

Runa Bibi Info Engineering Assignment 2 Report

by Runa Bibi

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Database Design for The Smile Factory

Information Engineering

Runa Bibi
1702463

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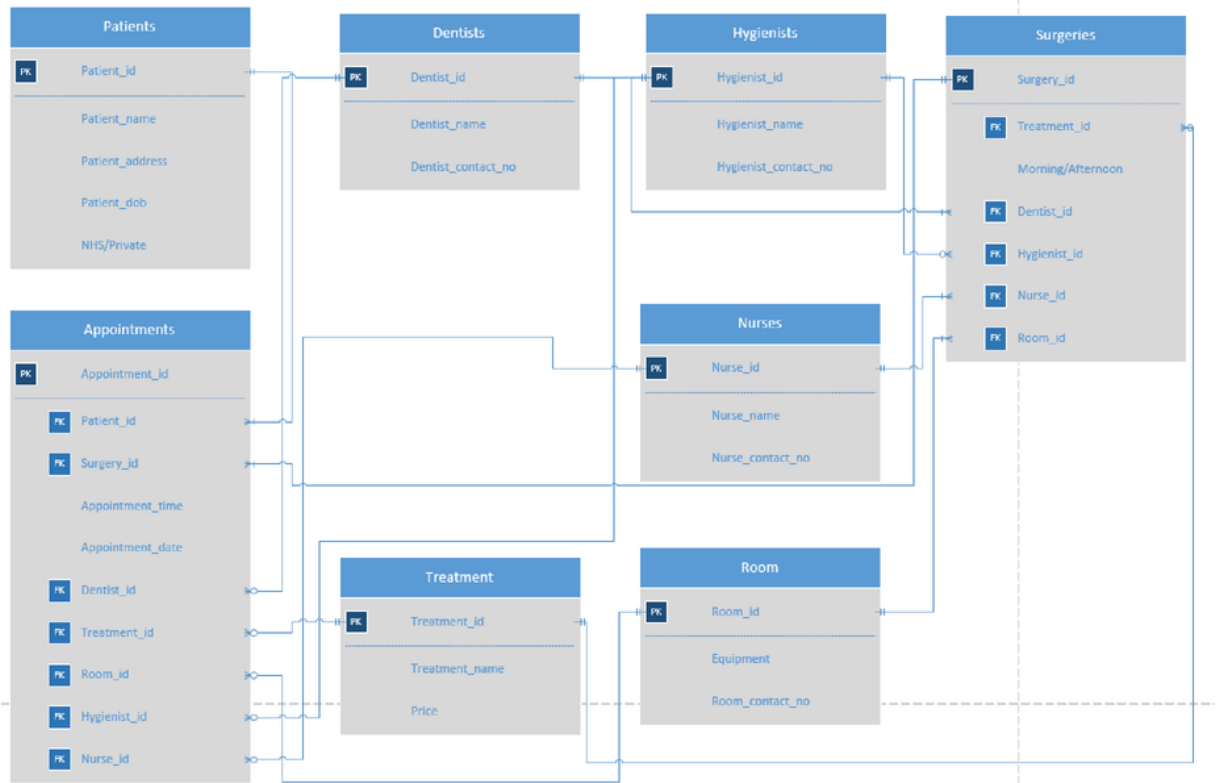
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Data Analysis

After analysing The Smile Factory's current system, it is clear they would benefit from a relational database with storage of patient details as well as surgery schedules and appointments through tables, queries and forms. Transactional processing [1] will also be carried out using this database i.e. patient appointment invoices. Relevant tables with appropriate relationships between attributes and entities will be applied.

Entity Relationship Diagram

This is the final ERD as created in Visio. It clearly shows that the tables will link together in a relational environment. It shows the entities relationships including the degree of the relationships and which foreign keys link to which primary key on each table [2].



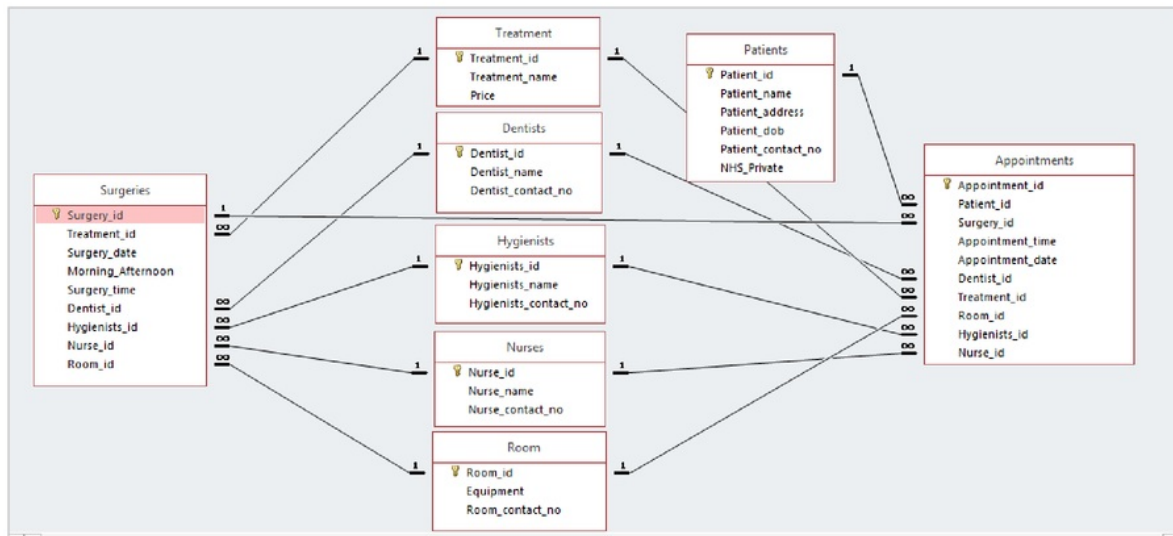
The following client requirements will be met with this design:

- Automatically update a schedule for each dentist – Dentist schedules can be queried based on Dentist_id
- Print out patient invoices – This will be form based with the option to print appointment details including Patient_id, Dentist_id, Treatment_id, Room_id, Hygienist_id and Nurse_id with the price of the treatment
- Record relevant information in a simplistic invoice list database – Patient appointments can be queried based on Patient_id
- Dentists, hygienists and nurses must be scheduled into a surgery slot – This is done within the Surgeries table

Surgeries	
PK	Surgery_id
FK	Treatment_id
Morning/Afternoon	
FK	Dentist_id
FK	Hygienist_id
FK	Nurse_id
FK	Room_id

- Income generated from patient appointments to be generated – Patient appointment invoice queries will generate a total price dependent on their treatment
- Produce relevant reports on time schedules – These will be produced based on Dentist_id, Hygienist_id and Nurse_id queries

The following shows the relationships in Access:



Reports

I used Macro queries to create reports.

Dentists Schedules

Dentist_id	Dentist_name	Surgery_id	Surgery_date	Surgery_time
D137152	Jenny Olsen	S162818	08/12/2017	12:30 PM
		S182014	20/03/2018	09:45 AM
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Nurses Schedules

Nurse_id	Nurse_name	Surgery_id	Surgery_date	Surgery_time
N162353	Jake Santiago	S142732	23/10/2017	09:00 AM
		S115623	17/04/2018	11:30 AM
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Hygienists Schedules

Hygienists_id	Hygienists_name	Surgery_id	Surgery_date	Surgery_time
H156982	Chris Stan	S158129	07/11/2017	03:15 PM
		S159284	03/11/2017	10:15 AM
		S138191	12/10/2017	02:30 PM
		S115623	17/04/2018	11:30 AM
		S182014	20/03/2018	09:45 AM

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Appointments Report

Appointment_id	Patient_id	Treatment_id	Price	Total
A134958	P128494	T148291	£230	230

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Forms

I also created forms for each table to allow the user to add and delete records and view each record. There is also the ability to save the record once they have added a new one. Once the user has completed everything they need to do there is an exit button which takes them to the main menu.



The Main Menu interface features a light blue background with a grey header bar. The header bar contains the text "Main Menu" in a large, dark blue font, flanked by two cartoon tooth characters. Below the header, the menu is organized into three main sections: "ADD/DELETE RECORDS", "OPEN SCHEDULES", and "NHS/PRIVATE PATIENTS". Each section contains several buttons for accessing different forms. Additionally, there is a "VIEW AND PRINT PATIENT INVOICES" section with a button for "Open Patient Invoice". A small icon of a computer monitor with a blue arrow is located in the bottom left corner.

ADD/DELETE RECORDS		OPEN SCHEDULES		NHS/PRIVATE PATIENTS	
Open Patient Form	Open Appointments Form	Open Dentist Schedule Form	Open Hygienist Schedule Form	Open NHS Patients Form	
Open Dentist Form	Open Room Form	Open Nurse Schedule Form		Open Private Patients Form	
Open Nurses Form	Open Surgeries Form				
Open Hygienists Form	Open Treatment Form				

VIEW AND PRINT PATIENT INVOICES

Open Patient Invoice

Patients Form



Patient_id
Patient_name
Patient_address
Patient_dob
Patient_contact_no
NHS_Private



Add Record

Delete Record

Save Record

Dentists Form



Dentist_id
Dentist_name
Dentist_contact_no



Add Record

Delete Record

Save Record

Hygienists Form



Hygienists_id
Hygienists_name
Hygienists_contact_no

Add Record

Delete Record

Save Record



Nurses Form



Nurse_id
Nurse_name
Nurse_contact_no

Add Record

Delete Record

Save Record



Surgeries Form



Surgery_id
Treatment_id
Surgery_date
Morning_Afternoon
Surgery_time
Dentist_id
Hygienists_id
Nurse_id
Room_id



Save Record

Add Record

Delete Record

Room Form



Room_id
Equipment
Room_contact_no



Add Record

Delete Record

Save Record

Treatment Form



Treatment_id
Treatment_name
Price



Add Record

Delete Record

Save Record

NHS Patients Query Form



Patient_id
Patient_name
NHS_Private



Private Patients Query Form

Patient_id	P148343
Patient_name	Liz Gilles
NHS_Private	Private







Appointments Form

Appointment_id	A118912
Patient_id	P148343
Surgery_id	S158129
Appointment_time	03:15 PM
Appointment_date	07/11/2017
Dentist_id	D154929
Treatment_id	T164927
Room_id	R203
Hygienists_id	H156982
Nurse_id	N192453







I also used forms to run queries using Macros and to create reports. The output of each report can be found above in the report section.

Dentist Schedule Query Form



Please
input
Dentist ID

D137152



Nurse Schedule Query Form



Please input
Nurse ID



Hygienists Schedule Query Form



Please input
Hygienist ID



Appointment Query Form



Please input
Patient ID



Appointments Report

Appointment_id	Patient_id	Treatment_id	Price	Total
A134958	P128494	T148291	£230	230

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As shown here, I was also able to use a formula to add the prices to produce a total, thus creating an invoice for the customer.

I then also added a print button the appointment query form so once the form has been run, the user can print an invoice out for the patient.

Appointment Query Form 

Please input
Patient ID

Appointments Report				
Appointment_id	Patient_id	Treatment_id	Price	Tota
A118912	P148343	T164927	£24	24

SQL

Using SQL, I was able to create each table and create relationships between them using foreign keys.

```
Create Dentists
CREATE TABLE Dentists(
Dentist_id TEXT (20) constraint Dentist_id_pk PRIMARY KEY,
Dentist_name TEXT (15),
Dentist_contact_no TEXT (20));
```

```
Create Surgeries
CREATE TABLE Surgeries(
Surgery_id TEXT (20) constraint Surgery_id_pk PRIMARY KEY,
Treatment_id TEXT (20) constraint fk_Treatment_id REFERENCES Treatment (Treatment_id),
Morning_Afternoon TEXT (15),
Dentist_id TEXT (20) constraint fk_Dentist_id REFERENCES Dentists (Dentist_id),
Hygienists_id TEXT (20) constraint fk_Hygienists_id REFERENCES Hygienists (Hygienists_id),
Nurse_id TEXT (20) constraint fk_Nurse_id REFERENCES Nurses (Nurse_id),
Room_id TEXT (20) constraint fk_Room_id REFERENCES Room (Room_id));
```

```
Create Appointments
CREATE TABLE Appointments(
Appointment_id TEXT (20) constraint Appointment_id_pk PRIMARY KEY,
Patient_id TEXT (20) constraint fk_Patient_id REFERENCES Patients (Patient_id),
Surgery_id TEXT (20) constraint fk_Surgery_id REFERENCES Surgeries (Surgery_id),
Appointment_time TEXT (10),
Appointment_date Date,
Dentist_id TEXT (20) constraint ap_fk_Dentist_id REFERENCES Dentists (Dentist_id),
Treatment_id TEXT (20) constraint ap_fk_Treatment_id REFERENCES Treatment (Treatment_id),
Room_id TEXT (20) constraint ap_fk_Room_id REFERENCES Room (Room_id),
Hygienists_id TEXT (20) constraint ap_fk_Hygienists_id REFERENCES Hygienists (Hygienists_id),
Nurse_id TEXT (20) constraint ap_fk_Nurse_id REFERENCES Nurses (Nurse_id);
```

I was also able to populate the tables with records using SQL [3]. As specified in the brief, there is records for four dentists, two hygienists and six dental nurses.

```
Insert Dentists
INSERT INTO Dentists ( Dentist_id, Dentist_name, Dentist_contact_no )
SELECT 'D154929', 'Zoe Wright', '07728375322';
```

	Dentist_id	Dentist_name	Dentist_contact_no
+	D113542	Liam Evans	07592548148
+	D137152	Jenny Olsen	07248934529
+	D154929	Zoe Wright	07728375322
+	D198431	John Smith	07132764451
*			

```
Insert Hygienists
INSERT INTO Hygienists ( Hygienists_id, Hygienists_name, Hygienists_contact_no )
SELECT 'H163281', 'Karen Thompson', '07654863134';
```

	Hygienists_id	Hygienists_name	Hygienists_contact_no
+	H156982	Chris Stan	07235347455
+	H163281	Karen Thompson	07654863134
*			

Insert Nurses

Nurses

```
INSERT INTO Nurses ( Nurse_id, Nurse_name, Nurse_contact_no )
SELECT 'N153824', 'Rosie Griffin', '07853042345';
```

	Nurse_id	Nurse_name	Nurse_contact_no
+	N117482	Billy Ray	07853042345
+	N134742	Jade West	07839245472
+	N153824	Rosie Griffin	07853042345
+	N162353	Jake Santiago	07472948392
+	N182943	Melissa Jones	07819924542
+	N192453	Hannah Evans	07362827342

User Guide

When the database is first opened the main menu is on screen.



Adding/Deleting Records:

1. Click on the form which records you want to access



2. To add a record press the add record button and to delete a record press delete record

The screenshot shows the 'Patients Form' interface. At the top, there is a header with the title 'Patients Form' and a cartoon tooth character. Below the header, there are several input fields for patient information: Patient_id (P112532), Patient_name (Emma Banks), Patient_address (13 Dunlin Rd, Leicester, LE5 3FP), Patient_dob (30/01/2002), Patient_contact_no (07832935434), and NHS_Private (NHS). At the bottom of the form, there are several buttons: a blue button with a plus sign, a dashed button with a double left arrow, a solid button with a single left arrow, a solid button with a single right arrow, a solid button with a double right arrow, and a vertical stack of three buttons: 'Add Record', 'Delete Record', and 'Save Record'. The 'Add Record' and 'Delete Record' buttons are circled in red, and red arrows point to them from the right.

3. Once you have completed filling in each field press the save record button

The screenshot shows the 'Patients Form' interface, identical to the previous one. The 'Add Record', 'Delete Record', and 'Save Record' buttons are stacked vertically. The 'Save Record' button is circled in red, and a red arrow points to it from the right.

4. Finally press the close form button to go back to the main menu

Patients Form

Patient_id: P112532
Patient_name: Emma Banks
Patient_address: 13 Dunlin Rd, Leicester, LE5 3FP
Patient_dob: 30/01/2002
Patient_contact_no: 07832935434
NHS_Private: NHS

Buttons: Add Record, Delete Record, Save Record

Navigation: Close (highlighted), Previous, Next, Previous 2, Next 2

Accessing Schedules:

1. First you need to click on the form with the schedules you need to access

Main Menu

ADD/DELETE RECORDS

- Open Patient Form
- Open Appointments Form
- Open Dentist Form
- Open Room Form
- Open Nurses Form
- Open Surgeries Form
- Open Hygienists Form
- Open Treatment Form

OPEN SCHEDULES

- Open Dentist Schedule Form (highlighted)
- Open Hygienist Schedule Form
- Open Nurse Schedule Form

VIEW AND PRINT PATIENT INVOICES

- Open Patient Invoice

2. Next you need to input the ID required e.g. Dentist_id and click the macro button in the right to open a report

Dentist Schedule Query Form

Please input Dentist ID



3. This is an example of the output you receive

Dentists Schedules				
Dentist_id	Dentist_name	Surgery_id	Surgery_date	Surgery_time
D137152	Jenny Olsen			
		S162818	08/12/2017	12:30 PM
		S182014	20/03/2018	09:45 AM
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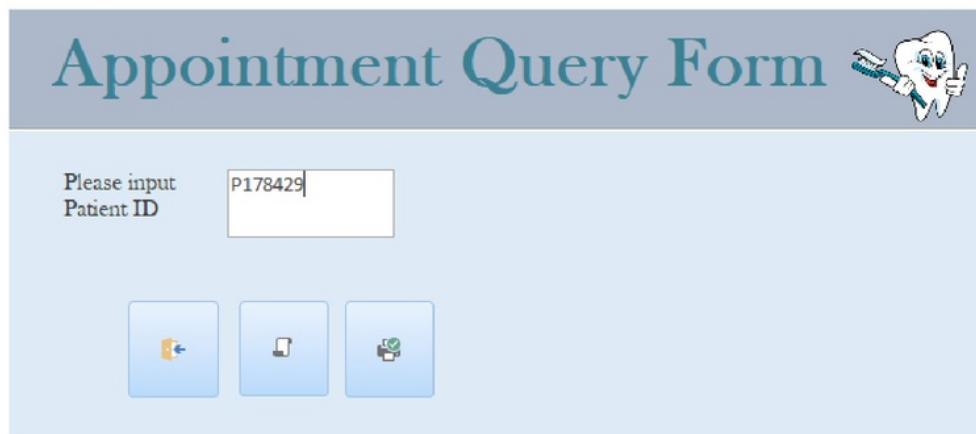
Print Patient Invoice:

1. Click the open patient invoice button



The screenshot shows the 'Main Menu' interface. At the top, there's a header with a cartoon tooth character and the text 'Main Menu'. Below this, the menu is divided into two main sections: 'ADD/DELETE RECORDS' on the left and 'OPEN SCHEDULES' on the right. Under 'ADD/DELETE RECORDS', there are eight buttons: 'Open Patient Form', 'Open Appointments Form', 'Open Dentist Form', 'Open Room Form', 'Open Nurses Form', 'Open Surgeries Form', 'Open Hygienists Form', and 'Open Treatment Form'. Under 'OPEN SCHEDULES', there are three buttons: 'Open Dentist Schedule Form', 'Open Hygienist Schedule Form', and 'Open Nurse Schedule Form'. Below these sections, there's a section titled 'VIEW AND PRINT PATIENT INVOICES' which contains a single button labeled 'Open Patient Invoice'. This button is circled in red, and a red arrow points to it from the left. At the bottom left of the menu, there is a small icon of a tooth with a plus sign.

2. Input a patient ID and click the centre button



The screenshot shows the 'Appointment Query Form' interface. At the top, there's a header with a cartoon tooth character and the text 'Appointment Query Form'. Below this, there's a text input field labeled 'Please input Patient ID' with the value 'P178429' entered. Below the input field, there are three buttons: a left arrow button, a document icon button, and a right arrow button.

3. You will see a report similar to this:

Appointments Report				
Appointment_id	Patient_id	Treatment_id	Price	Total
A131234	P178429	T148291	£230	230

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4. Click back on the appointment query form and click the print button

Main Menu Appointment Query Form Appointments Report

Appointment Query Form

Please input Patient ID

5. A print preview will appear, and you will be able to select your preferred printer settings

Appointments Report				
Appointment_id	Patient_id	Treatment_id	Price	Total
A131234	P178429	T148291	£230	230

References

- [1] J. Eckstein and B. R. Schultz, "Classifying Information Systems Tasks: Transaction and Analytical Processing," in *Introductory Relational Database Design for Business, with Microsoft Access*, John Wiley & Sons, Incorporated, 2017, p. 45.
- [2] Visual Paradigm, "What is Entity Relationship Diagram (ERD)?," [Online]. Available: <https://www.visual-paradigm.com/guide/data-modeling/what-is-entity-relationship-diagram/>. [Accessed 9 April 2018].
- [3] W3Schools, "SQL INSERT INTO Statement," [Online]. Available: https://www.w3schools.com/sql/sql_insert.asp. [Accessed 9 April 2018].

Runa Bibi Info Engineering Assignment 2 Report

GRADEMARK REPORT

FINAL GRADE

85/100

GENERAL COMMENTS

Instructor

You presented a very good design and you've used SQL efficiently to build all your tables with the access environment. All tables linked together well

You have a lovely opening screen and a consistent form design throughout. Maybe you sum to your linked tables e.g. figure dentist and hygienist et cetera which can give a better user experience when entering data. Breaches of macros to link to queries to look at the dentist and schedules et cetera. This really is a great system used access well and use the functionality well to build a great end-user system.

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