERO Email Address: u2802316@uel.ac.uk	Fuad Adeoye Oyero
2712185	Name: ISHTIAK RAHMAN Email Address: u2712185@uel.ac.uk	Ishtiak Rahman

Tutorial/Practical Number: 14

Tutor’s Name: Reena Popat

Date of agreement: October 22, 2024

Presentation Slides

An Information System Analysis of BP UK Retail

Coursework: Group Assignment

By:
GROUP 14.3
Abul Forhad Md YOUSUF (Student ID: 2824240),
Amrit BANSTOLA (Student ID: 2757048),
Fuad Adeoye OYERO (Student ID: 2802316),
Ishtiak RAHMAN (Student ID: 2712185).

Source: BP

Introduction of BP UK Retail

BP UK Retail is part of **BP p.l.c.** , a British multinational energy company headquartered in London, England. Through its partnership with **M&S Food**, **BP UK Retail** provides advanced fuels and market-leading convenience across the UK.

Information Systems (IS) in BP UK Retail Convenience Business

BP leverages a variety of advanced information systems to support its UK convenience retail operations, which span over 300 company-owned retail sites. These systems optimize operations, improve decision-making, and enhance customer and employee experiences.

01

StorePoint Back Office:
A comprehensive, cloud-based solution supporting daily business activities, including:
- Cash management
- Employee and supplier management
- Inventory and fuel control
- Data-driven insights and reporting

02 03 04 05 06

01 02 03 04 05 06

M&S Central Store Stock Management (CSSM):
Integrated with BP systems, this cloud-based solution ensures accurate stock levels, waste management, logistics, finance, and comprehensive reporting for M&S products.

01 02 03 04 05 06

Point of Sale (POS):
Processes in-store transactions while generating detailed insights into buying trends, enabling accurate demand forecasting.

01 02 03 04 05 06

Checkit:
A workflow management system that ensures quality in food-to-go services reduces waste and provides real-time performance metrics.

01 02 03 04 05 06

Employee App:
Simplifies employee scheduling with shift clocking functionality and detailed timecard tracking.

CN4000 - Information Systems Modelling and Design

01 02 03 04 05 06

BPme App:
Designed for customers, this cloud-based app facilitates digital fuel payments and integrates with the BPme Rewards loyalty program, using data analytics for a personalized customer experience.

Where we come in

BP is always looking to improve operational efficiencies using digital technologies. An **employee mobile app** can foster productivity by streamlining communication between employees and managers.Our analysis is based on its existing employee app and our goal is to make it more efficient by extending features.

Use Case Overview

What is a Use Case?

A **use case** is a detailed description of how a user interacts with a system to achieve a specific goal. It outlines the sequence of actions performed by the user and the system, as well as any conditions or exceptions that may arise during the interaction. Use cases focus on the "what" rather than the "how," making them a practical tool for defining system functionality from the user's perspective.

Importance of Use Cases:

- Testing & Validation: Create scenarios to ensure requirements are met and exceptions handled.
- Clear Requirements: Bridge the gap between stakeholders and developers with a shared understanding of system goals.
- Scalability: Simplify updates and system scaling with clear documentation.

Use Case Description – Holiday Request

Actors

Individuals, roles, or systems that interact with the system to achieve the goal.
In our example the actors are: Employee, Manager, Admin/HR Personnel.

Use Case Description – Holiday Request

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Individuals, roles, or systems that interact with the system to achieve the goal.
In our example the actors are: Employee, Manager, Admin/HR Personnel.

Goal
The objective or outcome the actor wants to achieve.
In our example the goal is to request a holiday.

Use Case Description – Holiday Request

Actors

Individuals, roles, or systems that interact with the system to achieve the goal.
In our example the actors are: Employee, Manager, Admin/HR Personnel.

Goal
The objective or outcome the actor wants to achieve.
In our example the goal is to request a holiday.

Preconditions
The conditions or requirements that must be met before the use case begins.
In our example some of the preconditions that we are assuming are that the employee has a mobile device and has log in information.

Level 0 DFD (Context Diagram)

Use Case Name: Submit Holiday Request
Actor: Employee
Steps:
1.Log in.
2.Navigate to “Holiday Requests”.
3.Select the desired dates and submit a request.
4.Receive confirmation that the request was sent.

Level 0 DFD (Context Diagram)

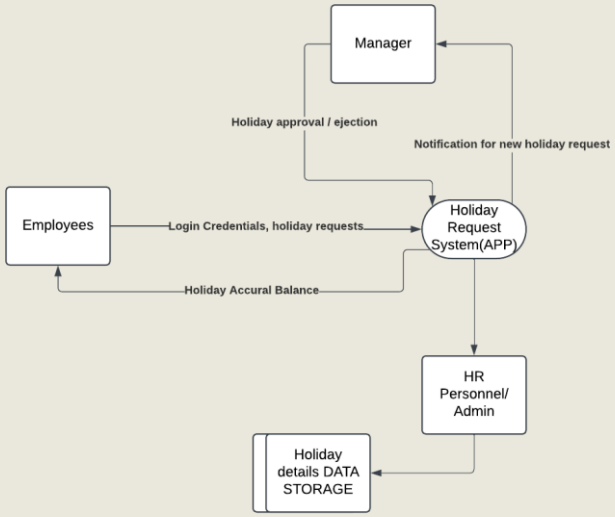
Use Case Name: Submit Holiday Request
Actor: Employee
Steps:
1.Log in.
2.Navigate to “Holiday Requests”.
3.Select the desired dates and submit a request.
4.Receive confirmation that the request was sent.

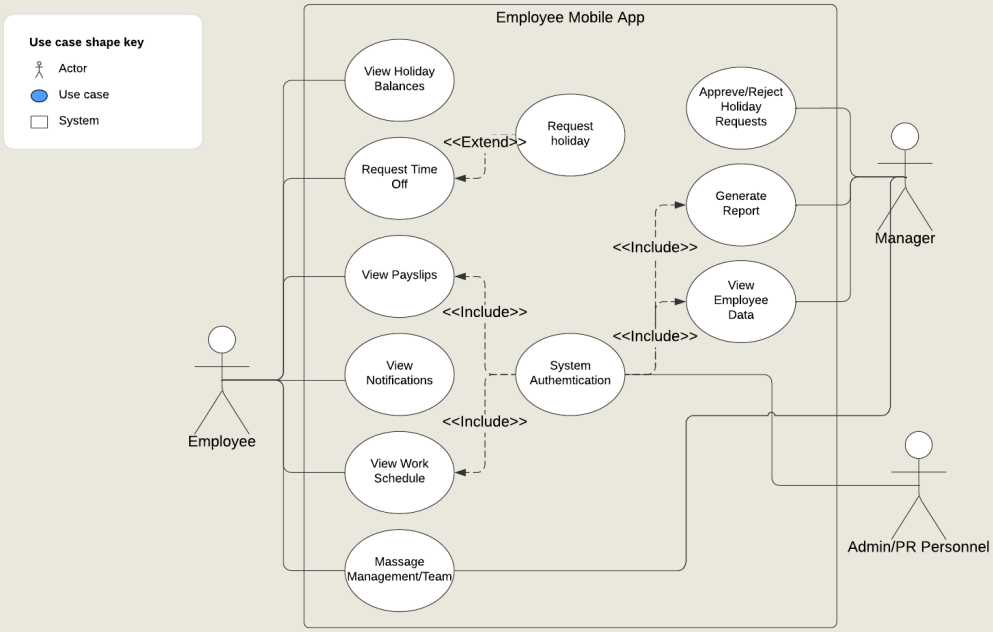
Use Case Name: Approve Holiday Requests
Actor: Manager
Steps:
1.Log in.
2.Navigate to “Team Holiday Requests.
3.Review the pending requests.
4.Approve or reject the request with an optional comment.

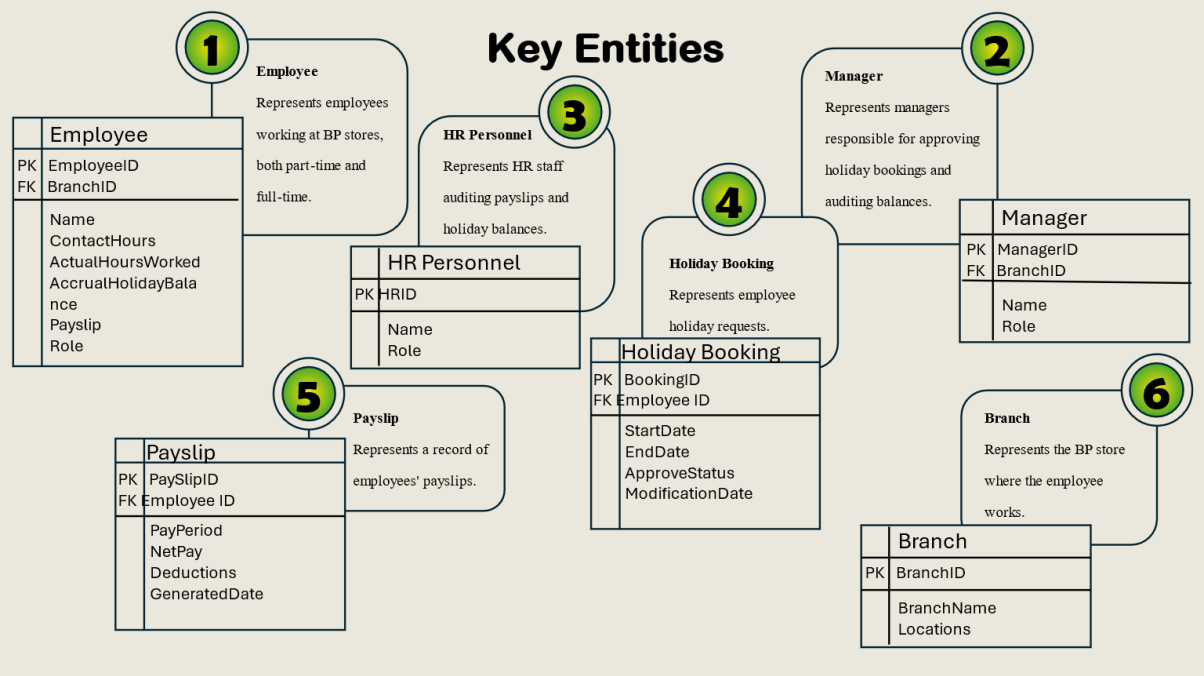
Level 0 DFD (Context Diagram)

Use Case Name: Submit Holiday Request
Actor: Employee
Steps:
1.Log in.
2.Navigate to “Holiday Requests”.
3.Select the desired dates and submit a request.
4.Receive confirmation that the request was sent.

Use Case Name: Approve Holiday Requests
Actor: Manager
Steps:
1.Log in.
2.Navigate to “Team Holiday Requests.
3.Review the pending requests.
4.Approve or reject the request with an optional comment.







Relationships and Verbs Connecting Entities

Examples

Branch ↔ Employee

- **Relationship Word:** *EMPLOYS*
- A branch *employs* multiple employees, and each employee *works at* one branch.

Employee ↔ Holiday Booking

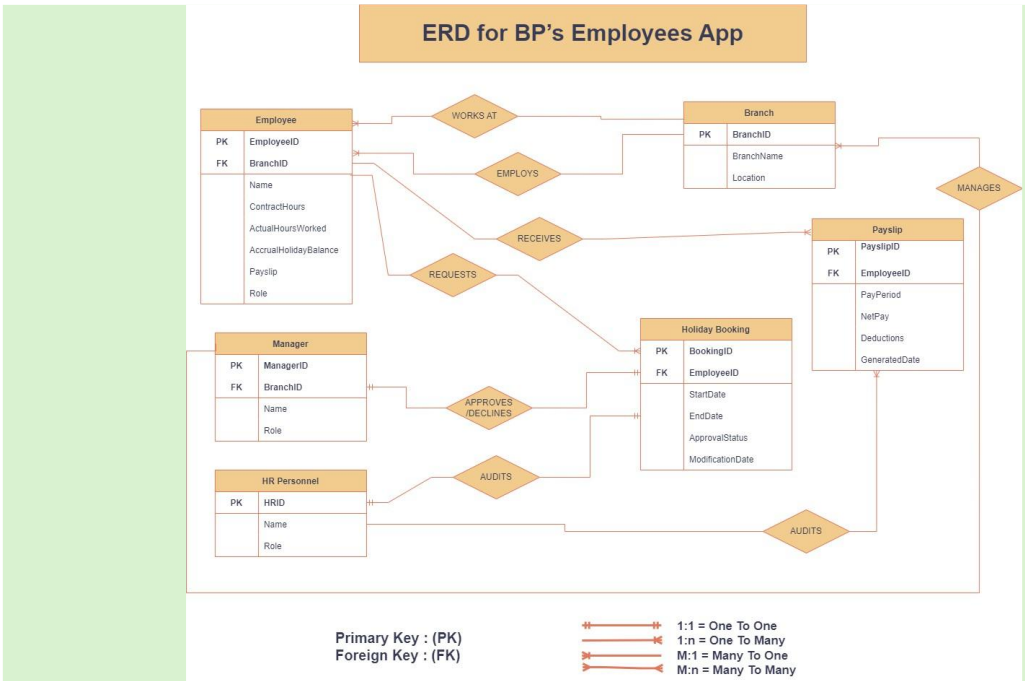
- **Relationship Word:** *REQUESTS*
- An employee *requests* multiple holiday bookings, and each holiday booking *belongs to* one employee.

Employee ↔ Payslip

- **Relationship Word:** *RECEIVES*
- An employee *receives* multiple payslips, and each payslip *belongs to* one employee.

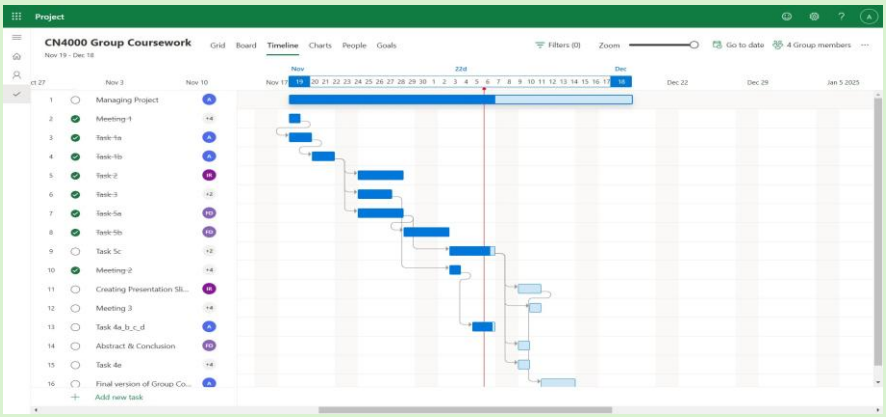
Manager ↔ Branch

- **Relationship Word:** *MANAGES*
- A manager *manages* one or more branches, and each branch *is managed by* a manager.



Project Management

We created a **Work Breakdown Structure (WBS)** and **Gantt charts** using **Microsoft Project** to plan, control, and monitor our project



Project Management

The **Tasks Distribution Table** helps us to allocate tasks effectively to group members.

Tasks Distribution Table	
Tasks	**Assigned To**
Task 1.a	Abul
Task 1.b	Abul
Task 2	Ishtiak
Task 3	Abul & Amrit
Task 4.a, 4.b, 4.c & 4.d	Abul
Task 4.e	Amrit, Fuad, Ishtiak & Abul
Task 5.a	Fuad
Task 5.b	Fuad
Task 5.c	Ishtiak & Amrit
Creating Presentation Slides	Ishtiak
Finalising Group Coursework	Abul

Thank you.