

Semester Project Report

Database Theory and Design

Prof. Machuria M. Johnson

ITSE 1346 17591

MAY 1

GROUP 3

Mai Tran, Nguyen Pham, Trung Nguyen, Daniel Macia,
Josue Rodriguez, Ivory Ibe, Macfrancis Belchi



Logo
Name

OVERVIEW

We were tasked with developing a Patient Record Keeping System (PRKS) that can be used by any small optical business. Our first Client, Foxy Optical, has graciously provide us with its current database in XML format.

We decided to utilize Microsoft Access to build a new database based on information provided.

“Our goal was to create a Clean, Accurate, Relevant and Reliable (CARR) Record Keeping System for Foxy Optical.”

The owner of the company would like to have the following Reports:

- A list of all Patients called “Current Patients”.
- A list of Doctors providing service and current Patients “Doctors & Patients.”
- A list of Patients, Their Prescriptions, and Doctor that wrote it “Patient Scripts.”
- A list of Patients, with No Prescriptions “Retail Customers Only”
- A list of Patients with a balance other than zero “Open Patient Accounts”
- A list of patients past due by more than 30 days “Accounts Past Due”

The owner of the company would also like to have the following Forms for data entry:

- “Sunglasses Sales” (No Prescription Required)
- “Prescription Eyeglasses/Contact Sales”
- New “Doctor” in the area
- New “Customer”

This document shall provide the Client with assumptions/adjustments to the original set of data, as well as detailed explanation regarding the design and usage of our system.

ISSUES - ASSUMPTIONS - ADJUSTMENTS

While working with the dataset provided by Foxy Optical, we encountered multiple consistency issues. We had to made reasonable assumptions and several adjustments to said inconsistency in order to progress. All issues and adjustments were summarized in the table below.

Table 1: Issues, Assumptions and Adjustments

ISSUE	ASSUMPTION	ADJUSTMENT
Multiple Doctors with missing ID	Input Error	Assign new IDs. We also adjust ID of NONE to 0 to be more intuitive
One customer with multiple Last Visit	Last visits were not correctly updated	Use the latest date
One customer with multiple Current Balance	Current balances were not correctly updated	Use the latest current balance
One customer with multiple Last Pay	Last pays were not correctly updated	Use the latest date

With the inconsistency dealt with, we were ready for the next step – Data Normalization.

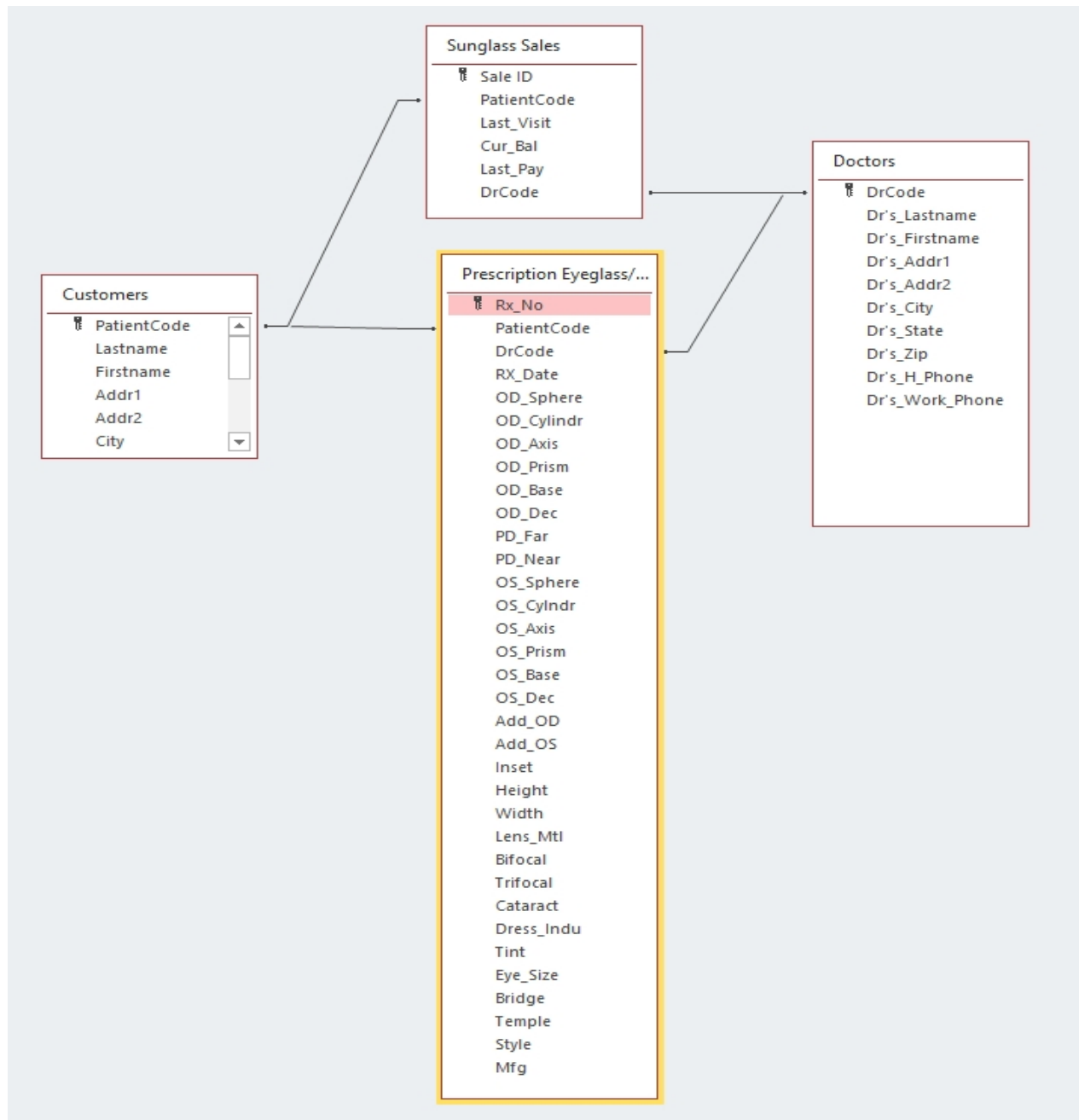
DATA NORMALIZATION

This process included creating tables and establishing relationships between those tables according to rules designed both to protect the data and to make the database more flexible by eliminating redundancy and inconsistent dependency. We divided the given data table into for separate tables that are interrelated. Figure 1: ER Diagram below shows all fields contained in each table, as well as the relationship between said tables.

The tables were designed so that our database could achieved the Third Normal Form (3NF). What it means is that our database now should be both resilient and easy to maintain/update. For example, in the event of a new doctor coming to town, instead of having to navigate the original huge table to find appropriate fields and update the record, it can now be done effortlessly. Also, once a data field is updated (a Doctor's hand phone for example), it would be automatically updated in all relevant documents. We would suggest that this approached could save Foxy Optical substantial resource in data management.

With the optimized database in place, we set out to create relevant templates for reports and forms that were required by Foxy Optical.

Figure 1: ER Diagram



REPORTS & FORM

REPORTS


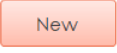

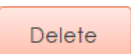
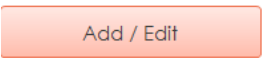
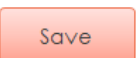
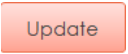

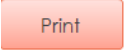
We created 6 report templates within our system in accordance with Foxy Optical's requirement. The reports were constructed in such a way that every change in the database shall be automatically reflected in relevant documents. The templates include:

- A list of all Patients called "Current Patients".
- A list of Doctors providing service and their current Patients called "Doctors and their Patients."
- A list of Patients, Their Prescriptions, and Doctor that wrote it called "Patient Prescriptions and Doctors."
- A list of Patients, with No Prescriptions called "Retail Customers Only".
- A list of Patients with a balance other than zero called "Open Patient Accounts".
- A list of patients with a balance not zero and past due by more than 30 days called "Accounts Past Due".

You can find samples of such report in the Appendix of this document.

FORMS

We also created several new forms per Foxy Optical's request. We also included several function buttons in each form for ease of use. A summary of each function is included in the table below.

Table 2: Form functions			
BUTTON	FUNCTION	BUTTON	FUNCTION
	Search		Create new record
	Back		Delete current record
	Add or edit record		Save new record
	Update record		Go to first, last record, next record, go to last.
	Print current record		

FORM - DOCTORS

DrCode

Dr's_Lastname

Dr's_Firstname

Dr's_Addr1

Dr's_Addr2

Dr's_City

Dr's_State

Dr's_Zip

Dr's_H_Phone

Dr's_Work_Phone

Add / Edit

Print

Record: 1 of 18

All fields in this form are locked by default. We thought that this form would be frequently accessed by employees for retrieving rather than altering the information. Therefore, it was designed in such way to prevent unintentional data alterations/deletions.

To Edit current data or add new entry, user should use the Add/Edit button. A new window will pop up, which will allow data alteration.

DrCode does not allow empty or duplicate data.

FORM - PATIENTS

PatientCode

Lastname

Firstname

Addr1

Addr2

City

State

Zip

H_Phone

Work_Phone

Last_Visit

Cur_Bal

Last_Pay

Add / Edit

Update

Print

Record: 1 of 22

All fields in this form are locked by default except for the three fields on the right (Last Visit, Current Balance, Last Pay). We used a similar approach with the Doctors form. However, Last Visit, Current Balance and Last Pay were fields that require update every time a customer visit; therefore, we included a function that allow employee to update those fields without the need of opening a new form.

To update fields on the right, employees simply need to input new information and hit the Update button.

PatientCode does not allow empty or duplicate data.

FORM - PRESCRIPTIONS EYEGLASSES/CONTACT SALES

FOXY OPTICAL
Prescriptions Eyeglasses/Contact Sales

Rx_No Add_OS Style AVIATOR
Patient Code Inset Mtg SOLO
Dr Code Height
RX Date 4/29/2015 Width
Lens_Mtl P
OD_Sphere 1.6
OD_Cylindr 2.3
OD_Axis 45
OD_Prism 0
OD_Base 1
OD_Dec 4
PD_For
PD_Near
OS_Sphere 2.5
OS_Cylindr 3
OS_Axis 60
OS_Prism
OS_Base 1.25
OS_Dec 4
Add_OD
Bifocal
Trifocal
Cataract
Dress_Incl D
Tint NONE
Eye_Size
Bridge
Temple

New Delete Save Print
Navigation arrows

Records: 1 of 23 No Filter Search

All fields in this form are not locked as we thought this form would be used mainly for data entry.

Rx_No does not allow empty or duplicate data.

PatientCode and DrCode are required. On-update validation rules was set up so that user can not save the record without providing such information.

FORM - PRESCRIPTION

FOXY OPTICAL
Prescriptions Eyeglasses/Contact Sales

Sale ID
PatientCode dv001
Last_Visit 1/1/2015
Cur_Bal 0
Last_Pay 1/1/2015
DrCode 0

New Delete Save Print
Navigation arrows

Records: 1 of 7 No Filter Search

All fields in this form are not locked as we thought this form would be used mainly for data entry.

Sale IDs are automatically generated.

We included Last Visit, Current Balance and Last Pay for ease of use.

DrCode was included because there was one record in the original data table of a commercial customer with DrCode.

USER INTERFACE

When we first set out on this project, we envisioned a system that required minimal explanation before the user can operate it effectively. We thought this was a crucial characteristic of a system intended for small optical businesses. However, despite our best effort, Microsoft Access was not easy to understand, sometimes counter-intuitive, for the general public.

With utmost ease of use in mind, we created a Main Interface for our system, on which the user can perform all day-to-day tasks with ease. We believe this would greatly assist Foxy Optical in their on-going operation.

The screenshot displays the 'Main Interface' window of the 'FOXY OPTICAL Patient Record Keeping System'. The window has a title bar with the text 'Main Interface' and standard Windows window controls (minimize, maximize, close). The main content area features a green header with the system name. Below this, the interface is organized into two primary sections: 'FORMS' and 'REPORTS'. The 'FORMS' section contains four orange buttons: 'CUSTOMERS', 'DOCTORS', 'RETAILS', and 'PRESCRIPTIONS'. The 'REPORTS' section contains six orange buttons: 'A list of All Patients', 'Retail Customers Only', 'Doctors and theirs Patients', 'Open Patient Accounts', 'Patient Prescriptions', and 'Account Past Due'. At the bottom of the window, there is a status bar with a record indicator showing 'Record: 1 of 1', navigation icons, a filter icon with the text 'No Filter', and a search input field.

FOXY OPTICAL Patient Record Keeping System	
FORMS	
CUSTOMERS	DOCTORS
RETAILS	PRESCRIPTIONS
REPORTS	
A list of All Patients	Retail Customers Only
Doctors and theirs Patients	Open Patient Accounts
Patient Prescriptions	Account Past Due

Record: 1 of 1 | No Filter | Search

CONCLUSION

Creating a Clean, Accurate, Relevant and Reliable Record Keeping System was not an easy endeavor. For the last two months, our team had been working vigorously to ensure all potential business situations were considered, and all errors were eliminated. The result was a Patient Record Keeping System that we can proudly say, to the best of our abilities, can be used by any small optical business. We believe it to be of use in pushing business operation efficiency to the next level.

We would like to take this opportunity to express our sincere thanks to you for allowing us to partake in this project. We wish you health, success, and best of luck in all your future endeavors.

Sincerely,

Group 3

APPENDIX – SAMPLE REPORTS

Current Patients					
FOXY OPTICAL					
A LIST OF ALL PATIENTS					
Thursday, April 29, 2021			Page 1 of 1		
Last Name	First Name	Patient Code	Address	Hand Phone	Work Phone
CHAIMAKER	PHYLLIS	pc001	8210 ROCKYHILL LANE HOUSTON TX 77036	(713) 771-2871	(713) 497-3987
CHAIMAKER	STEPHEN	sc001	8210 ROCKYHILL LANE HOUSTON TX 77036	(713) 771-2871	
CHARLES	RAY	rc001	123 8 TO THE BAR LANE NASHVILLE TN 56001	(281) 555-8642	
CLYDE	NORMAN	nc001	2468 MAIN APT 356 HOUSTON TX 77445	(713) 555-0989	
FLOWERS	MELVIN	mf001	8543 GRAPE STREET APT 2B HOUSTON TX 77024	(713) 555-6969	(713) 868-0779
GIBSON	DELL	dg001	324 WEST PINE DRIVE BROOKLYN NY 21009	(212) 555-3435	(212) 555-6000
GUMPER	ROBERT	rg001	5415 CHEENA DR	(713) 723-5400	(713) 668-1835

FOXY OPTICAL

DOCTORS CURRENT PATIENTS

Thursday, April 29, 2021

Page 1 of 1

Dr's Last Name	Dr's First Name	Dr Code	Address	City	State	Zip	Hand Phone	Work Phone
VINE	BERNARD	1	2529 W. T.C. JESTER SUITE 5	HOUSTON	TX	77018		(281) 555-5432
	LINKIN sl001	STEVE	5200 W LOOP SOUTH HOUSTON TX 77025	(713) 718-6462				
CASEY	BEN	2	CHANNEL 7	BOSTON	MA	02148	(617) 555-1234	(617) 555-1111
	MACKORMI TODD tm001		1234 HOME STREET HOUSTON TX 77079	(713) 555-1111 (713) 584-1000				
	MUNCHKIN DAVID dm001		5255 HARBORTOWN DRIVE APT 519 HOUSTON TX 77036	(713) 270-0759				
GLASSER	SYDNEY	3	234 APPLETON STREFF	WATERTOWN	MA	02155		(617) 555-2222
	OGDEN fo001	FRAN	2468 HAPPY VALLY DRIVE HOUSTON TX 77000	(713) 555-1234 (713) 555-9000				

FOXY OPTICAL

PATIENTS, PRESCRIPTIONS, AND DOCTORS

Thursday, April 29, 2021

Page 1 of 1

PatientCode Name	Dr Code	Home Phone	Work Phone	Last Visit
---------------------	---------	------------	------------	------------

am001	MEDINA	ARLIS 7	7137772341	7137181000	3/10/2015
-------	--------	------------	------------	------------	-----------

Rx No. am001	PRESCRIPTION	Dr'sCode	7	ZORBA	HENRY	(713) 555-0101
--------------	--------------	----------	---	-------	-------	----------------

RX_Date	3/8/2015
---------	----------

OD_Sphere	OD_Cylindr	OD_Axis	OD_Prism	OD_Base	OD_Dec	PD_Far	PD_Near
3.25	1.25	180	2.25	1.25	3	3	1
OS_Sphere	OS_Cylindr	OS_Axis	OS_Prism	OS_Base	OS_Dec	Add_OD	Add_OS
1.25	1.25	180	1.75	1	2	0.25	0.5
Inset	Height	Width	Lens_Mli	Bifocal	Trifocal	Cataract	
1	18	20	P	EXECUTIVE			
Dress_Indu	Tint	Eye_Size	Bridge	Temple	Style	Mfg	
D	AMBER #2	3.5	2.5	55.6	STRANGE	GUCCI	

cr001	RICHARD	CHRIS 11	7135556969	7135559696	4/29/2015
-------	---------	-------------	------------	------------	-----------

Rx No. cr001	PRESCRIPTION	Dr'sCode	11	EYEBALL	JOE	(305) 555-1400
--------------	--------------	----------	----	---------	-----	----------------

RX_Date	4/9/2015
---------	----------

OD_Sphere	OD_Cylindr	OD_Axis	OD_Prism	OD_Base	OD_Dec	PD_Far	PD_Near
1.6	2.3	45	0	1	4		
OS_Sphere	OS_Cylindr	OS_Axis	OS_Prism	OS_Base	OS_Dec	Add_OD	Add_OS
2.5	3	60		1.25	4		
Inset	Height	Width	Lens_Mli	Bifocal	Trifocal	Cataract	
			P				
Dress_Indu	Tint	Eye_Size	Bridge	Temple	Style	Mfg	
D	NONE				AVIATOR	SOLO	

FOXY OPTICAL

PATIENTS WITH A BALANCE

Thursday, April 29, 2021

Page 1 of 1

Lastname Firstname PatientCode	Address	Hand Phone	Work Phone	Current Bal	Last Pay
CHAIKMAKER PHYLLIS pc001	8210 ROCKYHILL LANE HOUSTON TX 77036	(713) 771-2871	(713) 497-3987	\$200.00	6/2/2015
CHAIKMAKER STEPHEN sc001	8210 ROCKYHILL LANE HOUSTON TX 77036	(713) 771-2871		\$125.00	5/16/2015
LINKIN STEVE sl001	5200 W LOOP SOUTH HOUSTON TX 77025	(713) 718-6462		\$250.00	10/1/2015
MACKORMIK TODD tm001	1234 HOME STREET HOUSTON TX 77079	(713) 555-1111	(713) 584-1000	(\$75.00)	1/1/2015

FOXY OPTICAL

ACCOUNTS PAST DUE

Thursday, April 29, 2021

Page 1 of 1

Lasname Firstname PatientCode	Address	Hand Phone	Work Phone	Current Bal	Last Pay
CHAIMAKER PHYLLIS pc001	8210 ROCKYHILL LANE HOUSTON TX 77036	(713) 771-2871	(713) 497-3987	\$200.00	6/2/2015
CHAIMAKER STEPHEN sc001	8210 ROCKYHILL LANE HOUSTON TX 77036	(713) 771-2871		\$125.00	5/16/2015
LINKIN STEVE sl001	5200 W LOOP SOUTH HOUSTON TX 77025	(713) 718-6462		\$250.00	10/1/2015
MACKORMIK TODD tm001	1234 HOME STREET HOUSTON	(713) 555-1111	(713) 584-1000	(\$75.00)	1/1/2015

FOXY OPTICAL

PATIENTS - NO PRESCRIPTIONS

Thursday, April 29, 2021

Page 1 of 1

Lastname Firstname PatientCode	Address	Hand Phone	Work Phone
CHARLES RAY rc001	123 8 TO THE BAR LANE NASHVILLE TN 56001	(281) 555-8642	
CLYDE NORMAN nc001	2468 MAIN APT 356 HOUSTON TX 77445	(713) 555-0989	
FLOWERS MELVIN mf001	8543 GRAPE STREET APT 2B HOUSTON TX 77024	(713) 555-6969	(713) 868-0779
GUMPER ROBERT rg001	5415 CHEENA DR HOUSTON TX 77036	(713) 723-5400	(713) 668-1835
LYNETTE JOHNSTON lw001	5555 HERE I AM STREET HOUSTON TX 77777	(713) 555-1235	
VIXEN DIANNE	12450 FOXCRAFT LANE	(281) 555-9753	