**Database Design Project**

**CSCI 210**

1. **Introduction**

Bidex is an entrepreneur who has an interest in owning a car lot. Bidex just acquired a 15-acre land and is operating an impound there. This lot will store impounded vehicles, release the car to the registered owners or authorized personnel, and release the car to insurance once authorized by the owner. Also, this lot will auction cars that have not been picked up within 35 days of storing them.

Bidex has contracts will multiple tow truck companies that will help transport impounded cars. The business has a record of all the tow truck drivers that work for each tow truck company and the fees they are required to charge per tow.

When a car is brought in by a tow truck driver, information such as make, model, color, vehicle identification number, location of tow, and reason for a tow are used to store the car in the system. On the second day of storage, the business will send letters to the registered owner informing them of the location of their car and what they must do to get it out.

Bidex car lot has employees that work in various departments, employees in the dispatch department send information about cars that need to be towed to the available tow truck driver, and the lot attendant deals with storing the cars in the lot at their designed location and also taking customers to their cars when necessary, security department makes sure the lot and its environment are safe while the customer service representatives attend to customers and attend to incoming calls.

1. **Business Rules**
   * Discounts can be given to customers whose cars were stolen.
   * All contracted companies are responsible for the maintenance of their trucks.
   * Selling a car at the auction clears the fees owed.
   * There are no refunds after payment.
   * Vehicles that weigh above 10000 pounds will be charged as heavy duty.
   * Customers are responsible for paying the fees charged for the letter.
   * Checks should be sent to the owner of a car if it sells for more than the fees owed.
   * Drivers must upload pictures of extra services offered before their fees can be granted.
   * Cars are prepped for auction after 30 days.
   * Make, model, color, year, VIN, and location towed from are required for a car to be checked in.
   * The business provides tow trucks.
   * Dispatcher decides if a customer needs a tow truck or a flatbed.
   * Payments can be made online or in person.
2. **Entity Relationship Diagram**

**Diagram

Description automatically generated**

1. **Entity Relationship Diagram (Expanded)**

**Diagram, engineering drawing

Description automatically generated**

1. **Primary Key Table**

|  |  |
| --- | --- |
| **Entity** | **Primary** Key |
| Customers | customer\_ID, last\_name, first\_name |
| Cars | car\_VIN, car\_ID |
| Contracted\_Company | company\_name |
| Payment | receipt\_ID, customer\_ID,car\_ID |
| Extra\_Services | car\_VIN, company\_name |
| Auction | car\_VIN |

1. **Integrity Rules**

***Entity Integrity Rule*** – The primary key must exist, be unique, and cannot be null.

***Referential Integrity Rule*** – The foreign key may be null (if it isn’t part of the table’s primary key), but it must have a valid entry.

|  |  |  |  |
| --- | --- | --- | --- |
| **Entity** | **Entity Integrity** | **Referential Integrity** | **Comments** |
| Customers | The customer\_ID, last\_name, and first\_name are unique PKs and will not be null. | The customer entity does not contain an FK. | The customers' table fulfills entity integrity and does not have an FK for referential integrity. |
| Cars | The car\_VIN and car\_ID are unique (surrogate) PK and will not be null. | The entity cars do not contain an FK. | Cars fulfills entity integrity and do not have an FK for referential integrity. |
| Contracted\_Company | The company\_name is a unique PK, and it will not be null. | Contracted\_Company does not contain an FK. | Contracted\_Company fulfills entity integrity and does not have an FK for referential integrity. |
| Payment | The receipt\_ID, customer\_ID, and car\_ID are all unique PKs and will not be null. | The payment entity references the customer\_ID and car\_ID, valid from the customer table and cars table respectively. | Payment fulfills entity integrity. Payment fulfills referential integrity because the two FKs will be valid. |
| Extra\_Services | car\_VIN and company\_name are unique (surrogate) PKs and will not be null. | The Extra\_Services entity contains two FK’s –  car\_VIN, and company\_name They are both PKs for their tables and will be valid. | Extra\_Services fulfills entity integrity and also fulfills referential integrity because the two referenced FKs cannot be invalid. |
| Auction | The car\_VIN is a unique PK, and it will not be null. | The auction entity does not contain an FK. | Auction fulfills entity integrity and does not have an FK for referential integrity. |

1. **Definition of Relationships Table**

|  |  |  |  |
| --- | --- | --- | --- |
| Entity 1 | Entity 2 | Relationship | Cardinality |
| Customers | Cars | One customer may have zero or many cars. | 1:M |
| Customers | Payment | One customer may make zero or many payments. | 1:M |

|  |  |  |  |
| --- | --- | --- | --- |
| Entity 1 | Entity 2 | Relationship | Cardinality |
| Cars | Contracted\_Company | Many cars can be brought in by one company. | M:1 |
| Cars | Extra\_Services | One car may have zero or many extra services. | 1:M |
| Cars | Auction | Many cars may be sold in one auction.  In an auction, one or many cars can be sold. | M:1 |

1. **SQL Statements used to create table**

**create table customers (**

**customer\_ID integer primary key autoincrement,**

**customer\_name text not null,**

**address text not null,**

**phone\_number text not null);**

**create table cars (**

**car\_VIN text not null,**

**car\_make text not null,**

**car\_model text not null,**

**car\_year integer not null,**

**car\_ID integer,**

**primary key (car\_VIN, car\_ID ));**

**create table contracted\_company (**

**company\_name text not null primary key,**

**drivers text,**

**company\_address not null);**

**create table payment(**

**receipt\_ID integer ,**

**payment\_amount integer,**

**payment\_type text,**

**receipt\_date datetime not null default (datetime('now')),**

**customer\_ID integer not null references customers(customer\_ID),**

**car\_ID integer not null references cars(car\_ID),**

**primary key (receipt\_ID, customer\_ID, car\_ID));**

**create table auction(**

**car\_VIN text primary key not null not null references cars(car\_VIN),**

**auction\_date datetime,**

**auction\_fees numeric(8,4) not null,**

**auction\_type text not null);**

**create table extra\_services(**

**car\_VIN text not null not null references cars(car\_VIN),**

**reason text,**

**amount\_requested numeric(8,4) not null,**

**extraService\_type text,**

**company\_name text not null references contracted\_company(company\_name),**

**primary key (car\_VIN, company\_name));**

1. **Primary Keys in SQL Statements – highlighted in orange.**
2. **Database Populated with Five Records per Table**

**insert into customers**

**values ('10', 'Mark Sterling', '9 Iroquois Road','5879654889'),**

**('11', 'Mark United', '995 Brown Court','5879659874'),**

**('12', 'John Tuchell', '9966 Longbranch Dr.','3175659874'),**

**('13', 'Mason Mount', '242 Southampton Ave.','3172584874'),**

**('14', 'Kai Harvetz', '252 Lilac Street.','3173256987');**

**insert into cars**

**values ('1LNHM81V87Y600143','25','Lincoln','Town Car','2007'),**

**('4A3AA46G11E035323','26','Mitsubishi','Galant','2001'),**

**('SAJWA1C78D8V38055','27','Toyota','Camry','2002'),**

**('SAJWA1C78D8V38055','28','Jaguar','XJ','2013'),**

**('5J6RM4850CL703159','29','Honda','CR V EX','2012');**

**insert into contracted\_company**

**values ('Big Doug', 'Scott', '3 South St.'),**

**('First to Arrive', 'Gilbert','7971 South Division Drive'),**

**('Towing You','','9895 Saxon Dr.'),**

**('Hick','Tom','182 Catherine St.'),**

**('BJ Towing', 'Lee','182 Catherine St.');**

**insert into extra\_services**

**values ('SAJWA1C78D8V38055', 'Off the road','50','Winch','Hick'),**

**('SAJWA1C78D8V38055','Extra time','30','','First to Arrive'),**

**('4A3AA46G11E035323','Cleanup','30','Cleaning','BJ Towing'),**

**('1LNHM81V87Y600143','Extra time','30','', 'Big Doug'),**

**('5J6RM4850CL703159', 'Off the road','50','Winch','Towing You');**

**insert into auction(auction\_date,car\_ID,auction\_fees)**

**VALUES ('11/05/2022','25','2500'),**

**('11/11/2022','26','2000'),**

**('12/03/2022','27','1500'),**

**('11/15/2022','28','2500'),**

**('12/12/2022','29','3500');**

**insert into payment (receipt\_ID, car\_ID,customer\_ID,payment\_amount,payment\_type)**

**VALUES ('1235','27','11','327','Cash'),**

**('1236','25','10','127','Cash'),**

**('1265','26','12','227','Credit Card'),**

**('1239','29','13','333','Cash'),**

**('1289','28','14','27','');**