Used-Car Sale Database Design

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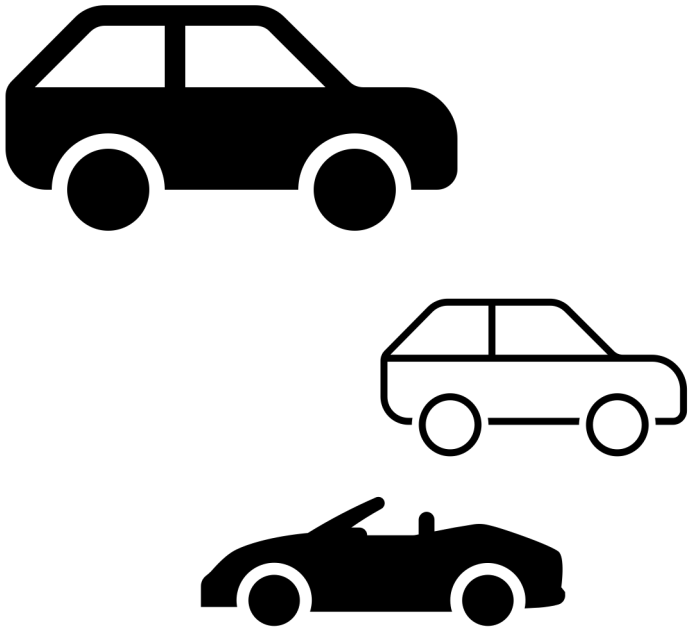
Objectives

- Database Purpose
- Business Objectives
- Business Rules
- Entity Relationship Diagram
- Database Implementation (Codes)
  - DDL (Schema & Entity), DML (Data Insert)
  - Views
  - Sever-side Modules
- Reports
- Conclusion & Potential Improvements

Database Purpose

- Track and report on used-car sales
- Contains following information:
  - Car
  - Users
  - Sales
- Main clients:
  - Customers
  - Seller
  - Administrator



Business Objectives

- Allow Customers to choose from a variety market
- Supply insights and potential customer info to sellers
- Provide data report on different manufacturers for market researches
- Prevent fraud on used-car sales

Business Rules

User Related:

- Customers are able to store multiple records of preferences
- Sellers must belong to a dealership or be an individual seller

Car Related:

- A car must hold a valid inspection report before entering the market.
- Every Car may have its own specifications like color, model, body style & manufacturer.

Business Rules

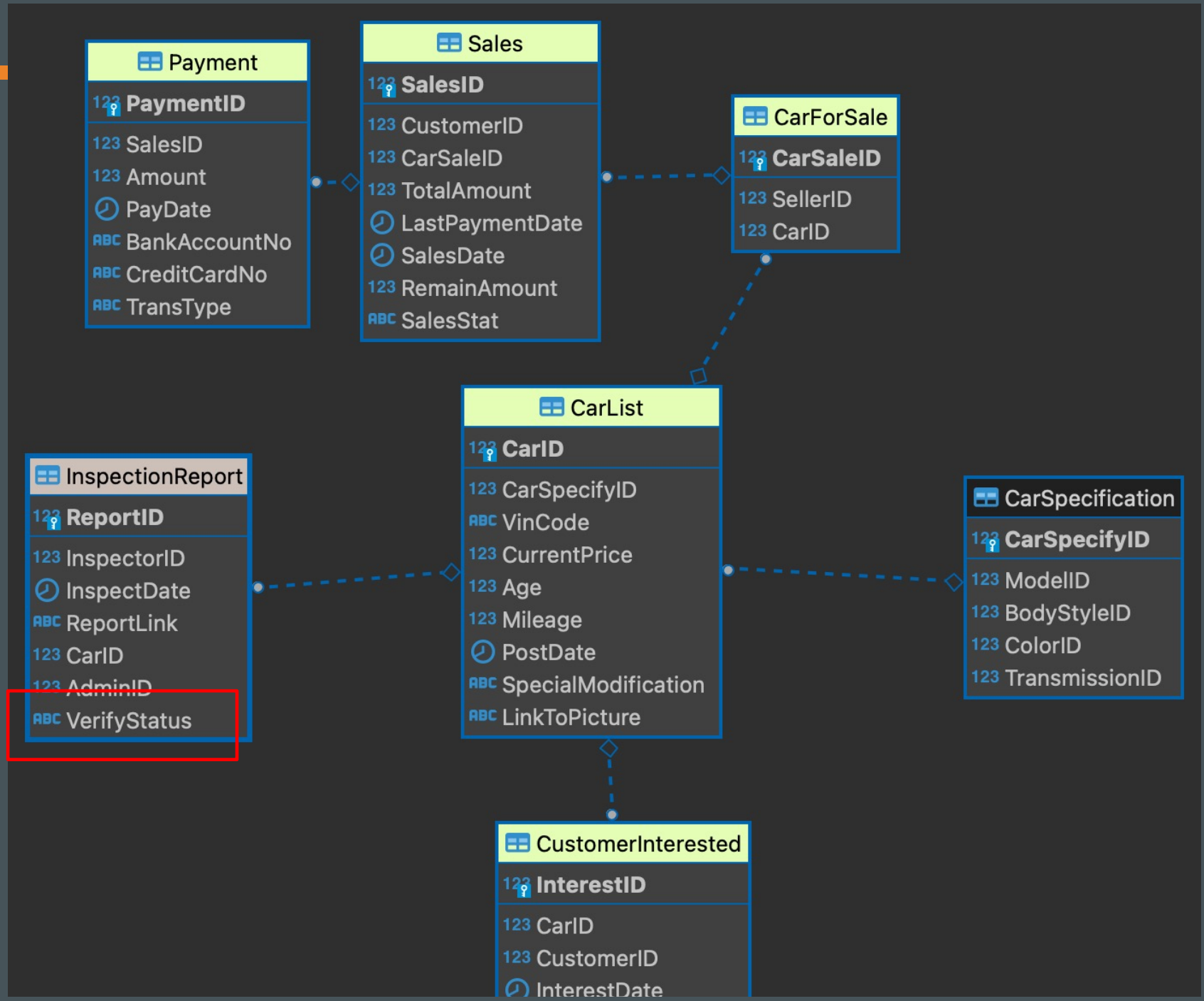
Sales Related:

- A car can be sold by multiple sellers, but it can only be related to one sales record.
- Customers can purchase multiple cars, but each car requires a separate record.

Admin Related:

- Daily encryption on credential info will be performed.
- A fraud report is created whenever a record is inserted.

Entity Relationship Diagram



Database Implementation
--DDL & DML

- Data Definition Language (DDL)
  - Create schemas (5) & tables (24)
    - Primary Key, Foreign Key, Index
    - Column-Level Constraints
      - NULL check, and condition to constrain values
  - Server-side modules (Functions, Trigger, …)
- Data Manipulation Language (DML)
  - Real Data (ex: Manufacture, Car Specification)
    - Using JDBC API via Java program
  - Virtual Data
    - Randomly selecting values
    - Using INSERT statement, or import from csv

Database Implementation --Server-Side Modules

- Functions (6)
  - To use a computed column
  - To use a table-level check constraint
- Computed Column (2)
  - Calculating remain amount of payment
  - Calculating sales status (ex: Processing, Completed)
- Table-Level Check Constraint (4)
  - Check car sold status
  - Check sale duplication
  - Check inspection verify status
  - Ensure correct payment information

Database Implementation --Server-Side Modules

- Data Encrypt (2)
  - Encrypt bank account number and credit card number
- Stored Procedures (2)
  - Daily performance to encrypt inserted payment records
  - Fraud related report tables generate.
- Trigger (2)
  - Update last payment data
  - Generate fraud related report

Database Implementation --Views

- Customer Car Preference
  - Allow sellers to find potential customers
  - Allow dealerships to make marketing plan
- Customer Personal Info
  - For payment contact.
  - For seller contact.
- Sold Car
  - For manufacture & dealerships to perform market researches

Reports


jul aug sep oct nov dec
feb mar apr may jun jul aug sep oct nov dec
125,058
125,487
124,000
105,450
86,502
154,568
56,845
110,000
150,000
35,000
83,000
95,054
97,511
99,011
99,216
101,090
101,684
101,962
102,747
124,500
125,000
154,000
95,000
154,200
110,000
89,000
50,000
68,700
123,000

Potential Improvement

- Simplify function algorithms
- A more solid business rule with fraud reports
- More application on customer interest & customer preference
- Optimize the relationship.

References

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- ContactInfo
  - Reference: https://cran.r-project.org/web/packages/generator/generator.pdf
- Customer, Seller, Administration, Dealership
  - Reference: https://cran.r-project.org/web/packages/randomNames/randomNames.pdf