Sp20 CSCI 1550-70 DataBase Management Fundamentals

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# Change Tracking

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| --- | --- | --- |
| Date | Changer(s) | Reason(s) |
| 1/31, 2020 | Andy | Initial draft |
| 2/2, 2020 | Andy | Add in some basic data modeling commentary |
| 2/5/2020 | Rosie | Add comments from meeting |
| 02/05/2020 | Mohamed | Add comments how we do the project |
| 02/12/2020 | Rosie | Deleted chair items |
| 02/19/2020 | Andy | Made some document formatting adjustments and a few other comments |
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# Description of Business

The business that we intend to do data modeling for will be retail. The name of the fake business we’ve chosen is “Rosie’s Salon”. It is a Salon that provides hair products and services such as haircuts, shampoos, hair-dying and other beauty sessions such as perhaps a pedicure.

# DataBase Model

We will need to discuss this aspect of the project and probably a fair amount time will be spent on this task. Perhaps it will be possible to iteratively cycle through the process of data modeling repeatedly until we are happy with the end result.

There seems to be 3 main phases for data modeling:

1. Conceptual
2. Logical
3. Physical

## Conceptual Data Modeling

Conceptual data modeling is the first step in data modeling and introduces the use of the Entity-Relationship diagram, E-R, or perhaps the Enhanced E-R, EER diagram.

Before we can create a conceptual data model it is necessary to jot down what are the key points of our simulated business. To keep the size of our task achievable in a one-semester class the following assumptions are made:

* There will only be one “Rosie’s Salon” store. It will not be a chain or in any way a business whereby employees might work at multiple locations.
* The accounting needed for the business will be farmed out, not done in house. The only thing needed in our data modeling is a way to generate reports which will be sent to the accounting business contracted to make payroll checks or deposits, withhold payroll taxes and send those taxes to the IRS and state department or revenue and do the needed yearly tax forms.
* Custodial work will also be contracted out. None of the salon workers will be employed to do cleaning, etc. except as part of the process of cleaning around the salon chairs or whatever.
* Web application costs and any internet access and phone access is all contracted out and not part of the business data model other than that it is a business expense; in much the same way as the contracted-out accounting, custodial or other utility expenses. They are treated pretty much like a business expense such as the building lease.
* The employees will include part-time and full-time workers. The only salaried worker(s) is the manager(s). It is anticipated that most employees will be hourly wage earners or subcontractor stylist who lease the use of a salon chair for certain periods of time. This translates into 3 worker job roles; manager, receptionist, and stylist.
* The business will be housed in one location and have options to expand within their leased space. Therefor the salon could be as small as one salon chair to as much as 20 salon chairs or any amount between 1 and 20.
* The business model is that for every salon chair available on a given day a stylist is assigned to or has leased the use of that chair.
* The receptionist role can be done by a stylist or a manager. This would be most likely during non-peak business hours or if there are one a few stylist chairs in the salon. When and if the salon gets many chairs or is especially busy then most likely then the receptionist will only be actively a receptionist.
* Employees can take time off – not be available on any given day. The policy for the amount of time away (time off or unavailable to be scheduled) will be dictated by written policy. But the data model will only need to concern itself with tracking what time away has been taken or is scheduled in the future.
* Tips are not tracked by the business and need not be included in the business data model.
* Customers can just stop in the buy products or schedule a stylist or arrange this over the phone or over an internet web App.

Given those assumptions the entities and the relationship of those entities is as follows:

1. Employee (EmpID, CreatedTimeDate, LastUpdatedTimeDate, FirstName, MiddleInitial, LastName,Phone,Email)
2. EmployeeHistory (EmpHistID, EmpID, UpdaterEmpID, ActivateIndicator, LastUpdatedTimeDate, FirstName, MiddleInitial, LastName,Phone,Email)
3. EmployeeSchedule (EmpID, UpdaterEmpID, TimeSlot, AvailableIndicator)
4. Customer (CustID, CreatedTimeDate, LastUpdatedTimeDate, FirstName, MiddleInitial, LastName,Phone,Email,AlternateContact)
5. CustomerHistory (CustHistID, CustID, UpdaterEmpID, ActivateIndicator, LastUpdatedTimeDate, FirstName, MiddleInitial, LastName,Phone,Email)
6. Product (ProductID, CreatedTimeDate, LastUpdatedTimeDate, NumberInStock, PhysicalLocation, ProductDescription)
7. \*\*ProductHist (ProductID, ChairID, UpdaterEmpID, LastUpdatedTimeDate, BackOrderedIndicator, numberOnOrder, VendorID)
8. Service(ServiceID, CreatedTimeDate, LastUpdatedTimeDate, ServiceDescription)
9. Vendor (VendorID, CreatedTimeDate, LastUpdatedTimeDate, Business, BusinessAddress, Phone,Email)
10. VendorProducts (VendorID, ProductID, UpdaterEmpID, LastUpdatedTimeDate)
11. ServiceProvider (ServiceProviderID, CreatedTimeDate, LastUpdatedTimeDate, Business, BusinessAddress, Phone, Email)
12. ServiceProviderHist (ServiceProviderHistID, ServiceProviderID, UpdaterEmpID, LastUpdatedTimeDate, FirstName, MiddleInitial, LastName, Phone, Email, DateTimeLastPaid, AmountLastPaid, OutstandingBalance)

Nore: UpdaterEmpID is equal to an EmpID.

The relationships of these entities is:

1. Employee to EmployeeHist is one to many,
2. Employee to EmployeeSchedule is one to one,
3. Customer to CustomerHist is one to many,
4. Product to ProductHist is one to many,
5. Vendor to VendorProducts is one to many,
6. Product to ProductHist is one to many,
7. ServiceProvider to ServiceProviderHist is one to many

To generate the E-R diagram for this set of entities and relationships is something I’m struggling with at this time. But will be included here when it becomes available.

## Logical Data Modeling

Logical data modeling is the second major step in data modeling. In this modeling step the Conceptual data model is “normalized”. See page 177 of the 11th edition of the Modern Database Management book. Key concepts include:

1. 1NF – First Normal Form
2. 2NF – Second Normal Form
3. 3NF – Third Normal Form
4. BCNF – Boyce-Codd Normal Form
5. 4NF – Fourth Normal Form
6. 5NF – Fifth Normal Form

Of these 2NF seems to be the most desired “normalization” form.

At any rate the E-R model created during the conceptual phase needs to be translated into a relational model.

The Logical E-R model for this project is in a separate Power Point document. Please refer to that for the DB model details.

## Physical Data Modeling

Physical data modeling is the third and final data modeling step. This step can result in “denormalization”, whereby vertical or horizontal partitioning is used for combining certain entities or possibly re-creating redundant attributes of the entities, which had been removed during the “normalization” logical data modeling phase. This would mainly be done in order to improve data access and updating efficiency.

This last step of data modeling takes refers to the relational model to help create the physical data model. From this physical model it should be very possible to create the DDL, Data Definition Language, SQL statements needed to create the desired Database Schema and tables.

# Business Roles

There are several business roles:

1. Manager
2. Stylist
3. Receptionist
4. Accountant or Financial officer

Each of these roles can translate into a different view of the business data. For instance, only the manager(s) and probably the accountant(s) should have access to other employee’s salary or commission information. For this reason, it is likely that various database views will be needed.

# Application Needs

During the course of business for Rosie’s Salon several Application needs should be satisfied. This includes:

1. Employee information handling
2. Customer information handling
3. Transaction processing
4. Accounting reports and activities

## Employee Data Handling

There is a need for an interface tool to add, delete and update employee information. This could include:

* Employee name; create or update
* Employee contact information; phone(s), mailing address, email address(es), W2 info, salary or commission, job role, etc.
* Employee timecard info; each start time and duration

## Customer Data Handling

Also a need for an interface tool to add, delete and update customer information. This could include:

* Cusrtomer name; create or update
* Customer contact information; phone(s), mailing address, email address(es), perhaps some short (less than 256 characters) of customer comments or feedback, etc.
* Customer service info; each start time and duration, what service was provided, e.g. hairsyling, manicure, etc.

## Transaction Handling

This is a biggie – a lot goes into processing a transaction. This could include:

* Customer identifier
* Time stamp of transaction
* Products sold to customer
* Services rendered to customer
* Cost of each product or service provided
* Total cost to customer of this transaction
* Employee identified for any and all services provided to customer
* Payment method customer used
* In a later phase of project, maybe various actions that were precipitated due to this transaction. For example, maybe some product is almost out and so an order needs to be placed for more of that product.
* Many other pieces of information are possible.

## Accounting Reports and other Activity

There is a need for an interface tool to help handle accounting types of activities. This could include:

* Producing a paycheck
* Withholding handling for Federal, State and local taxes
* Withholding for Social Security, Unemployment
* Automatic contribution handling for any retirement plan (401k, or whatever)
* Final year end reports for the business to analyze
* Tax year reports needed by the various tax entities

# Document Comments

**Comments:**

* We met at school on 2/5/2020 to discuss project
* Ask teacher, Can we have one or the other either EmpHis table or CustHis table? Or do we need both?
* Should we only allow for walkin appointments? Which would simplify our model, e.g. we wouldn’t probably need an EmployeeSchedule entity.
* Rosie deleted this one the file Feb,05 2020
  + Chairs can also be scheduled as unavailable by either a manager or receptionist for several reasons; there is no stylist available that day for that chair, a stylist is away for lunch or other reason, etc.
  + \*Chairs are scheduled on ½ hour intervals per the entire yearly schedule of the business. But they can be scheduled for repair and thus out of service for that period of time. When scheduled for repair all the no-longer available time slots are scheduled to a manager and that manager is responsible for putting that chair back into the availability rotation when the repair is completed.
  + \*sChairs are scheduled to customer where a stylist can provide a service, such as shampoo, haircut, manicure, and/or hair-dying.
  1. Chair to ChairHist is one to many,
  2. Chair to ChairSchedule is one to one,
  3. ChairSchedule to Employee is one to zero or one,
  4. Service to ChairSchedule can be many to one (a chair and time slot can be for multiple services, e.g. haircut and also a shampoo,
* Roise deleted this on Feb 19th(no need for chair assignment)
  + \*Chair (ChairID, CreatedTimeDate, LastUpdatedTimeDate, AvailableIndicator, PhysicalLocation)
  + \*ChairHistory (ChairHistID, CustID, UpdaterEmpID, ActivateIndicator, LastUpdatedTimeDate)
  + \*ChairSchedule (ChairID, UpdaterEmpID, EmpID TimeSlot, AvailableIndicator, ServiceID)