Unit 2 - Structured Query Language (SQL)

1. What are the DDL statements? Explain with their syntax.

2. What are the DML statements? Explain with their syntax.

3. What are the different data types used in Oracle SQL?

4. Explain different types of constraints on attributes in relational database management system.

5. Demonstrate the use of alter command with examples.

6. Write SQL Statements to perform following tasks-

   a. To add new column in existing table.

   b. To remove column from existing table.

   c. To change data type of column in existing table.

   d. To add NOT NULL constraint on particular attribute.

   e. To add check constraint on particular attribute.

   f. To add primary key to table.

   g. To add foreign key to table.

7. Give three variations of insert command with example.

8. What are the different types of SQL joins?

9. Explain different variations of Outer Join – full, right, left with example

10. Explain inner join with example

11. Explain Cartesian product with example

12. Explain natural join with example

13. Explain different aggregate functions with example

14. Explain the SQL Statements – like, in, between

15. Explain group by- having clause with example

16. Explain different set operations with example– union all, union, minus, intersect.

17. Given the Academic Institute database composed of following tables, where the primary keys are underlined. Give an expression in SQL for each of the following queries.

person (pid, pname, paddress, uid)

UIDData(uid, age)

student (rollno, pid, class, dept)

faculty (fid, pid, dept)

Studentattendance(rollno, perattendance);

Studentmarks(rollno, subject, marks)

Studentfee(rollno, feepaid, feedues)

Lectures(fid, class, subject)

Give an expression in SQL for each of the following queries

      a. Find the faculty who is also studying in M.Tech

      b. Find address of students whose attendance is less than 70%

      c. Find all the students who are eligible for voting

      d. Find the total fee paid by T.E.CSE students

      e. Find the address of students who have backlog subjects

      f. Find the list of students who are supposed to attend DBE lectures.

      g. Find all the teachers who teaches to student with uid 123456789101

      h. Find the faculties teaching a subject in which no defaulter student is found.

18. **Write a program in Java to create following tables and write sql queries to perform given tasks in Oracle**
Sailors(sid: integer, sname: string, rating: integer, age: real)
Boats(bid: integer, bname: string, color: string)
Reserves(sid: integer, bid: integer)

   a. Find the names and ages of all sailors

   b. Find all sailors with a rating above 7

   c. Find the names of sailors who have reserved boat number 103

   d. Find the sids of sailors who have reserved a red boat

   e. Find the colors of boats reserved by Raj

   f. Find the names of sailors who have reserved at least one boat

   g. Find the names of sailors who have reserved a red or green boat

   h. Find the names of sailors who have reserved both a red and a green boat

   i. Find sids of all sailors who have reserved red boats but not green boats

   j. Find all sids of sailors who have a rating of 10 or reserved boat 104

   k. Find the names of sailors who have not reserved a red boat

   l. Find sailors whose rating is better than some sailor called Ram.

   m. Find the names of sailors who have reserved all boats

   n. Find the average age of all sailors

   o. Find the average age of sailors with a rating of 10

   p. Find the name and age of the oldest sailor

   q. Count the number of sailors

   r. Count the number of different sailor names

   s. Find the names of sailors who are older than the oldest sailor with rating of 10

   t. Find the age of the youngest sailor for each rating level

   u. Find the age of youngest sailor who is at least 18 years old

   v. For each red boat, find the number of reservations for this boat

   w. Find average age of sailors for each rating level.

   x. Find those ratings for which the average age of sailors is 18

19. Consider the following relations:

Student(snum: integer, sname: string, major: string, level: string, age: integer)
Class(cname: string, room: string, fid: integer)
Enrolled(snum: integer, cname: string)
Faculty(fid: integer, fname: string, deptid: integer)

Write the following queries in SQL. No duplicates should be printed in any of the answers.

1. Find the names of all Juniors (Level = JR) who are enrolled in a class taught by I. Teach.

2. Find the age of the oldest student who has History major

3. Find the age of the oldest student who is enrolled in a coursetaught by I. Teach.

4. Find the names of all classes that meet in room R128

5. Find the names of all classes that have five or more studentsenrolled.

6. Find the names of all students who are enrolled in two classes

7. Find the names of faculty members who teach in every room in which some class istaught.

8. Find the names of faculty members for whom the combined enrollment of the courses that they teach is less than five.

9. Print the Level and the average age of students for that Level, for each Level.

10. Print the Level and the average age of students for that Level, for all Levels except JR.

11. Find the names of students who are enrolled in the maximum number of classes.

12. Find the names of students who are not enrolled in any class.

20. Consider the following schema:

Suppliers(*sid:* integer, *sname:* string, *address:* string)

Parts(*pid:* integer, *pname:* string, *color:* string)

Catalog(*sid:* integer, *pid:* integer, *cost:* real)

1. Find the *pname*s of parts for which there is some supplier.

2. Find the *sname*s of suppliers who supply every part.

3. Find the *sname*s of suppliers who supply every red part.

4. Find the *pname*s of parts supplied by Acme Widget Suppliers and by no one else.

5. Find the *sid*s of suppliers who charge more for some part than the average cost of thatpart (averaged over all the suppliers who supply that part).

6. For each part, Find the *sname*of the supplier who charges the most for that part.

7. Find the *sid*s of suppliers who supply only red parts.

8. Find the *sid*s of suppliers who supply a red part and a green part.

9. Find the *sid*s of suppliers who supply a red part or a green part

21. The following relations keep track of airline flight information:

Flights(*flno:* integer, *from:* string, *to:* string, *distance:* integer,

departs: time, *arrives:* time, *price:* integer)

Aircraft(*aid:* integer, *aname:* string, *cruisingrange:* integer)

Certified(*eid:* integer, *aid:* integer)

Employees(*eid:* integer, *ename:* string, *salary:* integer)

1. Find the names of aircraft such that all pilots certified to operate them earn more than
80,000.

2. For each pilot who is certified for more than three aircraft, find the *eid* and the maximum
Cruisingrange of the aircraft that he (or she) is certified for.

3. Find the names of pilots whose *salary* is less than the price of the cheapest route fromLos Angeles to Honolulu.

4. For all aircraft with *cruisingrange* over 1,000 miles, find the name of the aircraft and theaverage salary of all pilots certified for this aircraft.

5. Find the names of pilots certified for some Boeing aircraft.

6. Find the *aid*s of all aircraft that can be used on routes from Los Angeles to Chicago.

7. Identify the flights that can be piloted by every pilot who makes more than $100,000.
(*Hint:* The pilot must be certified for at least one plane with a sufficiently large cruising
range.)

8. Print the *ename*s of pilots who can operate planes with *cruisingrange* greater than 3,000 miles, but are not certified on any Boeing aircraft

9. A customer wants to travel from Madison to New York with no more than two changesof flight. List the choice of departure times from Madison if the customer wants to arrivein New York by 6 p.m.

10. Compute the difference between the average salary of a pilot and the average salary ofall employees (including pilots).

11. Print the name and salary of every non pilot whose salary is more than the average salary for pilots.

22. Consider the following relational schema.
An employee can work in more than one department; the *pct time* _eld of the Works relation shows the percentage of time that a
given employee works in a given department.
Emp(*eid:* integer, *ename:* string, *age:* integer, *salary:* real)
Works(*eid:* integer, *did:* integer, *pct time:* integer)
Dept(*did:* integer, *budget:* real, *managerid:* integer)

Write the following queries in SQL:
1. Print the names and ages of each employee who works in both the Hardware department and the Software department.

2. For each department with more than 20 full-time-equivalent employees (i.e., where the part-time and full-time employees add up to at least that many full-time employees), print the *did* together with the number of employees that work in that department.

3. Print the name of each employee whose salary exceeds the budget of all of the departments that he or she works in.

4. Find the *managerid*s of managers who manage only departments with budgets greater than $1,000,000.

5. Find the *ename*s of managers who manage the departments with the largest budget.

6. If a manager manages more than one department, he or she *controls* the sum of all the budgets for those departments. Find the *managerid*s of managers who control more than $5,000,000.

7. Find the *managerid*s of managers who control the largest amount.

23. Consider the employee database, where the primary keys are underlined.
Give an expression in SQL for each of the following queries.

employee(*employee-name*, *street*, *city*)
works(*employee-name, company-name*, *salary*)
company(*company-name*, *city*)
manages(*employee-name, manager-name*)

a. Find the names of all employees who work for First Bank Corporation.

b. Find the names and cities of residence of all employees who work for First Bank Corporation.

c. Find the names, street addresses, and cities of residence of all employees who work for First Bank Corporation and earn more than $10,000.

d. Find all employees in the database who live in the same cities as the companies for which they work.

e. Find all employees in the database who live in the same cities and on the same streets as do their managers.

f. Find all employees in the database who do not work for First Bank Corporation.

g. Find all employees in the database who earn more than each employee of Small Bank Corporation.

h. Assume that the companies may be located in several cities. Find all companies located in every city in which Small Bank Corporation is located.

i. Find all employees who earn more than the average salary of all employees of their company.

j. Find the company that has the most employees.

k. Find the company that has the smallest payroll.

l. Find those companies whose employees earn a higher salary, on average, than the average salary at First Bank Corporation.

m. Modify the database so that Jones now lives in Newtown.

n. Give all employees of First Bank Corporation a 10 percent raise.

o. Give all managers of First Bank Corporation a 10 percent raise.

p. Give all managers of First Bank Corporation a 10 percent raise unless the salary becomes greater than $100,000; in such cases, give only a 3 percent raise.

q. Delete all tuples in the *works* relation for employees of Small Bank Corporation.