



Data Modeling and Implementation Techniques

Project

Reliable Electronics



Background

Reliable Electronics is a producer of electronic components and testing equipment. The company is located in the Boston City area with multiple plants. The corporation has over 10,000 full-time employees.

Approximately 200 employees are employed with the company's maintenance department, which is responsible for the maintenance of the building and grounds. Maintenance has assigned a group of employees to provide maintenance for each building or plant. The employees assigned to each building or plant collectively possess the skills needed to provide proper upkeep. Such employees include carpenters, electricians, painters, welders, plumbers, and the like. The maintenance department also has a group of employees with special skills to assist with special projects that may arise.



Problem Overview

In September 2018, Will Baxter and his management team completed a week-long retreat to evaluate maintenance operations. The key outcome was the prioritization of initiatives focused on improving the equipment depot's operations.

Equipment Depot Issues

The equipment depot provides maintenance employees with essential tools for their duties. While each employee receives a basic toolbox with inexpensive items like hammers and screwdrivers, more specialized tools must be checked out from the depot. However, tools often become lost, stolen, or damaged, leading to significant losses. The estimated annual loss exceeds \$50,000. To address this, Will Baxter has prioritized the development of an automated system to track equipment check-ins and check-outs.

Warehouse Challenges

The equipment warehouse is responsible for storing supplies like screws, nails, and plywood, crucial for job completion. It operates in two locations: a main warehouse about a mile from the main campus and a smaller, more convenient central warehouse. Employees often bypass the main warehouse, preferring the closer one, even when needed supplies are unavailable. This behavior results in unnecessary inventory orders and increased carrying costs. Although the exact financial impact is unclear, management agrees that it is likely substantial. Therefore, improving the warehousing system is also a top priority for the maintenance department.

MODULE 1



In this module, we outline the information to be stored in the database and its presentation through forms and reports.

Some of the form names and input screens are as shown below:

1. Equipment Checkout Form
2. Equipment Check-in Form
3. Inventory Entry Form
4. Maintenance Request Form
5. Equipments Requisition Form



Equipment Check-out Form

This form is used by maintenance employees to request and check out equipment from the equipment depot for their job assignments.

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Equipment Checkout Form	
Form ID: _____	
Employee Name: _____	Employee ID: _____
Equipment Name: _____	Equipment ID: _____
Checkout Date: _____	Expected Return Date: _____
Condition : _____	
Approval: _____	
Department: _____	
Purpose: _____	

Equipment Check-in Form

This form is used by employees to return equipment to the equipment depot after completing their job assignments.

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Equipment Check-in Form	
Form ID: _____	
Employee Name: _____	Employee ID: _____
Equipment Name: _____	Equipment ID: _____
Check-in Date: _____	
Condition: _____	
Comments: _____	
Department: _____	



Inventory Entry Form

This form is used by employees to record new inventory items into the system or update existing inventory records.

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Inventory Entry Form:

Form ID: _____

Equipment Name: _____ Equipment ID: _____

Quantity: _____

Location: _____

Date of Entry: _____

Employee Name: _____ Employee ID: _____

Department: _____

Maintenance Request Form

This form is used by employees to request maintenance services for equipment or facilities.

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Maintenance Request Form:

Request ID: _____

Employee Name: _____ Employee ID: _____

Date of Request: _____ Priority Level: _____

Description: _____

Location: _____

Equipment Name: _____ Equipment ID: _____

Estimated Repair Cost: _____

Approval: _____



Some of the routine reports to be produced are as shown below:

1. Equipment Checkout Report
2. Equipment Check-in Report
3. Lost/Stolen equipment Report
4. Employee Equipment Utilisation Report
5. Equipment Requisition Report
6. Inventory Status Report
7. Maintenance Request Report
8. Equipment Usage Report
9. Excess Inventory Report
10. Job cost report
11. Employment Productivity Report



Equipment Checkout Report

This report summarizes all instances where equipment has been borrowed from the equipment depot by maintenance employees. It includes details such as the date of checkout, the employee responsible, and the equipment issued. This report helps track equipment usage and identify any delays or instances of missing equipment.

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Equipment Checkout Report

Date of Report: mm/dd/yyyy

Report ID	Employee ID	Equipment ID	Checkout Dates	Expected Return dates	Condition at Checkout
xxx	xxx	xxx	xxx	xxx	xxx
xxx	xxx	xxx	xxx	xxx	xxx

Lost/Stolen Equipment Report

The **Lost/Stolen Equipment Report** is a detailed document that tracks and records instances of equipment that has been reported as lost or stolen within the organization. This report is crucial for identifying trends, assessing the financial impact of lost or stolen equipment, and implementing measures to mitigate future losses.

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Lost/Stolen Equipment Report

Date of Report: mm/dd/yyyy

Equipment Name	Equipment ID	Employee ID	Employee Name	Date last checked out	Date reported	Est. value
xxx	xxx	xxx	xxx	xxx	xxx	xx
xxx	xxx	xxx	xxx	xxx	xxx	xx



Inventory Status Report

This Report provides a snapshot of the current inventory levels and status within the maintenance department's Equipments warehouses.

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Inventory Status Report

Date of Report: mm/dd/yyyy

Report ID	Equipment ID	Equipment Name	Current Quantity	Location	Date of Last update
xxx	xxx	xxx	xxx	xxx	xxx
xxx	xxx	xxx	xxx	xxx	xxx

Equipment Requisition Report

This Report is a detailed document that tracks and records all requests for Equipments needed to complete maintenance tasks or projects. This report is crucial for managing inventory, ensuring the timely availability of necessary Equipments, and monitoring the usage and costs associated with maintenance activities.

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Equipment Requisition Report

Date of Report: mm/dd/yyyy

Report ID	Equipment ID	Employee ID	Quantity Requested	Date of Request	Delivery Preference	Status
xxx	xxx	xxx	xxx	xxx	xxx	xx
xxx	xxx	xxx	xxx	xxx	xxx	xx



The input and output screens for routine report transactions to be performed using the database.

Input Screen Title: Equipment Checkout Report

- **Fields:**
 - Employee ID: [Text Box]
 - Equipment ID: [Text Box]
 - Checkout Date: [Date Picker]
 - Expected Return Date: [Date Picker]
 - Condition: [Drop-down Menu]
 - Approval: [Signature Box]
- **Buttons:** [Submit], [Reset]

Output Screen Title: Equipment Checkout Report

- **Fields:**
 - Report ID: [Text Box]
 - Employee ID: [Text Box]
 - Equipment ID: [Text Box]
 - Checkout Dates: [Date Range Picker]
 - Expected Return Dates: [Date Range Picker]
 - Condition at Checkout: [Drop-down Menu]
- Buttons:** [Generate Report], [Export to PDF], [Print]

Module 2



Data Dictionary

- A DBMS System catalog sometime called Data Dictionary, active Data Dictionary, or integrated data dictionary.
- It is a repository of information about the logical structure of the database.
- It contains metadata or the data about data in the database. It has entries for all types of objects that exist in the Database.
- There are also some Data Dictionary tools that are available without particular DBMS, called freestanding data dictionaries.



Importance of Data Dictionary

- Ensures consistency and clarity across all forms, reports, and transactions.
- Ensures effective communication among team members and stakeholders.
- It reduces errors by enforcing standard data formats, constraints, and validation rules, thus ensuring accurate and reliable data.
- It helps database administrators and developers efficiently manage, update, and maintain the database schema.
- Ensures consistency and accuracy in data management

Key Data items

- **Form ID:** Unique identifier for the form (varchar)
- **Employee ID:** Unique ID of the employee (int)
- **Equipment ID:** Unique ID of the equipment (int)
- **Checkout Date:** Date and time of checkout (Date)
- **Quantity:** Number of equipment being added or requested (int)
- **Condition:** Condition of the equipment (varchar)
- **Request ID:** Unique identifier for the maintenance request (int)
- **Estimated Repair Cost:** Cost estimated for repair (int)

Term	Data Type	Description
Form ID.	varchar	Unique identifier for the form
Employee ID	int	Unique ID of the employee
Equipment ID	int	Unique ID of the equipment
Employee Name	varchar	Unique Name of the employee
Equipment Name	varchar	Unique Name of the equipment
Checkout Date	Date	Date and time of checkout
Expected return date	Date	Expected date of return
Condition	varchar	Condition of the equipment at the time of checkout



Let's take an example for data items that we have.

- **Heading:**

Example: Employee ID

- **Key Points:**

- **Term:** Employee ID
- **Data Type:** int
- **Description:** Unique identifier for each employee.
- **Example:** 2



Cross Reference Table

Definition:

- A cross-reference table is a matrix that maps data items from the data dictionary to specific forms, reports, in the system.
- It serves as a reference guide to identify where specific data elements are used and how they are interconnected within different components of the system.

Purpose:

- We will use the cross reference table to display which data elements are used in each form, report, or transaction.
- Ensures that all data elements should be utilized correctly across different parts of the system.
- It Gives a clear picture of data item usage, ensuring consistency across different forms and reports.

Example Cross-Reference Table in Our Project for Forms

- **Forms**

- Equipment Checkout Form
- Equipment Check-In Form
- Inventory Entry Form
- Maintenance Request Form
- Equipments requisition Form
- Material Usage Report
- Excess Inventory Report
- Employee Equipment Utilization Report
- Job Cost Report
- Employee Productivity Report

- **Terms:**

- Form ID
- Employee Id
- Employee Name
- Equipment Name
- Checkout Date
- Expected Return Date

A.

Term	Equipment checkout Form	Equipment check in Form	Inventory Entry Form	Maintenance Request Form	Equipments requisition Form
Form ID.	✓	✓	✓		✓
Employee ID	✓	✓	✓	✓	✓
Equipment ID	✓	✓	✓	✓	✓
Employee Name	✓	✓	✓	✓	
Equipment Name	✓	✓	✓	✓	✓
Checkout Date	✓	x	x	x	x
Expected return date	✓	x	x	x	x
Condition	x	✓	x	x	x
Approval	x	✓	x	x	x
Department	✓	✓	✓	x	✓

Cross Reference Table in our Project For Reports

- **Reports**
 - **Equipment Checkout Report**
 - **Equipment Check-In Report**
 - **Inventory Entry Report**
 - **Maintenance Request Report**
 - **Equipments requisition Report**
 - **Material Usage Report**
 -
- **Terms:**
 - **Form ID**
 - **Employee Id**
 - **Employee Name**
 - **Equipment Name**
 - **Checkout Date**
 - **Expected Return Date**
 - **Condition**
 - **Approval**
 - **Department**
 - **Check In Date**
 - **Comments**

Term	Equipment checkout Report	Equipment check in Report	Inventory Status Report	Maintenance Request Report	Material requisition Report	Lost/Stolen Equipment Report
Form ID.	x	x	x	x	x	x
Employee ID	✓	✓	x	x	x	x
Equipment ID	✓	✓	✓	x	x	x
Employee Name	x	x	x	x	x	✓
Equipment Name	x	x	✓	x	x	✓
Checkout Date	✓	x	x	x	x	x
Expected return date	✓	x	x	x	x	x
Condition	x	x	x	x	x	x
Approval	x	x	x	x	x	x
Department	x	x	x	x	x	x
Check-in	x	✓	x	x	x	x



Why is it Important?

- It Helps in tracking each data item that is used within the system, ensuring nothing is missed.
- It Verifies that forms, reports, are utilizing all necessary data elements.
- Identifies redundant or missing data items, helping optimize system design and functionality. (efficiency)
- Simplifies the process of generating reports by providing a clear map of data sources and their usage.

So, The cross-reference table is crucial for ensuring that data is correctly and consistently applied across all system components, contributing to the overall reliability and efficiency of the project.

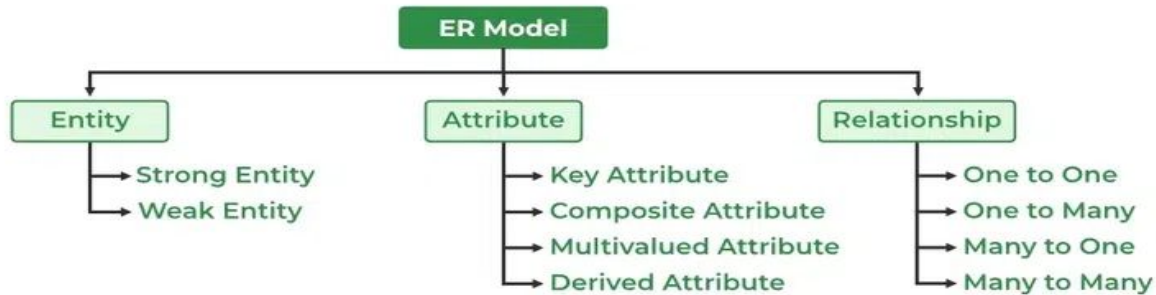
Module 3

Creating ER Diagrams

Visual Clarity: ER diagrams provide a clear visual representation of the database structure, making it easier to understand the relationships between different entities.

Accurate Data Modeling: They help in identifying relationships, cardinality, and constraints, ensuring that the data model accurately reflects real-world scenarios.

Guidance for Implementation: ER diagrams act as a blueprint for database implementation, assisting developers and stakeholders in the design process.

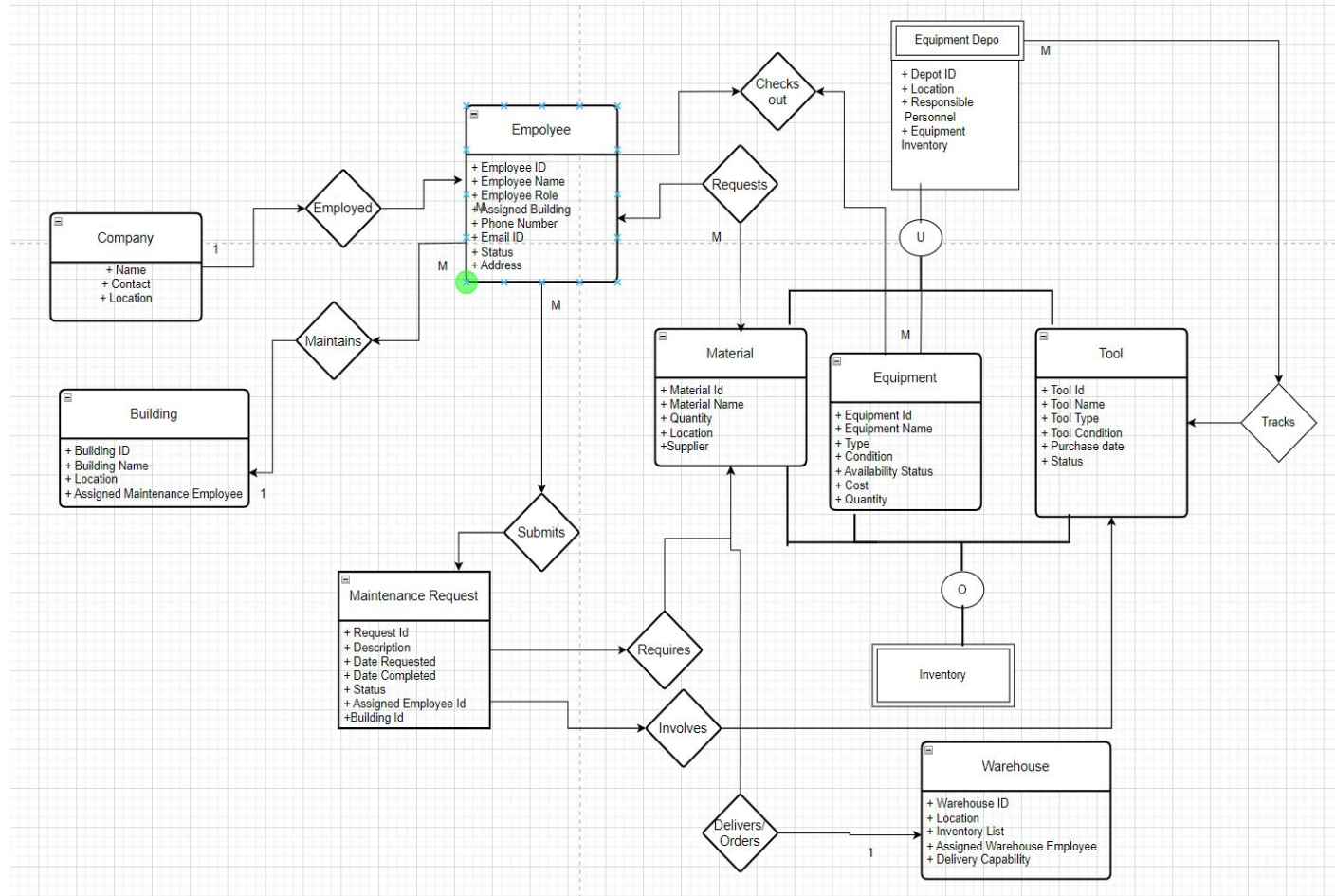


Entities and Attributes



Entity	Attributes	Type
Company	Name, Contact, Location	Strong
Employee	Employee ID, Employee Name, Employee Role, Assigned Building, Phone Number, Email ID, Status, Address	Strong
Building	Building ID, Building Name, Location, Assigned Maintenance Employee	Strong
Equipment	Equipment ID, Equipment Name, Type, Condition, Availability Status, Cost, Quantity	Strong
Material	Material ID, Material Name, Quantity, Location, Supplier	Strong
Tool	Tool ID, Tool Name, Tool Type, Tool Condition, Purchase Date, Status	Strong
Warehouse	Warehouse ID, Location, Inventory, Delivery Capability	Strong
Equipment Depot	Depot ID, Location, Responsible Personnel, Equipment Inventory	Weak Entity
Maintenance Request	Request ID, Description, Date Requested, Date Completed, Status, Assigned Employee ID, Building ID	Strong
Inventory	(No specific attributes listed; implied as an aggregate)	Weak Entity

ERD Diagram



Relationship and cardinality of attributes

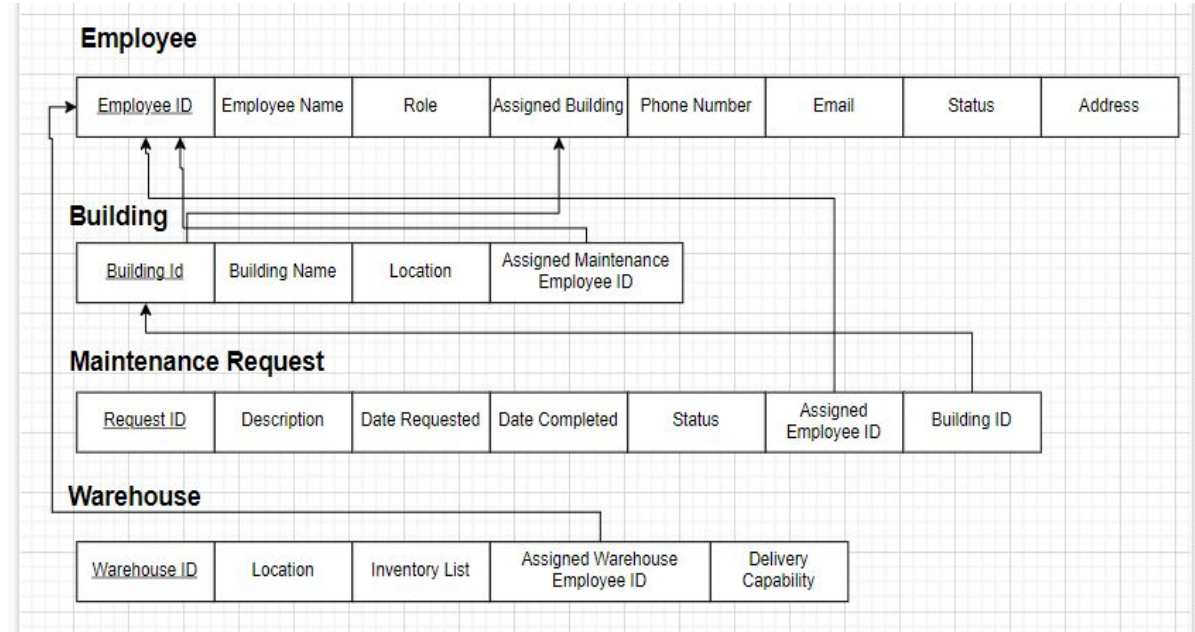


Relationship	Involved Entities	Cardinality
Employed	Company, Employee	1
Maintains	Employee, Building	M:1
Checks out	Employee, Equipment	M
Requests	Employee, Material	M
Tracks	Equipment Depot, Tool	U
Submits	Employee, Maintenance Request	M:1
Requires	Maintenance Request, Material	M
Involves	Maintenance Request, Tool	M
Delivers	Warehouse, Material	1

Schema for Database

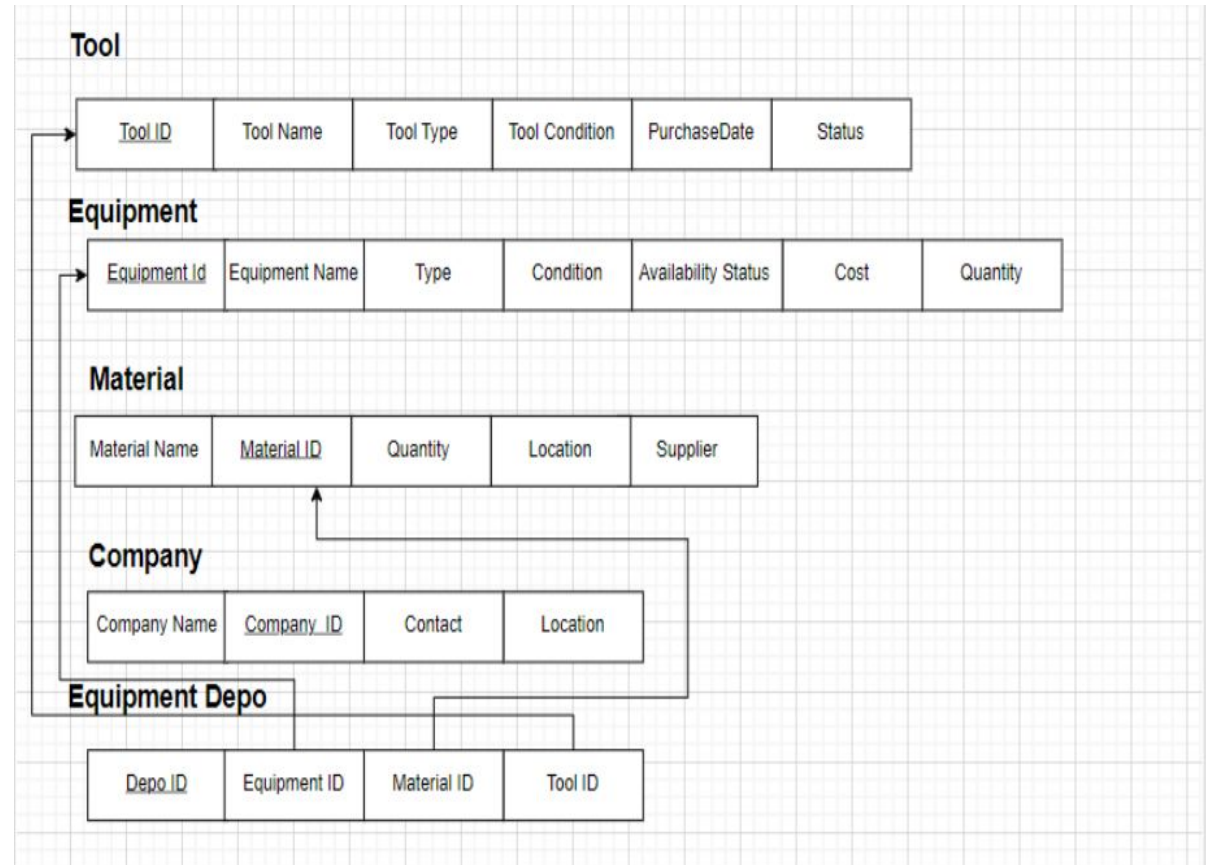
The schema serves as the foundation for all database operations, ensuring data integrity and consistency while guiding how the database will be built, queried, and maintained.

- Each table includes columns that represent the attributes of the entity, with one or more columns designated as the primary key to uniquely identify records.





- Relationships between tables are depicted using foreign keys, which link the primary key of one table to a corresponding column in another table.
- This visual layout helps in understanding the structure, relationships, and constraints within the database.




Module 4

Relational Schema Design

- We implemented the design using a relational database management system MySQL: "The relational schema was developed to ensure efficient data management and querying."
- "Entities include Company, Employee, Department, Building, Equipment, Warehouse, Tools, Materials, and Maintenance Request."
- "Relationships between entities were carefully mapped to preserve data integrity."

SQL Database - Creating Tables



→ We created the necessary tables to store data using SQL Create Table statements to Define structure of each entity and attributes.

- Company Table
- Employee Table
- Department Table
- Building/Plant Table
- Equipment Table
- Equipment Checkout Table
- Warehouse Table
- Inventory Table
- Tools Table
- Materials Table
- Maintenance Request Table

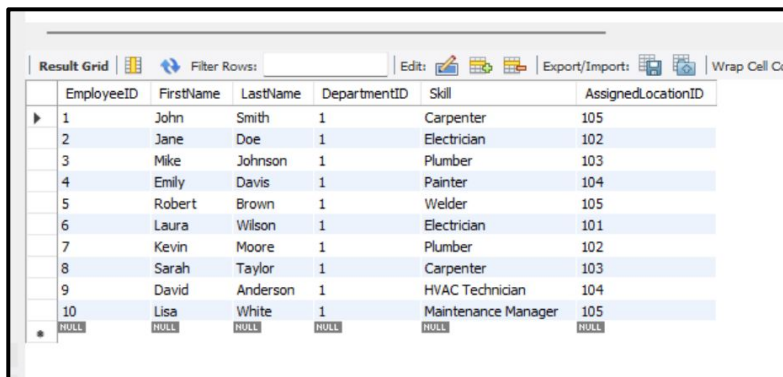
Here are some examples of the Created Tables

Employee Table

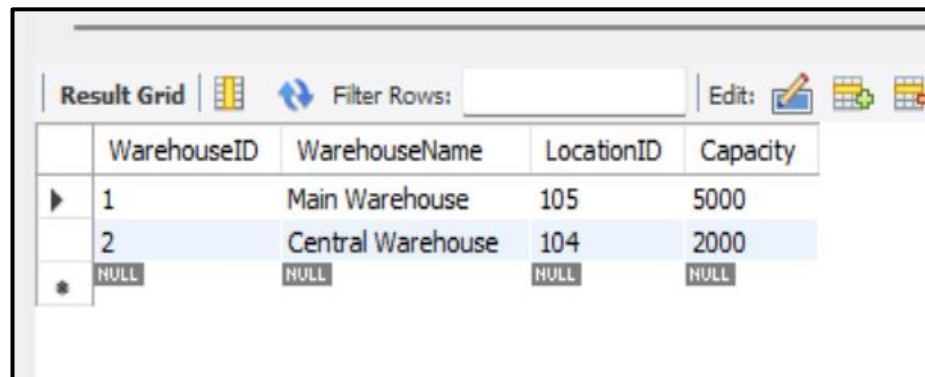
```
CREATE TABLE Employee (  
  EmployeeID INT PRIMARY KEY,  
  FirstName VARCHAR(50),  
  LastName VARCHAR(50),  
  DepartmentID INT,  
  Skill VARCHAR(50),  
  AssignedLocationID INT,  
  FOREIGN KEY (DepartmentID) REFERENCES  
  Department(DepartmentID),  
  FOREIGN KEY (AssignedLocationID)  
  REFERENCES Building(LocationID)
```

Warehouse Table

```
CREATE TABLE Warehouse (  
  WarehouseID INT PRIMARY KEY,  
  WarehouseName VARCHAR(100),  
  LocationID INT,  
  Capacity INT,  
  FOREIGN KEY (LocationID) REFERENCES  
  Building(LocationID)  
);
```



	EmployeeID	FirstName	LastName	DepartmentID	Skill	AssignedLocationID
▶	1	John	Smith	1	Carpenter	105
	2	Jane	Doe	1	Electrician	102
	3	Mike	Johnson	1	Plumber	103
	4	Emily	Davis	1	Painter	104
	5	Robert	Brown	1	Welder	105
	6	Laura	Wilson	1	Electrician	101
	7	Kevin	Moore	1	Plumber	102
	8	Sarah	Taylor	1	Carpenter	103
	9	David	Anderson	1	HVAC Technician	104
	10	Lisa	White	1	Maintenance Manager	105
*	NULL	NULL	NULL	NULL	NULL	NULL



	WarehouseID	WarehouseName	LocationID	Capacity
▶	1	Main Warehouse	105	5000
	2	Central Warehouse	104	2000
*	NULL	NULL	NULL	NULL

Inserting data into Tables

Data was inserted into each table to demonstrate the functionality and integrity of the database. Each table was inserted with a minimum of ten records.

Inserting data into company table:

Query of inserting data into company table-

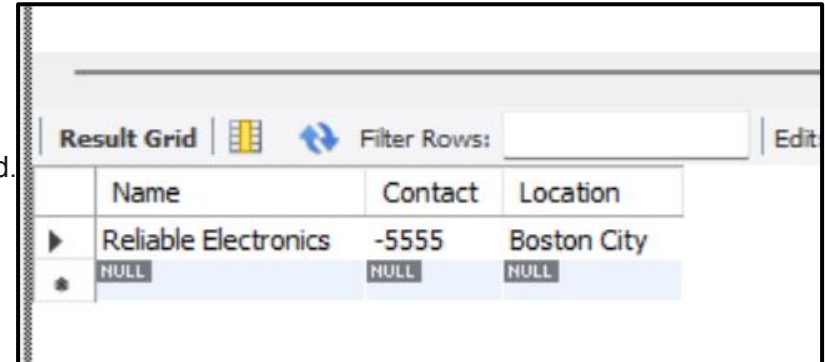
insert into Company values ('Reliable Electronics', 555-555-5555, 'Boston City');

we've inserted a record for a company named Reliable Electronics with the following details:"

Name: Reliable Electronics - The name of the company.

Contact: 555-555-5555 - The company's contact number.

Location: Boston City - The location where the company is based.

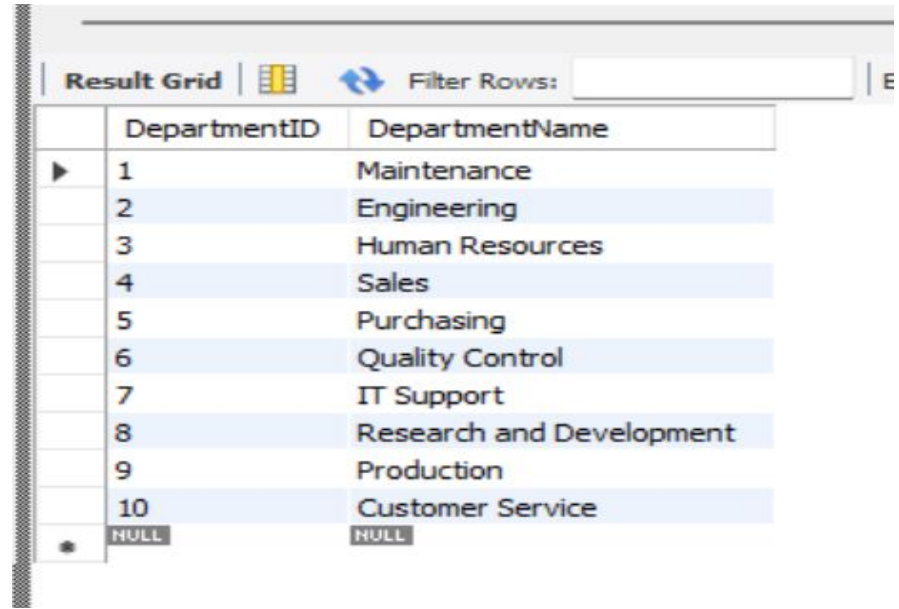


	Name	Contact	Location
▶	Reliable Electronics	-5555	Boston City
*	NULL	NULL	NULL

Inserting data into Department table:

INSERT INTO Department (DepartmentID, DepartmentName) VALUES

(1, 'Maintenance'),
(2, 'Engineering'),
(3, 'Human Resources'),
(4, 'Sales'),
(5, 'Purchasing'),
(6, 'Quality Control'),
(7, 'IT Support'),
(8, 'Research and Development'),
(9, 'Production'),
(10, 'Customer Service');



	DepartmentID	DepartmentName
▶	1	Maintenance
	2	Engineering
	3	Human Resources
	4	Sales
	5	Purchasing
	6	Quality Control
	7	IT Support
	8	Research and Development
	9	Production
	10	Customer Service
•	NULL	NULL

Inserting data into Employee table:

INSERT INTO Employee (EmployeeID, FirstName, LastName, DepartmentID, Skill, AssignedLocationID) VALUES

(1, 'John', 'Smith', 1, 'Carpenter', 105),
(2, 'Jane', 'Doe', 1, 'Electrician', 102),
(3, 'Mike', 'Johnson', 1, 'Plumber', 103),
(4, 'Emily', 'Davis', 1, 'Painter', 104),
(5, 'Robert', 'Brown', 1, 'Welder', 105),
(6, 'Laura', 'Wilson', 1, 'Electrician', 101),
(7, 'Kevin', 'Moore', 1, 'Plumber', 102),
(8, 'Sarah', 'Taylor', 1, 'Carpenter', 103),
(9, 'David', 'Anderson', 1, 'HVAC Technician', 104),
(10, 'Lisa', 'White', 1, 'Maintenance Manager', 105);

Result Grid						
Filter Rows:						
Edit: Export/Import: Wrap Cell Cc						
	EmployeeID	FirstName	LastName	DepartmentID	Skill	AssignedLocationID
▶	1	John	Smith	1	Carpenter	105
	2	Jane	Doe	1	Electrician	102
	3	Mike	Johnson	1	Plumber	103
	4	Emily	Davis	1	Painter	104
	5	Robert	Brown	1	Welder	105
	6	Laura	Wilson	1	Electrician	101
	7	Kevin	Moore	1	Plumber	102
	8	Sarah	Taylor	1	Carpenter	103
	9	David	Anderson	1	HVAC Technician	104
	10	Lisa	White	1	Maintenance Manager	105
*	NULL	NULL	NULL	NULL	NULL	NULL

Query



SQL queries are essential for interacting with the database, allowing us to retrieve, manipulate, and manage data efficiently."

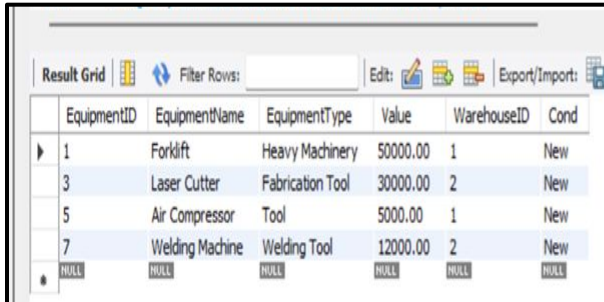
"They enable us to perform various operations, such as filtering records, joining multiple tables, and aggregating data to generate meaningful reports

In this project, SQL queries were used to extract valuable insights and process non-routine requests, demonstrating the database's practical functionality."

Query 1

List equipment with a specific condition (e.g., 'New')

SELECT * FROM Equipment WHERE Cond = 'New'



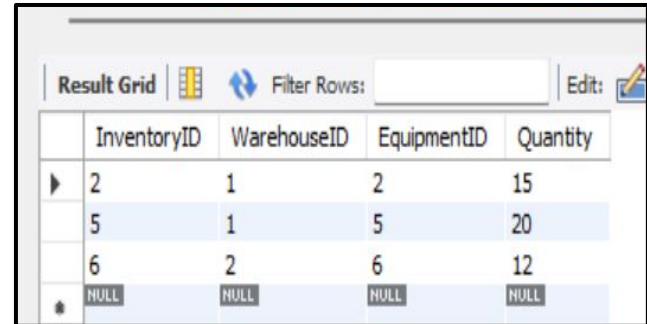
The screenshot shows a database interface with a 'Result Grid' tab selected. The grid displays the results of a query filtering for equipment with a condition of 'New'. The columns are EquipmentID, EquipmentName, EquipmentType, Value, WarehouseID, and Cond. There are five rows of data, all with 'New' in the Cond column. The first row is highlighted with a blue background.

	EquipmentID	EquipmentName	EquipmentType	Value	WarehouseID	Cond
▶	1	Forklift	Heavy Machinery	50000.00	1	New
	3	Laser Cutter	Fabrication Tool	30000.00	2	New
	5	Air Compressor	Tool	5000.00	1	New
	7	Welding Machine	Welding Tool	12000.00	2	New
*	NULL	NULL	NULL	NULL	NULL	NULL

Query 2:

List inventory items with quantity in stock greater than a than a certain number (e.g., 10)

SELECT * FROM Inventory WHERE Quantity > 10;



The screenshot shows a database interface with a 'Result Grid' tab selected. The grid displays the results of a query filtering for inventory items with a quantity greater than 10. The columns are InventoryID, WarehouseID, EquipmentID, and Quantity. There are four rows of data, all with quantities greater than 10. The first row is highlighted with a blue background.

	InventoryID	WarehouseID	EquipmentID	Quantity
▶	2	1	2	15
	5	1	5	20
	6	2	6	12
*	NULL	NULL	NULL	NULL

Query3. List all employees who have checked out equipment but have not returned it yet, along with the equipment details.

```
SELECT e.FirstName, e.LastName, ec.CheckoutDate, ec.DueDate, eq.EquipmentName, eq.EquipmentType
FROM EquipmentCheckout ec
JOIN Employee e ON ec.EmployeeID = e.EmployeeID
JOIN Equipment eq ON ec.EquipmentID = eq.EquipmentID
WHERE ec.IsReturned = FALSE;
```

Result Grid						
	Filter Rows:		Export:		Wrap Cell Content:	
	FirstName	LastName	CheckoutDate	DueDate	EquipmentName	EquipmentType
▶	Jane	Doe	2024-08-02	2024-08-16	Conveyor Belt	Production Equipment
	Robert	Brown	2024-08-05	2024-08-19	Air Compressor	Tool
	Sarah	Taylor	2024-08-08	2024-08-22	CNC Machine	Precision Tool

MODULE 5



What is Normalization?

Normalization: It is the process of organizing a database to minimize redundancy and improve data integrity by dividing it into related tables.

- **1NF (First Normal Form):** A table is in 1NF if all its columns contain atomic (indivisible) values and each column contains values of a single type.
- **2NF (Second Normal Form):** A table is in 2NF if it is in 1NF and all non-prime attributes are fully functionally dependent on the candidate key..
- **3NF (Third Normal Form):** A table is in 3NF if it is in 2NF and all the columns are only dependent on the primary key, eliminating any transitive dependency.
- **Boyce-Codd Normal Form (BCNF):** A table is in BCNF if it is in 3NF and for every functional dependency, the left side is a superkey, addressing certain types of anomalies not handled by 3NF.



Employee Table

Functional Dependencies:

- EmployeeID → FirstName, LastName, DepartmentID, Skill, AssignedLocationID
- DepartmentID → DepartmentName
- AssignedLocationID → LocationName, Address

EmployeeID is a candidate key and determines all other attributes.

The table is in 1NF because it uses atomic values.

It is in 2NF because there are no partial dependencies (all non-key attributes depend on the whole key).

To be in BCNF, every determinant should be a candidate key. Here, DepartmentID and AssignedLocationID are not candidate keys, but they do not violate BCNF because they are not part of the same table with partial dependencies.

Equipment Table

Functional Dependencies:

- EquipmentID → EquipmentName, EquipmentType, Value, WarehouseID, Cond
- WarehouseID → WarehouseName, LocationID, Capacity

The table is in 1NF (atomic values).

The table is in 2NF (no partial dependencies).

It is in BCNF because EquipmentID is a candidate key and determines all other attributes.



Inventory Table

Functional Dependencies:

- Inventory ID \rightarrow Warehouse ID, EquipmentID, Quantity
- Warehouse ID \rightarrow Warehouse Name, LocationID, Capacity
- Equipment ID \rightarrow EquipmentName, Equipment Type, Value, WarehouseID, Cond

Normalization:

- The table is in 1NF (atomic values).
- The table is in 2NF (no partial dependencies).
- The table is in BCNF because Inventory ID is a candidate key and determines all other attributes.

Warehouse Table

Functional Dependencies:

- WarehouseID \rightarrow WarehouseName, LocationID, Capacity
- LocationID \rightarrow LocationName, Address

Normalization:

- The table is in 1NF (atomic values).
- The table is in 2NF (no partial dependencies).
- The table is in BCNF because WarehouseID is a candidate key and determines all other attributes.



Conclusion

- After implementing the required database and automated solutions, Reliable Electronics successfully addressed the key issues.
- The new equipment checkout system provided real-time tracking of tools and equipment, significantly reducing losses and ensuring that items are returned promptly.
- The improved warehousing system streamlined inventory management, making it easier for employees to locate and access the necessary supplies, regardless of location.
- As a result, the company not only curbed excessive inventory costs but also enhanced overall operational efficiency, enabling maintenance staff to complete their tasks more effectively.
- These changes led to substantial cost savings and improved productivity within the maintenance department, positioning Reliable Electronics for continued success.



**THANK
YOU**