

MATH6183 – SQL Coursework

- This coursework will count for 15% of the assessment for MATH6183.
- Details of how to submit the coursework are provided below.
- The deadline for the coursework is **15:59 on 3 November 2023**. The time of electronic submission is taken from Blackboard.
- The deadline is strict. Please refer to the course handbooks for the penalties applied to late assignments.
- Remember to back up your work regularly. No additional time will be given for lost computer files.
- This work must be your own. Any references used must be cited and any help received from others should be duly acknowledged. You are reminded that cheating and plagiarism are treated very seriously by Mathematical Sciences and by the University.

Electronic submissions

- You are expected to submit electronically one pdf file. Details of what to include in the pdf file are given below.
- Please name your files using the final eight digits of your student ID number **only**, e.g. 12345678.pdf, where 12345678 should be replaced by your student ID number. Do not include your name.
- Your file should be uploaded to the MATH6183 Blackboard site in the Assignments section.

SQL Assignment: Hospital Staff Shift Allocation Database

Background:

You have been given a database that details which staff member has been allocated to each ward in a hospital for each of three shifts (morning, evening, night) between the start of January 2022 and the end of August 2022. The data are stored in hospital.db, which can be downloaded from Blackboard. Below we give a brief description of the tables and fields within the database but you can also use the commands learned in the SQL workshops to determine the structure of the database and the fields within each table.

Database Structure

The database consists of five tables:

1. **allocation:** The allocation table is a list of allocations of staff members to shifts and wards on particular days. It contains the fields: `allocation_id` (primary key), `allocation_people_id` (link to the people table), `allocation_date`, `allocation_shift` (which of three shifts the allocation is being made for and a link to the shift table), `allocation_ward` (link to the ward table indicating which ward the person is working on).
2. **band:** The band table provides information on the band a person is working at. It contains the fields: `band_id` (primary key), `band_type` (whether a person at this band is a consultant, doctor, health care assistant or a nurse), `band_salary` (the annual salary of someone at this band).
3. **people:** The people table includes all of the personal information about members of staff. It includes the fields: `people_id` (primary key), `people_first_name` (first name of staff member), `people_surname` (last name of staff member), `people_email` (e-mail address of staff member), `people_telephone` (telephone number of staff member), `people_dob` (date of birth of staff member), `people_band` (a code indicating which band the person is employed at which links to the band table), `people_specialty` (the specialty that the staff member works within, e.g. orthopaedics, neurology, etc.).
4. **shift:** The shift table provides details of the shifts. It includes the fields: `shift_id` (primary key), `shift_start` (time that the shift begins), `shift_end` (time that the shift finishes).
5. **ward:** The ward table provides details of the wards. It includes the fields: `ward_id` (primary key), `ward_specialty` (the type of patients treated on the ward, e.g. orthopaedics, neurology), `ward_patients` (the capacity of the ward).

Tasks:

Write SQL queries for each of the following questions. You should be able to use a single query for each question.

1. Output the total number of hours that the staff member with ID number 10566 has worked in the given time period. You can assume that each shift lasts for 8 hours.
2. Output a list of staff members who were born in 1957, ordered from oldest to youngest, giving their full names written as “[first name] [surname]” and their dates of birth.
3. Output a list of staff who were working in the Neurology Ward on 1 June 2022 giving their full names written as “[first name] [surname]”.
4. The hospital spotted suspicious behaviour on the General Wards (G1 and G2) on the following shifts in March: morning 3 March 2022; morning 8 March 2022; evening 14 March 2022. Return the name(s) of any staff members who have worked on all three of these shifts. Do not return the names of staff members who have only worked on one or two of these shifts.
5. Output the number of each staff type (consultant, doctor, health care assistant, nurse) working each shift for the emergency department on 1 May 2022.

6. Output the total number of hours worked by each type of staff member (HCA, nurse, doctor, consultant) for each month from January to August 2022.
7. Output the total staff costs for each specialty between 1 January 2022 and 31 August 2022. Assume that a full-time member of staff works 230 shifts per year and that the salary figures given in the band table are the amount paid to a member of staff for one year's work.

Your document should include a title and then a list of solutions to the above questions. Each solution should include a clearly formatted SQL query and the output of the query. Please make it clear which question you are answering within the document.

If you choose to edit your SQL in a package other than SQLite, please check that it will work in SQLite.

Marking

The assignment will be marked out of 100, with the marks allocated as follows:

- 85 marks: SQL queries
- 15 marks: clear formatting of queries and solutions