Assignment 1
Data Management for the Big Data Age

1 Assignment Description

This is a group assignment. Students are referred to the university's policy on plagiarism. The aim of this assignment is to develop skills for using SQL to create, query and manipulate databases (Task 1) and designing databases using ER modelling techniques (Task 2).

2 Task 1: SQL

Consider the following employee database:

> EMP(empno, ename, job, *mgrno*, hiredate, sal, comm, *deptno*)
> DEPT(deptno, dname, location)

Employees identified by EMPNO work in departments identified by *DEPTNO*. Employees have managers identified by *MGRNO*. Employees who manage other employees are managers.

Implement the following requests using MariaDB and show both the SQL queries/updates and query outputs with headings indicating question numbers (2.1 – 2.6). Temporary tables are not allowed to use to formulate the queries/updates.

2.1 Database Creation and Population
Create the employee database using the above database schema. Populate the tables with data supplied at the end of this section. Show the table create statements and ensure that primary and foreign keys are correctly defined.

2.2 Find employees (ENAME) whose job (JOB) is either ANALYST or PROGRAMMER, ordered by employee name.

2.3 Find employees whose salary (SAL) is higher than their manager's salary. List name of both employees (ENAME) and their managers (rename as MNAME).

2.4 Find departments (DNAME) in which all employees earn more than 4000.

2.5 Find the department with the largest number of employees. Show DNAME, the number of employees, and the average salary. If more than one such department exists, list all of them.

2.6 Update for those employees who work for the departments located in "ADELAIDE" by increasing their salaries by 6%. Show all columns of the EMP table after the update.

EMP

EMPNO	ENAME	JOB	MGRNO	HIREDATE	SAL	COMM	DEPTNO
7839	ALAN	TRAINER		17-NOV-13	5000		10
7698	LARRY	TRAINER	7839	01-MAY-15	3000		30
7782	RICHARD	TRAINER	7839	09-JUN-17	4200		10
7566	DEAN	TRAINER	7839	02-APR-17	3200		40
7654	MIKE	SALESMAN	7698	28-SEP-12	3300	3500	30
7499	JIM	SALESMAN	7698	20-FEB-13	1600	1000	30
7844	JEAN	SALESMAN	7698	08-SEP-13	1500		30
7900	JAMES	PROGRAMMER	7698	03-DEC-15	3500		30
7521	JILL	SALESMAN	7698	22-FEB-15	2300	500	30
7902	HARRY	ANALYST	7566	03-DEC-17	3000		40
7369	ANNE	PROGRAMMER	7902	17-DEC-16	1200		20
7788	KIM	ANALYST	7566	09-DEC-16	3000		20
7876	ADAM	PROGRAMMER	7788	12-JAN-18	3100		20
7934	TIM	PROGRAMMER	7782	23-JAN-18	4500		10

DEPT

DEPTNO	DNAME	LOCATION
10	CONSULTING	ADELAIDE
20	SALES	ADELAIDE
30	MARKETING	SYDNEY
40	EDUCATION	MELBOURNE

3   Task 2: ER

The BestChoice Real Estate Agent employs you to design database for them. Here's the information that you gather:

1) BestChoice has many branches throughout the country. Each branch has a unique branch number, an address, a telephone number and an email address. Detail information about an address includes: unit number if any, street number, street name, suburb, state, and postcode.
2) Each branch has employees. Each employee has an employee number (unique within BestChoice), a name, an address, a telephone number, annual salary and the date the employee joined BestChoice. Detail information about an address is the same as that of a branch. One employee cannot work for more than one branch.
3) Each branch must have a manager who manages the operations of the branch.
4) Within BestChoice each employee (except the CEO) has a supervisor to report to.
5) Each branch has properties for rent. Each property for rent is allocated to an employee, who oversees the management of the property. The property number, address, type, number of rooms, weekly rent and a set of features are recorded for each property. Each feature is recorded separately for later use. Detail information about an address is the same as that of a branch. The property number is unique within BestChoice.
6) BestChoice keeps information about owners and renters. A property must be owned by one owner and can be rented by at most one renter. An owner must own at least one property. A renter may rent several properties or may not rent a property.
7) For an owner, a unique owner number, a name, a telephone number and the number of a bank account should be given. For a renter, a unique renter number, a name, a telephone

number, preferred type of accommodation and the maximum weekly rent the renter is prepared to pay should be indicated.

8) When a property is rented out, a rental agreement is drawn up between the renter and the property. The actual weekly rent, the start date and the ending date of the rental are recorded in each rental agreement.

You are required to

(a) draw an ER diagram that captures the above information;
(b) transform the ER diagram in (a) into a set of relation schema, and indicate primary and foreign keys.

4   Submission Requirements

You are asked to submit a single pdf file with the name Assignment1.pdf to canvas. If you need to submit more than one file, put them in a single ZIP file. For each submitted file, you are required to include the information about your group, including each member of the group.

5   Marking Scheme

Work will be assessed based on the quality and presentation. The assignment will be marked out of 60 and will contribute **15%** towards assessment of the unit.

Assessment item	Marks
2.1	8
2.2	4
2.3	4
2.4	4
2.5	4
2.6	4
3(a).1	4
3(a).2	4
3(a).3	2
3(a).4	2
3(a).5	4
3(a).6	2
3(a).7	4
3(a).8	2
3(b)	8
Total	60