DATABASE DESIGN DOCUMENTATION

**TABLE OF CONTENTS**

**Page**

1. **Introduction……………………………………………………………………………………. 3**
2. **Design Choices ………………………………………………………………………………4-5**
3. **Common Tables**
   1. Users……………………………………………………………………………………. 6
   2. Branch …………………………………………………………………………………..7
   3. Car………………………………………………………………………………………. 8
   4. CarType ………………………………………………………………………………… 9
   5. Reservations……………………………………………………………………………10
   6. Extra Fees…………………………………………………………………………… 10
4. **ERD ……………………………………………………………………………………………. 11**

**Introduction:**

We are designing a relational database for a Car Rental system to support the operations of a car rental agency. Things to note/requirements to create this database:

* Each branch maintains a queue of all existing cars, and car types.
* The car rental agency maintains a list of all their customers
* Reservation can be done at any branch.
* Each customer can rent a car and return it to the same branch or any other branches in Canada for an additional fee.
* If a car is returned to another branch it will be included in the returned branch queue of available cars.
* Car rental can be done on a daily, weekly or monthly basis.
* Each rental category has its own pricing based on the car type.
* If a customer has a Gold star membership with the rental agency, they will be eligible for free upgrades in case the car type selected is not available. Returning cars to different branches will be free of charge for gold membership customers.
* Gold membership is granted automatically if a user rent at least 3 times in the same year.
* Late fee is applied in case a customer returns a car later than the reservation return date

**COMMON TABLES/ DATABASE DESIGN**

Design Choices:

The first step of the database design was to realize the various types of users of this database in which case we were presented with 2 outcomes:

1. An employee/Admin who would process car returns and rentals
2. A Client/Customer who would request cars, and be able to register new accounts into the database as a Client

We broke down the requirements into seven tables which would satisfy the basic conditions of the request:

1. Users would contain all information pertaining to the users of the database (such as phone number, address, etc)
2. Car would contain necessary information pertaining to a specific car (starting with individual cars) such as color, make, model, and its status (whether it was currently used, in rental, or in repair).
3. CarType we decided is an ‘archetype’ of char, upon which contains more general information about the vehicle that we can classify vehicles under, such as SUV versus a sedan or a truck. We decided that each car type would have its own base price, thus we made price attributes attached to the CarType
4. For the Branch table, we decided we didn’t need much information about the branch other than a unique Branch ID, and its location (as a string, as IDs are hard for human eyes to read).
5. Reservations contains only information it needs to make the reservation, such as the start date and end date, the total pricing, and lastly the user ID attached to the reservation
6. ExtraFees is an additional table that we decided upon creating, to account for the state the vehicle rented was returned in. If it was damaged and unserviceable, we would charge the Client extra fees.

EXTRA DESIGN CHOICES

* We decided that each branch should have its own branch ID, to account for in the future if there were various branches within the same city ( *as opposed to being forced to have 1 branch per city),* thus also allowing queries to be accurate even if this was changed in the future
* Due to the varying choices of the car, we based prices based on the type of vehicle (sedan vs SUV for example) to account for differing prices
* We made an extra table/relation for the Car Model, which has the attributes **daily price, weekly price and monthly price** where the price can vary based on whether the user wants to rent for a few days, a few weeks, or even a few months.
* We have an extra fee table, to account for the state that the car was returned in. If it was returned with either low gas, unserviceable condition, we would add fees to the Client that was renting the vehicle

**COMMON TABLES**

These are tables that are used consistently throughout the database. These tables are related to the two groups mentioned in the design choices: Admins and Clients.

**USERS**

This is the table that the majority of all our other tables operate under, as we MUST have a Client or Admin in order to process requests or allow users to view their current status. This is our largest table, due to the amount of data that we collect on the user (although some fields are optional to fill, we do want accurate information for the Client for example in case we need to contact them).

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Column Name** | **Type** | **Descriptive**  **Name** | **Valid**  **Values** | **Index**  **Column** | **Allow**  **Nulls** | **Description** |
| User ID | uniqueidentifier | User ID |  | Unique  Primary Key | No | This field is a unique GUID to identify the current user. This identifier is the persons record |
| Total Year Rent | nchar(50) | # of times user rented this year | 1-50 |  | Yes | This field represents the total times user rented vehicles this year. This can be null due to a client not renting yet, just signed up. |
| username | nvarchar(50) | Account username | any |  | No | The account username of the user |
| password | nvarchar(50) | Account password | any |  | No | The account password of the user |
| First Name | nchar(50) | User’s First Name | any |  | No | The first name of the user |
| Last Name | nchar(20) | User’s Last name | any |  | No | The last name of the user |
| Address | nchar(100) | User’s Address | any |  | No | The address of the user |
| CreditCardNum | bigint | User’s Credits # | 1-2^63 |  | yes | The users credit card |
| Phone | nvarchar(15) | User’s Phone # | 1-9 |  | yes | The user’s phone number |
| Gold | bit | Gold membership qualification | 1 or 0 |  | No | Determines whether the user has gold membership qualification or not |
| Role | nvarchar(50) | The role of the user in the database | Client or Admin |  | no | Contains the role of the user in the database, in order to display the proper forms |

**BRANCH**

This table merely deals with the branch ID and the location of the branch, which is used in our other data tables to create reservations or create reports.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Column Name** | **Type** | **Descriptive**  **Name** | **Valid**  **Values** | **Index**  **Column** | **Allow**  **Nulls** | **Description** |
| Branch\_ID | Uniqueidentifier | Branch ID |  | Unique  Primary Key | No | The GUID of the branch associated to the location |
| Location | nvarchar(20) | Location of Branch | Edmonton, West Edmonton |  | No | The location associated to the branch |

**CAR**

This table contains all information pertaining to the specific vehicle specifications, such as color, make, status, the type of vehicle, and if it is in current use by a certain user

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Column Name** | **Type** | **Descriptive**  **Name** | **Valid**  **Values** | **Index**  **Column** | **Allow**  **Nulls** | **Description** |
| VehicleID | uniqueidentifier | Vehicle ID |  | Unique Primary Key | No | the specific vehicles identifier |
| Color | varchar(50) | Vehicle Color | Red, Blue |  | yes | The color of the vehicle |
| Model | varchar(50) | Vehicle Model | Model-S F-150 |  | yes | The model of the vehicle |
| Make | varchar(10) | Vehicle Make | Ford,Tesla,Toyota |  | yes | The maker of the vehicle |
| Status | int | Vehicle Status | 0,1,2 |  | yes | 0 = available 1 = in use/rented 2 = in repairs |
| [Type of Vehicle] | varchar(50) | Car frame of Vehicle | sedan,SUV, truck | Unique Foreign Key | no | The frame of the vehicle |
| UserID | uniqueidentifier | Current User ID of Vehicle |  | Unique Foreign Key | Yes | The user id of the user renting this vehicle (if it is being rented currently) |

**CARTYPE**

This table addresses the pricing of the type of vehicle (a truck should be in a different pricing bracket versus say a mustang). We break down this pricing into three possible ways (based on the amount of time a user can rent a vehicle):

1. Daily Pricing for anything less than a week
2. Weekly Pricing for anything less than a month, but more than a single week
3. Monthly Pricing for anything more than a week

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Column Name** | **Type** | **Descriptive**  **Name** | **Valid**  **Values** | **Index**  **Column** | **Allow**  **Nulls** | **Description** |
| [Type of Vehicle] | varchar(50) | The vehicle frame | Sedan, suv, truck | Unique Primary Key | No | The frame of the vehicle (e.g. truck, suv) |
| [Daily Price] | money | Day to day price | $75-300 |  | Yes | The daily price to rent the vehicle |
| [Weekly Price] | money | Weekly price | $100-500 |  | Yes | The weekly price to rent the vehicle |
| [Monthly Price] | money | Monthly price | $500-9999 |  | Yes | The monthly price to rent the vehicle |

**EXTRA FEES**

This table addresses any extra fees we may encounter due to the state of the vehicle when it was returned. This includes late fees, damage fees, and the price associated with each of these fees. The database can accomodate for any newly introduced fees in case the Car Rental owners so choose.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Column Name** | **Type** | **Descriptive**  **Name** | **Valid**  **Values** | **Index**  **Column** | **Allow**  **Nulls** | **Description** |
| [Types of Fees] | varchar(10) | The different types of fees | Late (fee), damage (fee) | Unique Primary Key | Yes | The Types of extra fees the owners may consider adding |
| Price | money | Fee price | $50 - 9999 |  | Yes | The price associated to the specific fee |

**RESERVATIONS**

This table contains all the information needed to create a car reservation/rental request at the behest of the client. The admins will use this table to process the reservation and handle the return of the vehicle, while the Client will only need to request a reservation. This reservation depends on the Branch ID, Vehicle ID and User ID from our other tables. This equates to the reservation table being dependant on our other tables

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Column Name** | **Type** | **Descriptive**  **Name** | **Valid**  **Values** | **Index**  **Column** | **Allow**  **Nulls** | **Description** |
| ReservationID | uniqueidentifier | Reservation’s ID |  | Unique Primary Key | No | The ID of this instance of the reservation |
| [Start Date] | smalldatetime | Starting date | YYYY-MM-DD |  | Yes | The start date of the reservation |
| [End Date] | smalldatetime | Starting  date | YYYY-MM-DD |  | Yes | The end date of the reservation |
| [Total Price] | money | Price of reservation | $130.00 |  | Yes | The total price of the reservation |
| BranchID | uniqueidentifier | Branch ID |  | Unique Foreign Key | No | The branch ID/branch the reservation was made at |
| VehicleID | uniqueidentifier | Vehicle ID |  | Unique Foreign Key | No | The ID of the requested vehicle |
| UserID | uniqueidentifier | User ID |  | Unique Foreign Key | No | The ID of the user making the reservation |

