SOFTENG 351 S1 C – Lab 01
Due Date: Sunday 15 March 2020 at 11:59pm

SE | Software Engineering
The University of Auckland

10 marks in total = 1% of the final grade

DATABASES AND DATABASE USERS

Figure 1.2 A database that stores student and course information.

STUDENT

Name	Student_number	Class	Major
Smith	17	1	CS
Brown	8	2	CS

COURSE

Course_name	Course_number	Credit_hours	Department
Intro to Computer Science	CS1310	4	CS
Data Structures	CS3320	4	CS
Discrete Mathematics	MATH2410	3	MATH
Database	CS3380	3	CS

SECTION

Section_identifier	Course_number	Semester	Year	Instructor
85	MATH2410	Fall	07	King
92	CS1310	Fall	07	Anderson
102	CS3320	Spring	08	Knuth
112	MATH2410	Fall	08	Chang
119	CS1310	Fall	08	Anderson
135	CS3380	Fall	08	Stone

GRADE_REPORT

Student_number	Section_identifier	Grade
17	112	B
17	119	C
8	85	A
8	92	A
8	102	B
8	135	A

PREREQUISITE

Course_number	Prerequisite_number
CS3380	CS3320
CS3380	MATH2410
CS3320	CS1310

1. Identify some informal queries and update operations that you would expect to apply to the database shown in Figure 1.2.

[1 Mark]

2. Specify all the relationships among the records of the database shown in Figure 1.2.

[1 Mark]

3. Give some additional views that may be needed by other user groups for the database shown in Figure 1.2.

[1 Mark]

4. Cite some examples of integrity constraints that you think can apply to the database shown in Figure 1.2.

[1 Mark]

5. Consider Figure 1.2.
a.   If the name of the 'CS' (Computer Science) Department changes to 'CSSE' (Computer Science and Software Engineering) Department and the corresponding prefix for the course number also changes, identify the columns in the database that would need to be updated.
b.   Can you restructure the columns in COURSE, SECTION, and PREREQUISITE tables so that only one column will need to be updated?

[2 Mark]

DATABASE SYSTEM CONCEPTS AND ARCHITECTURE

6. Think of different users for the database of Figure 1.2. What type of applications would each user need? To which user category would each belong and what type of interface would they need?

[1 Mark]

7. If you were designing a Web-based system to make airline reservations and to sell airline tickets, which DBMS Architecture, i.e., Centralized DBMS, Basic Client/Server or Three-Tier Client/Server Architecture, would you choose? Why? Why would the other architectures not be a good choice?

[1 Mark]

8. Consider the following

Figure 2.1 Schema diagram for the database in Figure 1.2.

STUDENT

Name	Student_number	Class	Major

COURSE

Course_name	Course_number	Credit_hours	Department

PREREQUISITE

Course_number	Prerequisite_number

SECTION

Section_identifier	Course_number	Semester	Year	Instructor

GRADE_REPORT

Student_number	Section_identifier	Grade

In addition to constraints relating the values of columns in one table to columns in another table, there are also constraints that impose restrictions on values in a column or a combination of columns within a table. One such constraint forces that a column or a group of columns must be unique across all rows in the table. For example, in the STUDENT table, the StudentNumber column must be unique (to prevent two different students from having the same StudentNumber). Identify the column or the group of columns in the other tables that must be unique across all rows in the table?

[2 Mark]