MONASH University
Information Technology

FIT9132 Introduction to Databases

2021 Semester 2

Assignment 2B - SQL - County General Hospital

Assignment weighting 15%

Marked out of 100 returned as a grade out of 15

County General Hospital treats patients who are identified by a unique patient id. When a patient is admitted to the hospital, the hospital records the patient's first and last name, address, date of birth and emergency contact number (if they are not already on the system). They also record the date and time of admission. The system needs to maintain a record of all admissions for a particular patient. When a patient is discharged, the date and time of their discharge for this admission is recorded.

While in the hospital each patient is assigned one doctor (identified by a doctor id) as their supervising doctor. A patient's supervising doctor may be in charge of many admissions. The hospital records each doctor's title, first and last names and phone number. A doctor may have one or more specialisations (eg. Orthopaedic, Renal, etc), but not all doctors who work at the hospital have a specialisation.

During their admission, patients are prescribed procedures as part of their care by doctors. Procedures consist of tests such as "X-Rays", "Blood Tests" etc, they also include medical procedures which might be required such as "Shoulder Replacement". A patient may have procedures prescribed by their supervising doctor or any other doctor working in the hospital.

A procedure is identified by a procedure code. Each procedure has a name (such as "Wrist X-Ray") and includes a description of what the procedure involves, the time required for the procedure and the current standard patient cost for this procedure. When a particular procedure is prescribed during a patient's admission, the date and time when the procedure is carried out is also recorded. A particular procedure is completed before any further procedures are run (two procedures cannot occur simultaneously). Some procedures, such as blood tests are carried out by technicians, more complex procedures may require a doctor to perform the procedure.

If a procedure is carried out by a technician the hospital does not record the details of the technician who completed the procedure.

If a doctor carries out the procedure, the doctor who completes the procedure is recorded (the doctor who completes the procedure may be different from the doctor who prescribes it). Even if a team of doctors is involved in the procedure, only one doctor (the doctor in charge) is recorded as completing the procedure.

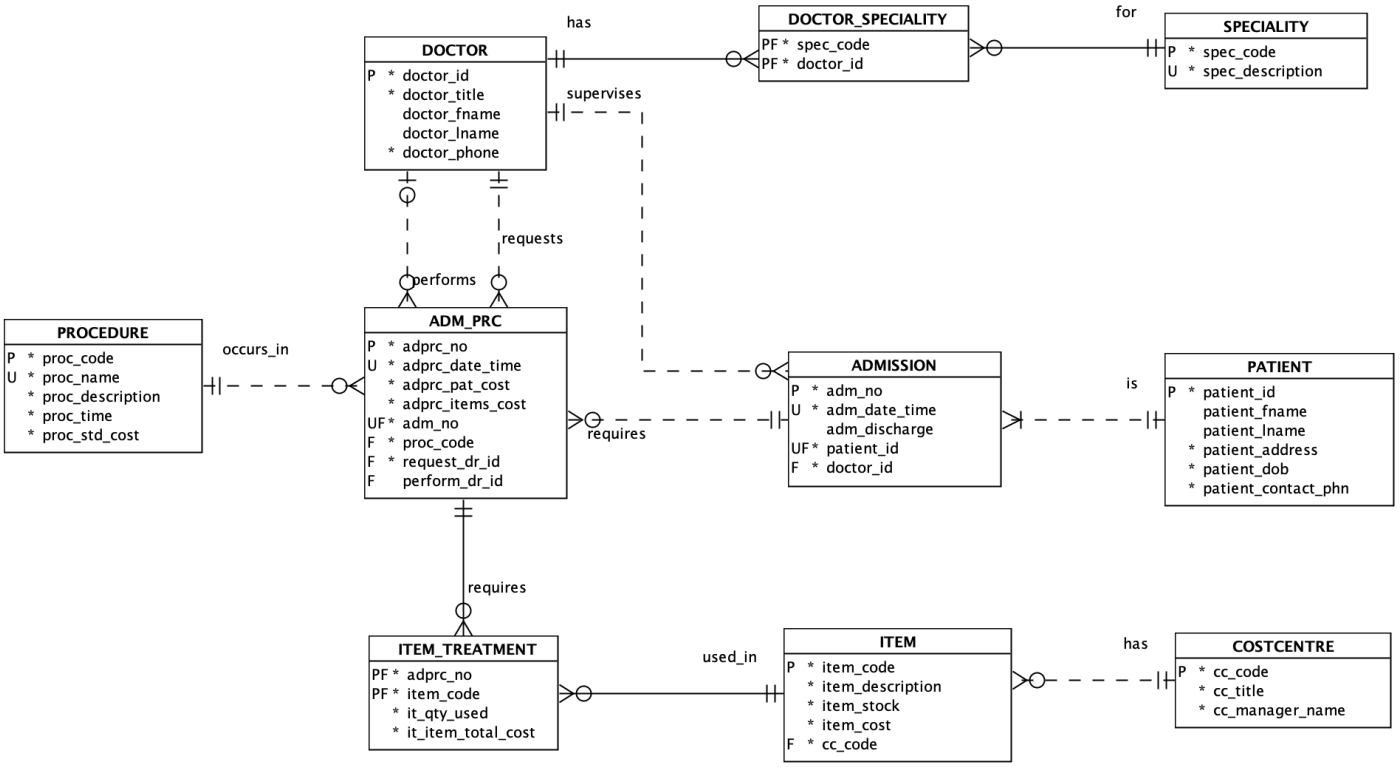
County General Hospital only records the details of a procedure carried out on an admission after the procedure has been completed.

Not all admissions require a procedure to be carried out.

Procedures may require "extra" items such as syringes or swabs. Each item held in stock is assigned an item code. The item description, current stock and price are recorded. For accounting purposes, each item is assigned to a unique cost centre, such as Pharmacy, Radiography or Patient Aids. A cost centre is identified by a cost centre code and has recorded the cost centre title and manager's name. The quantity of each item used in a particular procedure is recorded.

Patients are billed for the cost for the procedure itself and also any "extra" items which are used as part of a procedure. The billed charge is based on the procedure/item cost at the date and time of the procedure.

A data model has been developed for the County General Hospital, the logical model is shown below:



The tables for the County General Hospital have been created in the Monash Oracle server and are available from the user **CGH** who has given you select rights on the tables. You will use these tables to answer the SQL Queries listed below.

Your answers for these tasks must be placed in the supplied SQL Script **cgh_queries.sql**

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In answering these queries you are ONLY permitted to use the SQL structures and syntax which have been covered within this unit ie. the material covered in SQL Basic (week 7 workshops & week 8 tutorial), SQL Intermediate (week 9 workshops & week 10 tutorial), SQL Advanced (week 10 workshops & week 11 tutorial) and the Oracle Common Functions document.

SQL syntax and commands outside of the covered work, as detailed above, will not be accepted/marked.

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You must ONLY use the data as provided in the text of the questions. Where a particular case (upper case, lower case, etc.) for a word is provided you **must only use that case**. You may divide names such as Abra Baltzar into the first name of Abra and a last name of Baltzar if required. **Failure to adhere to this requirement will result in a mark of 0 for the relevant question**.

ANSI joins must be used where two or more tables are to be joined, ***under no circumstances can "implicit join notation" be used*** *- see the week 7 workshop slides and the week 8 tutorial*

When required to show output which involves the patient or doctor name as a full name, the name must not have any leading spaces (ie. not start with a space).

Where a full name is requested in any output it should be in the form first name last name eg. Abra Baltzar.

REMEMBER you must keep up to date with the Moodle Ed Assignment 2B forum where further clarifications may be posted (this forum is to be treated as your client).

Please be careful to **ensure you do not post anything which includes your reasoning, logic or any part of your work to this forum**, *doing so violates Monash plagiarism/collusion rules* and has significant academic penalties.

Queries to complete [100 marks]

Q1. List the doctor title, first name, last name and contact phone number for all doctors who specialise in the area of "ORTHOPEDIC SURGERY" (this is the specialisation description). Order the list by the doctors' last name and within this, if two doctors have the same last name, order them by their respective first names.

[6 marks]

Q2. List the item code, item description, item stock and the cost centre title which provides these items for all items which have a stock greater than 50 items and include the word 'disposable' in their item description. Order the output by the item code.

[6 marks]

Q3. List the patient id, patient's full name as a single column called 'Patient Name', admission date and time and the supervising doctor's full name (including title) as a single column called 'Doctor Name' for all those patients admitted between 10 AM on 11th of September and 6 PM on the 14th of September 2021 (inclusive). Order the output by the admission time with the earliest admission first.

[9 marks]

Q4. List the procedure code, name, description, and standard cost where the procedure is less expensive than the average procedure standard cost. The output must show the most expensive procedure first. The procedure standard cost must be displayed with two decimal points and a leading $ symbol, for example as $120.54

[9 marks]

Q5. List the patient id, last name, first name, date of birth and the number of times the patient has been admitted to the hospital where the number of admissions is greater than 2. The output should show patients with the most number of admissions first and for patients with the same number of admissions, show the patients in their date of birth order.

[9 marks]

Q6. List the admission number, patient id, first name, last name and the length of their stay in the hospital for all patients who have been discharged and who were in the hospital longer than the average stay for all discharged patients. The length of stay must be shown in the form 10 days 2.0 hrs where hours are rounded to one decimal digit. The output must be ordered by admission number.

[12 marks]

Q7. Given a doctor may charge more or less than the standard charge for a procedure carried out during an admission procedure, the hospital administration is interested in finding out what variations on the standard price have been charged. The hospital terms the difference between the *average* actual charged procedure cost which has been charged to patients for all such procedures which have been carried out the procedure standard cost as the "Procedure Price Differential". For all procedures which have been carried out on an admission determine the procedure price differential. The list should show the procedure code, name, description, standard time, standard cost and the procedure price differential in procedure code order.

For example procedure 15509 "X-ray, Right knee" has a standard cost of $70.00, it may have been charged to admissions on average across all procedures carried out for $75.00 - the price differential here will be 75 - 70 that is a price differential +5.00 If the average charge had been say 63.10 the price differential will be -6.90.

[15 marks]

Q8. For every procedure, list the items which have been used and the maximum number of those items used when the procedure was carried out on an admission. Your list must show the procedure code, procedure name, item code and item description and the maximum quantity of this item used for the given procedure.

For example, Vascular Surgery may require one standard anaesthetic pack, and then a number of Bupivacaine injections; sometimes one has been used sometimes two - the required listing will show:

43556	Vascular surgery	AN002	Std Anaesthetic Pack	1
43556	Vascular surgery	BI500	Bupivacaine Inj .5% 10ml Steriamp	2

If the procedure has not been carried out on any admission or has not used any items then the item code, item description and maximum quantity columns must show "---". The output must be in procedure name order and within a procedure in item code order.

[16 marks]

Q9. Find the ninth most expensive procedure/s for a procedure carried out on an admission.

As an example, say we have the following "dummy" data (note these are just representative numbers, they do not reflect the data you have access to):

ADPRC_NO	PROC_CODE	ADM_NO	PATIENT_ID	TOTALCOST
1200	43114	100300	100200	500.01
1210	43114	100340	100189	400.95
1203	32266	100310	100210	310.10
1215	15509	100300	100200	253.24
1207	15509	100300	100200	253.24
1240	15509	100350	100289	100.00
1201	65554	100300	100200	100.00
1211	65554	100300	100200	88.98

The fifth most expensive procedure/s here, are those identified by adprc_nos 1240 and 1201 in this "dummy" data.

Your report must show the admission procedure number, the procedure code, the admission number, the patient id who this procedure was carried out on, the date and time (time in 24 hour format) that the procedure was carried out and the total cost for the procedure. The total cost will be the cost charged to this patient for this procedure plus the cost for extra items required. The output should be in admission procedure number order.

[18 marks]

--- **End of Queries** ----

SUBMISSION REQUIREMENTS

Due Date: **Thursday 21st October 2021 at 4 PM AEDT (week 12)**

*Please note, if you need to resubmit, you **cannot** depend on your tutors' availability, for this reason, please be VERY CAREFUL with your submission.* **It is strongly recommended that you submit several hours before this time to avoid such issues.**

For this assignment there is only one file you are **required** to submit:

- cgh_queries.sql

If you need to make any comments to your marker/tutor please place them at the head of this script in the "Comments for your marker:" section.

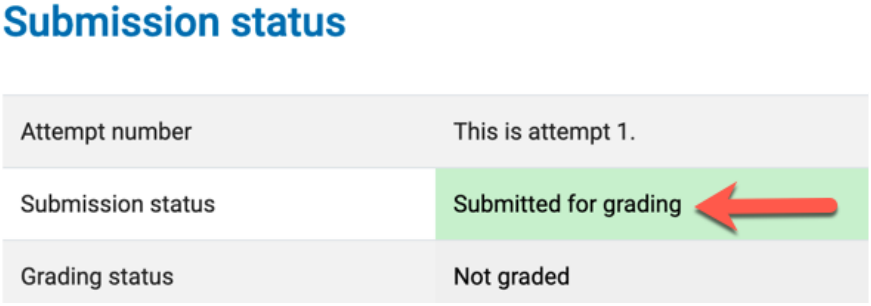
Do not zip this file into a zip archive, submit the SQL script as it is. The SQL script must also have been pushed to the FIT GitLab server with an appropriate history as you developed your solutions (a minimum of four pushes). Please ensure your commit comments are meaningful.

Late submission will incur penalties at the rate of -5 mark for every 12 hours the submission is late.

Please note we **cannot mark any work on the GitLab Server**, you need to ensure that you submit correctly via Moodle since it is only in this process that you complete the required student declaration without which work **cannot be assessed**.

It is your responsibility to ENSURE that the file you submit is the correct files - we strongly recommend after uploading a submission, and prior to actually submitting, that you download the submission and double-check its contents.

Your assignment **MUST** show a status of "Submitted for grading" before it will be marked.



If your submission shows a status of "Draft (not submitted)" it will not be assessed and **will incur late penalties after the due date/time**.

Please ***carefully*** read the documentation under the "Assignment Submission" on the Moodle Assessments page which covers things such as extensions and resubmission.

CRITERIA FOR MARKING

Submissions will be graded on:

- the correct application of SQL statements and constructs to:
    - retrieve the required data in the required format, and
    - where a layout or column heading has been specified, appropriately reflect these requirements.

Submissions **will be grade penalised** if they:

- contain SET ECHO … or SPOOL commands,
- the SQL code is not formatted consistently
- do not have a semicolon (;) closing the query for every query submitted,
- do not make use of column aliases when you use arithmetic calculation, concatenation, functions, or other output manipulation unless specified otherwise in the above,
- do not use to_char/to_date where appropriate in handling dates,
- use subqueries and SQL conditions unnecessarily (although you are not required to consider efficiency of your solution you should try an ensure that you use the minimum number of subqueries and SQL conditions when arriving at your answer),
- do not have an appropriate development history on the FIT GitLab server for all source files (**at least four pushes required**),
- do not restrict the SQL structures and syntax used to those which have been covered within this unit ie. the material in SQL Basic (week 7 workshops & week 8 tutorial), SQL Intermediate (week 9 workshops & week 10 tutorial), SQL Advanced (week 10 workshops & week 11 tutorial) and the Oracle Common Functions document. Any such material will NOT be marked.