**Project Report: Courier Database Management System**

Project Summary:

This project focuses on designing a database for a Courier delivery organisation. Large chunk of data is gathered by courier companies right from start (pickup) to transportation and till final delivery. This data includes important details about customer, type of package, target location etc. Hence, there are numerous number of data records for different type of parcels and there is a need to effectively manage this data by building a database where all relevant information can be stored.

The database system proposed by us in this report records information in different tables as can be seen in the ERD diagram. This diagram is prepared in the analysis phase of project as per the business requirement of such courier companies. This proposal basically incorporates three important aspects of courier delivery i.e. Status tracking, Route chosen and pricing information. First table, customer incorporates details like customer address i.e. source destination. This help us courier company to build database of its customers. Second table, parcel details generates a unique ID for package using which it’s pricing and status can always be tracked. From automation prospective, tables like standard rate and pricing are incorporated in design as they will help the company officials in automatic calculation of price.

Since courier companies business are spread across the cities it is important to maintain their warehouse details present in each city. On other hand, tables like route details & route chosen are mapping various target destinations (zipcodes) covered by the warehouse so package gets delivered to the right place. From tracking prospective tables like status will give details like reasons of failure. This system would be structured in a way that all the information will be in table format whether it is the warehouse details info or the route chosen info etc. The purpose of this system is to increase automation and reduce manual effort by giving features like price calculation, self-tracking of parcel.

Important points and features that this design incorporates are as mentioned below:

* Total distance to be covered will be calculated on basis of source and target zipcodes.
* 3 types of delivery type can be chosen (Normal, speed and express).
* Pricing information will be calculated on basis of delivery type chosen, total weight of package and total distance to be covered.
* Route will be chosen on basis of zipcodes covered by the warehouse.

This report includes details about the design of proposed database system in form of entity relationship diagram (ERD). All tables in this database system have been mentioned along with their functional description and usage. Metadata of tables (key, attributes and fields) have been described in the section of entities and attributes. This report address the needs of the courier company in form of business rules and contains all relevant information that may be required by the users of this system.

Entities and their Attributes:

|  |  |
| --- | --- |
| Objects | Description |
|  |  |
| Table 1. Customers | Maintaining customers details of each and every customers |
| a. customerID | Primary key/Unique identifier of the customer |
| b. customerFirstname | Customer First Name |
| c. customerLastname | Customer Last Name |
| d. customerEmail | Customer Email |
| e. customerPhone | Customer Phone |
| f. customerStreetno | Address (street no) where customer lives |
| g. customerCity | Address (city) where customer lives |
| h. customerState | Address (state) where customer lives |
| i. customerZipcode | Address (zipcode) where customer lives --> Source Zipcode |
|  |  |
| Table 2. Parcel | Maintaining Parcel details of each and every package |
| a. packageID | Primary key/Unique identifier of the courier/package to be sent |
| b. packageWeight | Total Weight of Package --> will decide cost |
| c. packageDistance | Total distance to be covered by Package --> will decide cost & calculated on basis of source and target Zipcode |
| d. TargetPhone | Customer Phone |
| e. TargetStreetno | Address (street no) where package needs to be delivered |
| f. TargetCity | Address (city) where package needs to be delivered |
| g. TargetState | Address (state) where package needs to be delivered |
| h. TargetZipcode | Address (zipcode) where package needs to be delivereds --> Target Zipcode |
| i. customerID | Foreign key to identify customer to which package belongs |
|  |  |
| Table 3. StandardRates | Determing rates that will be applicable depend on type of delivery choosen |
| a. rateID | Primary key/Unique identifier of the standard rate table |
| b. deliveryType | Type of Delivery --> Normal, speed, Express |
| c. deliveryTyperate | Type of Delivery price rate |
| d. unitWeightprice | Price charged per lb weight size |
| e. distancePrice | Price per mile |
|  |  |
| Table 4. Pricing | This table indicates final price of package |
| a. packageID | Foreign Key,Primary key for the pricing |
| b. totalWeightprice | Total weight price = unitWeightprice\*packageWeight |
| c. totalDistanceprice | Total distance price = packageDistance\*Distanceprice |
| d. deliveryTypeprice | Type of Delivery price rate |
| e. Totalprice | Total price = Total weight price + Total distance price + deliveryTypeprice |
| f. rateID | Foreign key to identify rateID from standard rate table |
|  |  |
| Table 5. Warehouse Details | This table indicates warehouse details of company in a city |
| a. warehouseID | Primary key/Unique identifies warehouse |
| b. warehouseName | Name of the warehouse |
| c. warehouseStreet | Address (street no) of warehouse |
| d. warehouseCity | Address (city) of warehouse |
| e. warehouseState | Address (state) of warehouse |
| f. warehouseZipcode | Address (zipcode) of warehouse |
|  |  |
| Table 6. Route Details | This table indicates warehouse details of company in a city |
| a. RouteID | Primary key/Unique identifier of the route table |
| b. warehouseID | Foreign key to identify warehouseID from warehouse details |
| c. zipcodeCovered | Address (street no) of warehouse |
|  |  |
| Table 7. Route Choosen and  status tracking | This table indicates route that be choosen (i.e. package would be going to which warehouse) and status of package |
| a. packageID | Foreign Key,Primary key for this table |
| b. RouteID | Foreign key to identify route choosen |
| c. Status | To indicate final status of package --> To warehouse, reached warehouse, Delivered, Not Delivered |
| d. Reason of Failure | If package not delivered then reason of failure |
|  |  |

ERD:



Business Rules:

1. Route will be chosen based on the zipcodes covered by warehouse mentioned in the table Route details.
2. Depending on standard rates, pricing of the package will be decided.
3. Delivery type of parcel can be of 3 different types i.e. normal, speed and express
4. Every package will have a single pricing based on the total distance, total weight and delivery type chosen.
5. In status tracking table, if package status is a failure then field reason of failure needs to be updated.
6. One customer can send one or more packages to different destination.
7. Every package would have a unique id based on which its status can be tracked and pricing can be seen.

Major Data Questions:

1. What are the different reasons for failure of a package delivery?
2. What are the different type of status that can be shown for the package like not delivered, on the way to warehouse?
3. How many total no of route where the courier company operates and can delivers package?
4. Can the target destination customer details are also collected and recorded by the company?
5. Any changes in standard rate card will automatically adjust the pricing calculated for the package?