Medical Informatics: Tutorial 3

SQL querying

- Please attempt all questions on this worksheet in advance of the tutorial, and bring with you all work. Tutorials cannot function properly unless you do the work in advance.
- You are welcome to bring along any questions you may have, e.g. from the lectures.
- Assessment is formative, meaning that tutorials do not contribute to your final grade.

Introduction

In this tutorial you will get to practice with SQL queries. In particular, you will formulate queries for the database introduced in the previous tutorial for keeping track of patients, their GPs and drugs prescribed by GPs to patients.

Relational database for a clinical scenario

Here is a set of table declarations for a relational database to keep track of patients, their GPs and drugs prescribed by GPs to patients.

```
CREATE TABLE General_Practitioner (
    id                  CHAR(10),
    name                VARCHAR(60),
    email               VARCHAR(60),
    current_practice    VARCHAR(60),
    years_of_experience INTEGER,
    PRIMARY KEY (id)
 )
```

```
CREATE TABLE Patient (
    chi             CHAR(10),
    name            VARCHAR(60),
    email           VARCHAR(60),
    postcode        CHAR(6),
    year_of_birth   INTEGER,
    gp_id           CHAR(10) NOT NULL,
    PRIMARY KEY (chi),
    FOREIGN KEY (gp_id) REFERENCES General_Practitioner
 )


CREATE TABLE Drug (
    id              CHAR(10),
    brand_name      VARCHAR(60),
    generic_name    VARCHAR(60),
    company         VARCHAR(60),
    PRIMARY KEY (id)
 )


CREATE TABLE Prescription (
    pr_id           CHAR(10),
    p_id            CHAR(10),
    gp_id           CHAR(10),
    d_id            CHAR(10),
    quantity        INTEGER,
    date            DATE,
    PRIMARY KEY (pr_id),
    FOREIGN KEY (p_id) REFERENCES Patient,
    FOREIGN KEY (gp_id) REFERENCES General_Practitioner,
    FOREIGN KEY (d_id) REFERENCES Drug
 )
```

Example data

The following (fictitious) example data may help you construct your queries.

Patient

chi	name	email	postcode	year_of_birth	gp_id
0103624538	Alastair Brown	a.brown@example.com	EH89FK	1962	gke8849340
1208783406	Amy Murray	a.murray@example.com	AB83KL	1978	vnn8458554
3005402592	Fiona Campbell	f.campbell@example.com	LO43PR	1940	asw2213032
0812965634	Julia Clark	j.clark@example.com	SD34TR	1996	asw2213032
1411845100	Rhona Wilson	r.wilson@example.com	SD98VF	1984	kwr9852345
3101974980	Andrew Ross	a.ross@example.com	SH51MN	1997	fcv0949043
2208663398	Hamish Walker	h.walker@example.com	EH24DX	1966	sdf2939475
1909793256	Iain Scott	i.scottt@example.com	EH56FF	1979	fcv0949043

General_Practitioner

id	name	email	current_practice	years_of_experience
sdf2939475	Charlotte Aitken	c.aitken@example.com	Meadows Clinic	4
gke8849340	David Taylor	d.taylor@example.com	Rose Clinic	23
vnn8458554	Lucy Taylor	l.taylor@example.com	Rose Clinic	35
fcv0949043	Jack McGregor	j.mcgregor@example.com	Talbot Practice	12
asw2213032	Kyle Russell	k.russell@example.com	Earth Practice	26
kwr9852345	Hannah Mclean	h.mclean@example.com	Foster Clinic	8

Drug

id	brand_name	generic_name	company
gf23496889	Humolin R	Minocycline	PharmaWorld
po50094505	Novalin R	Minocycline	GrecoGen
mq95032359	Precoz	Acarbose	PharmaWorld
op99823820	Glucabay	Acarbose	HealthRight
kr87019382	Mycabutin	Rifabutin	GrecoGen
zg93055406	Zagan	Sparfloxacin	HorizonMed

Prescription

pr_id	p_id	gp_id	d_id	quantity	date
dfgkj38392	3005402592	asw2213032	gf23496889	1	20-01-2006
pepro83321	3005402592	asw2213032	gf23496889	1	29-11-2007
merer11760	3101974980	fcv0949043	po50094505	3	10-06-2014
mettr44039	2208663398	sdf2939475	gf23496889	5	08-01-2015
plote50975	3005402592	asw2213032	op99823820	1	08-01-2015
clarw81294	2208663398	sdf2939475	zg93055406	2	18-05-2015
bfhoo06912	0812965634	asw2213032	mq95032359	4	20-01-1999

Questions: Queries in SQL

For each of the following questions, formulate the corresponding SQL queries in SQL. If you can think of different variations of SQL queries for any questions, write these down as well.

Optional: Running your SQL queries

If you wish to, you can run your queries with the use of MySQL (based on what we learnt in Lab 1) after importing `tut3_db.sql`, which you can access from the course website.

Alternatively, you can run your queries with the use of the freely available online tool SQL Fiddle at http://www.sqlfiddle.com/. To use the tool, please copy and paste the content of the text file tut3.txt into the Schema Panel on the left, and then click the "Build Schema" button. You only need to do this once (to create the database and populate it with data). Once this is successfully done, you can write your SQL queries inside the Query Panel on the right, and then click the "Run SQL" button. The results should appear on the bottom part of the screen. Note that you should only include one SQL query in the Query Panel, and you should click the "Run SQL" button every time you want to run a query.

(1) Retrieve the details of all GPs. The schema of the output table should be the same as that of the General_Practitioner table.

(2) Retrieve the names and emails of all GPs that have more than 10 years of experience.

(3) Retrieve the names of all patients that are registered with a GP that has more than 10 years of experience.

(4) Retrieve the emails of all patients that are currently between 18 and 21 years old (including 18 and 21).

(5) Retrieve all drugs produced by PharmaWorld and HealthRight.

(6) Retrieve the names of all patients, along with the names and current practices of their GPs.

(7) Retrieve the brand names of all drugs with generic name 'Minocycline', along with the corresponding producing companies.

(8) Retrieve the names of all patients that have been prescribed a drug with generic name 'Minocycline'.

(9) Retrieve the names of all patients that have been prescribed a drug with generic name 'Minocycline' by a GP that has more than 10 years of experience.