Your Online Junkyard Retailer

Project Design Document

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Executive Summary

PartsHound is an Internet used auto parts retailer. Customers are able to browse PartsHound's inventory through a web-browser and select the auto parts they wish to purchase. The inventory may be browsed by customers using filters that restrict searches to manufacturer's part number, part description, vehicle make, vehicle model, or vehicle year. Search results will show a small photo of the desired part along with part number, description, stock availability, weight, and purchase price.

Once suitable parts have been found, the user can request to purchase items placed in their shopping cart using an online payment method. Online payments are processed using PayPal's electronic funds verification.

Special parts requests are available to customers who are unable to find what they are looking for. If the part is unique to the industry, customers can complete a request form which will be emailed to PartsHounds staff to be handled manually. During the time that customers are waiting for a response, they may view the status of their request by logging into the website.

Each customer will have a unique online profile that allows them to view their purchasing history and pending shipments. The online customer profile keeps each customer's contact and shipping information so repeat purchases can be made without the need to reenter adress details.

PartsHound staff will maintain the online inventory through a web-browser. Staff can edit or delete any inventory item as well as add new inventory items. Staff may also update the shipping status on each customer's order as items are packaged and shipped out to their labeled address.

Domain Assumptions

The Internet retail system for PartsHound makes certain assumptions regarding the flexibility of overall environment.

Inventory

Inventory will be restricted to auto parts fitting cars, light trucks, and motorcycles. Inventory items are sold at a fixed price which is not open for negotiation. All stock

quantity will be initially set through the site administrator's interface. It will be assumed that the sale of each part reduces that part's stock quantity by a value of one.

It is also assumed that more than one part item may fit a particular vehicle. For instance, a headlight that fits a 2003 Ford F150 will also fit a 2004 Ford F150 as well as a 2003 F350.

Customers

Customers will have the option of separating the billing address from the shipping address. It is assumed that customers will have basic automotive knowledge allowing them to determine if the part in question is the correct part for their individual need.

Payment

Accepted forms of payment will be cash, cheque, or credit card. Customers paying with credit card will have their transactions processed through PayPal while customers paying with alternate forms will be prompted on where to send payment. Customers may apply multiple payment types to each individual purchase.

Shipping Costs

Shipping costs will be dependant upon the weight of each part item. There will be a calculated cost to ship items within North America based on the total weight of the combined purchased parts. Shipments will be packed in-house and sent via regular postal services.

Database Model

The PartsHound online retail system will utilize an SQL-compatible relational database.

ER Diagram

The following relational diagram is proposed for the PartsHound database:

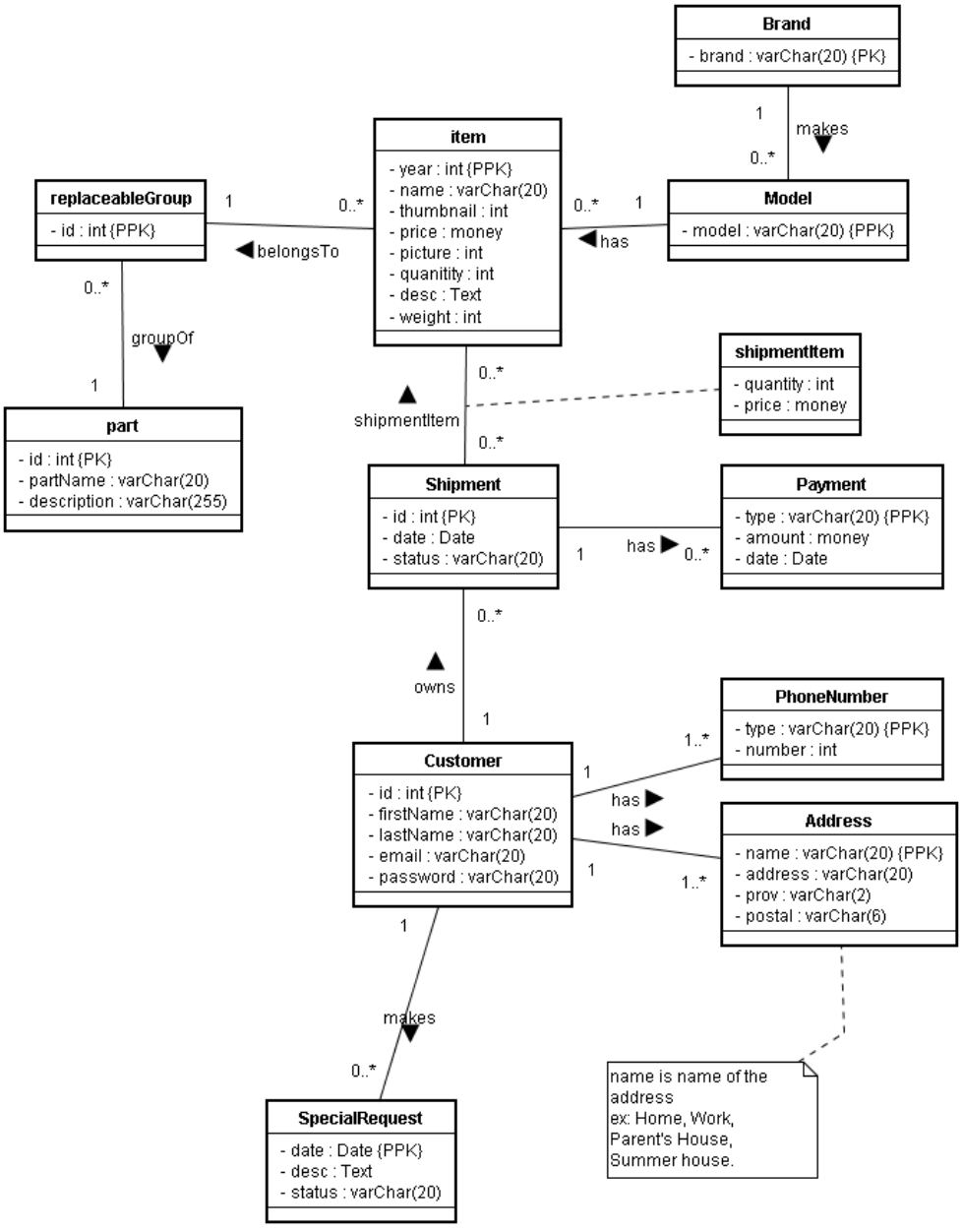

Figure 1 – ER Diagram for PartsHound

Relational Overview

Customer

The Customer relation assigns a unique identifier to each tuple along with storing the customer's first and last name, email address, and login password. The login password is stored in such a manner that the password can be verified from the stored data, but not recovered.

Each customer has multiple phone number and multiple address types stored in separate tables.

Item

Each item within the item relation corresponds to a tangible part. The relations stores the name, description, stock quantity, full-size graphic, thumbnail graphic, and purchase price of each item.

Part

Parts are essentially categories for items. For instance, headlights and bumpers would be considered parts, but a 2003 Ford F150 headlight would be considered an actual item.

ReplaceableGroup

The replaceableGroup relation stores the part compatibility information. For example, even though two different part items, created by two different manufacturers, were created for two different types of cars – it is possible that the two parts are interchangeable.

Shipment

Items are shipped out in a single shipment. The shipment relation stores which item was shipped on any given shipment.

ShipmentItem

Items that have been shipped are entered into the ShipmentItem relation. Each item shipped displays the quantity along with the price that was paid.

SpecialRequest

Occasionally, customers of PartsHound may not be able to find the part they are searching for. Such customers are able to issue special requests that are handled manually, however, customers are able to log into their account at any time to view the status of their pending request.

SQL DDL

The following SQL will create the required relations and attributes as described in figure 1.

```
CREATE TABLE Part(
      partId int NOT NULL,
      partName varChar(20),
      description varChar(255),
      PRIMARY KEY(partId))

CREATE TABLE Brand(
      name varChar(20),
      PRIMARY KEY(name))

CREATE TABLE Model(
      name varChar(20),
      brand varChar(20),
      PRIMARY KEY(name, brand),
      FOREIGN KEY(brand) REFERENCES Brand(name))

CREATE TABLE Item(
      brand varChar(20) NOT NULL,
      model varChar(20) NOT NULL,
      year int NOT NULL,
      name varChar(20),
      desc TEXT,
      relateId int NOT NULL,
      price money,
      quantity int,
      picture BLOB,
      thumbnail BLOB,
      weight int,
      PRIMARY KEY(brand, model, relateId, year),
      FOREIGN KEY(relateId) REFERENCES ReplaceableGroup(id),
      FOREIGN KEY(brand) REFERENCES Brand(name),
      FOREIGN KEY(model) REFERENCES Model(name))

CREATE TABLE ReplaceableGroup(
      id int NOT NULL,
      partId int,
      PRIMARY KEY(id),
      FOREIGN KEY(partId) REFERENCES part(id))

CREATE TABLE Shipment(
      id int NOT NULL,
      date Date,
      status varChar(20),
      customerId int,
      PRIMARY KEY(id),
      FOREIGN KEY(customerId) REFERENCES Customer(id))
```

```
CREATE TABLE Payment(
      type varChar(20),
      shipId int,
      amount money,
      date Date,
      PRIMARY KEY(type, shipId),
      FOREIGN KEY(shipId) REFERENCES Shipment(id))

CREATE TABLE ShipmentItem(
      itemId int NOT NULL,
      shipId int NOT NULL,
      quanitity int,
      price money,
      PRIMARY KEY(itemId, shipId),
      FOREIGN KEY(itemId) REFERENCES Customer(id)
      FOREIGN KEY(shipId) REFERENCES Shipment(id))

CREATE TABLE Customer(
      id int NOT NULL,
      firstName varChar(20),
      lastName varChar(20),
      email varChar(20),
      password varChar(20),
      PRIMARY KEY(id));

CREATE TABLE PhoneNumber(
      type varChar(20) NOT NULL,
      customerId  int NOT NULL,
      number int,
      PRIMARY KEY(type, customerId),
      FOREIGN KEY(customerId) REFERENCES Customer(id))

CREATE TABLE Address(
      name varChar(20) NOT NULL,
      customerId  int NOT NULL,
      address varChar(20),
      prov varChar(20),
      postal varChar(6),
      PRIMARY KEY(name, customerId),
      FOREIGN KEY(customerId) REFERENCES Customer(id))

CREATE TABLE SpecialRequest(
      Date DATE,
      customerId INT,
      desc TEXT,
      status VARCHAR(20),
      PRIMARY KEY(customerId, Date),
      FOREIGN KEY(customerId) REFERENCES Customer(id))
```

User Interface

The user interface will be delivered completely by HTML via Java Server Pages technology. Any web-browser capable of rendering HTML 4.01 may be used to participate in the PartsHound's online retail system.

The electronic funds payment process will be handled entirely by PayPal and therefore will comprise of a different user interface from the one created for PartsHound. Attempts will be made to ensure the two user interfaces combine to make a seamless sales experience for each customer.

Feature Set

On top of providing basic e-commerce style services to online customers, PartsHound will cross reference compatible parts from other vehicle types and manufacturers providing our customers with more choice and price variation.

Customers will also be able to view real-time inventory levels as well as track their purchases during shipment.

Site Map

The following page structure has been proposed for use within the online retail system. Visitors to the site will be allowed to immediately browse the inventory without the need to log in.

As customers search through the inventory, a shopping cart keeps track of each item they select to purchase. Customers are free to continue shopping until they are ready to purchase their items.

Upon checkout, the software will ask the customer to log in to an existing account, or give the option to create a new account should this be a first-time customer. Relevant shipping and address information is verified and the customer is finally prompted for payment.

Customers may also create a special request if they were unable to find a necessary part. The special request form will take their question and notify PartsHound staff who will contact the customer directly with a solution. Customers may view the status of their special request by logging into the retail system.

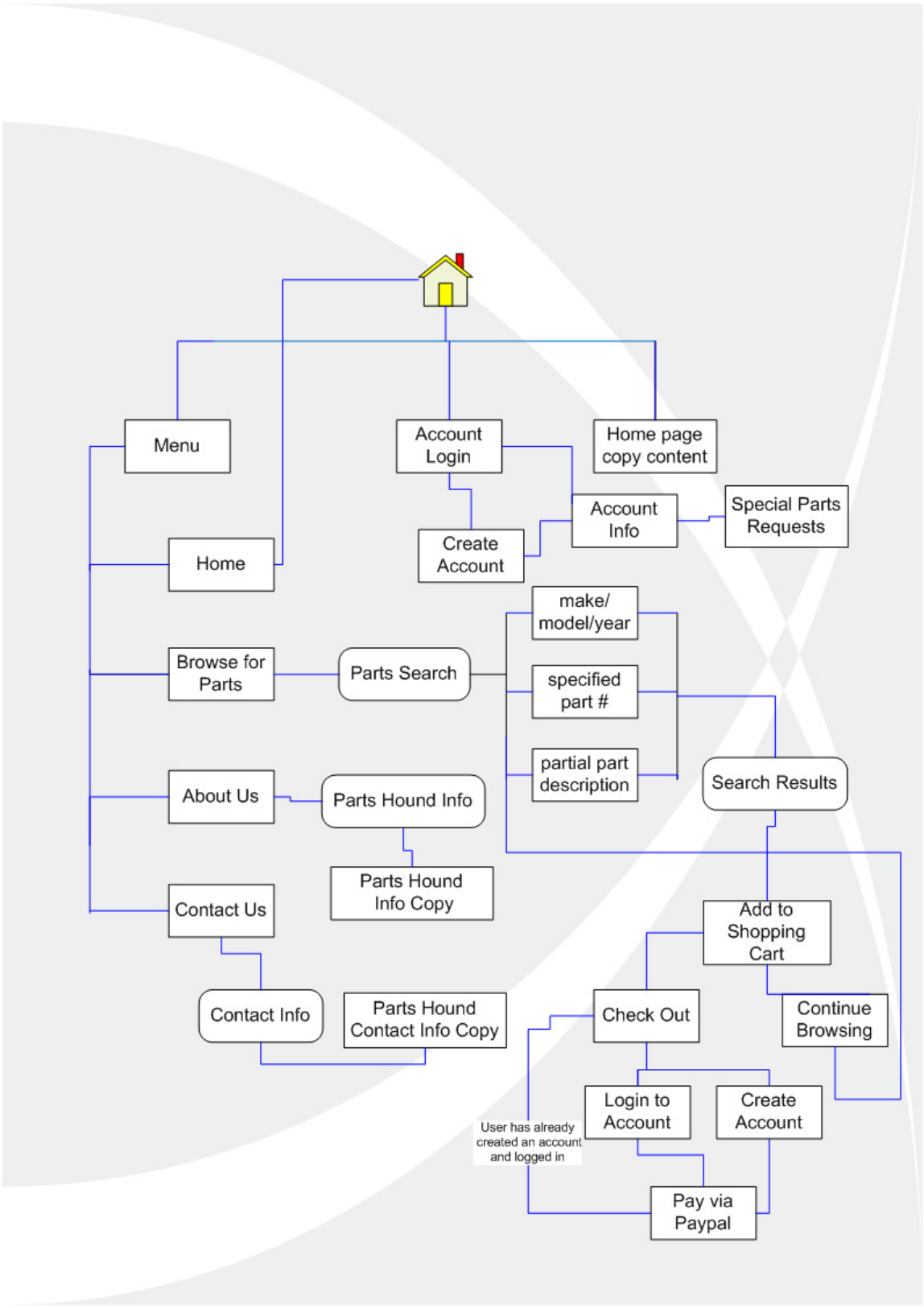

Figure 2 – The PartsHound Site Map