CS 4347 Semester Project: Small Airport Company Database System

Project Description

This project implements a relational database system for a fictional small airport company. The database is designed to manage employees, departments, interview and application processes, product sales, marketing sites, and vendor-part supplies. It supports complex queries and analytical views, and ensures data integrity through relational constraints and normalization.

Name

- **Cheryl De Mello**

EER Diagram & Schema Design

- An Enhanced Entity-Relationship (EER) diagram was used to model the real-world entities and relationships.
- The diagram includes superclasses and subclasses, one-to-many and many-to-many relationships.
- Superclass/subclass modeling was used for `PERSON`, with specializations for `EMPLOYEE`, `CUSTOMER`, and `INTERVIEWER`.

Tables Created

1. `PERSON`
2. `PHONE`
3. `EMPLOYEE`
4. `EMPLOYEE_DEPARTMENT_ASSIGNMENT`
5. `RANK_TABLE`
6. `DEPARTMENT`

7. JOB_POSITION
8. APPLICATION
9. INTERVIEW
10. INTERVIEW_EVALUATION
11. PRODUCT
12. SALE
13. MARKETING_SITE
14. PART_TYPE
15. PRODUCT_PART_USAGE
16. VENDOR
17. VENDOR_PART_SUPPLY
18. SALARY_PAYMENT

Views Implemented

1. View_AvgMonthlySalary
2. View_IntervieweesPassed
3. View_SalesPerProductType
4. View_EmployeesAllDepartments
5. View_ProductCost

Key Queries Demonstrated

- Highest average monthly salary
- Interviewers who evaluated a candidate
- Departments with no job postings
- Employees with no supervisees
- Candidates selected for all applied jobs
- Products with highest profitability
- Sites with no sales
- Employees working in all departments

Five Additional Likely Business Rules

1. An employee cannot supervise more than 10 people – to maintain manageable team sizes.
2. Candidates cannot apply for more than 5 open jobs at a time – to prevent spam applications.
3. Vendors must offer at least one part under $50 – to keep vendor costs competitive.
4. Each interview must be evaluated by at least 3 interviewers – to ensure fair judgment.
5. A department must post at least one job every 6 months – to promote internal growth.

Importance of Superclass/Subclass Modeling

Yes, modeling superclass/subclass relationships is crucial in this environment. For example:

- `PERSON` is a general entity that can represent `EMPLOYEE`, `INTERVIEWER`, or `CUSTOMER`.
- This design reduces redundancy and improves clarity.
- It allows shared attributes like `Name`, `Address`, and `Email` to be centralized, while role-specific attributes are handled in subclasses.

Justification for Using Oracle (or any Relational DBMS)

- Data Integrity: Enforces constraints like primary keys, foreign keys, and check constraints.
- Query Power: SQL enables powerful queries and analytics, such as nested subqueries and views.
- Security: Oracle supports granular access control, essential in HR and sales systems.
- Scalability: Oracle handles large volumes of data and can scale as the company grows.
- Standardization: Relational models are well-understood, making onboarding and maintenance easier.

Conclusion

This project demonstrates the design, implementation, and use for a robust relational database tailored to the needs of a small airport company. It supports important operations, reporting, and analytics while maintaining data consistency and scalability.