**Sample database**

DEPARTMENT(dname, budget, head-of-department)

Primary Key = (dname)

EMPLOYEE(enum, fname, salary, DOB, dname)

Primary Key = (enum)

Foreign Key (dname) references DEPARTMENT(dname)

**Question 1**

Write a sequence of CREATE TABLE and/or ALTER TABLE statements that modifies and extends a database given above in the following way.

1. Add another table about the names of projects implemented by each department. Note that a department may implement more than one project and a project is implemented by only one department.

CREATE TABLE PROJECT(

pname VARCHAR2(30) NOT NULL,

dname VARCHAR2(30) NOT NULL,

CONSTRAINT PROJECT\_PKEY PRIMARY KEY(pname),

CONSTRAINT PROJECT\_FKEY FOREIGN KEY(dname)

REFERENCES DEPARTMENT(dname)

);

1. Add the possibility to store in the database information about the total number of employees a department consists of.

ALTER TABLE DEPARTMENT ADD COLUMN TotalEmp INT;

**Question 2**

Implement in SQL the following data manipulations on the sample database.

1. Create a new department called 'SALES' with a budget equal to 500000 and head of department is 'James'. Move employee number (enum) 700 to the new department.

INSERT INTO DEPARTMENT VALUES ('SALES', 500000, 'James');

UPDATE EMPLOYEE

SET dname='SALES;

WHERE enum = 700;

1. Delete a department called 'FINANCE' and leave all employees from the department not attached to any department.

UPDATE EMPLOYEE

SET dname = NULL

WHERE dname = 'FINANCE';

DELETE DEPARTMENT

WHERE dname = 'FINANCE';

1. Increase by 10% the budgets of all departments that have more than 10 employees.

UPDATE DEPARTMENT

SET budget = 1.1 \* budget

WHERE dname IN

(SELECT dname

FROM EMPLOYEE

GROUP BY dname

HAVING count(\*)>10);

**Question 3**

Implement the following queries as SELECT statements.

1. Find the first names (fname) of all employees together with the budgets (budget) of all departments the employees belong to.

SELECT fname, budget

FROM EMPLOYEE JOIN DEPARTMENT

ON EMPLOYEE.dname = DEPARTMENT.dname;

1. Find the names of all departments (dname) that have no employees.

SELECT dname

FROM DEPARTMENT

WHERE dname NOT IN

(SELECT dname FROM EMPLOYEE);

1. Find the names of all departments (dname) together with the total number of employees in each department. Do not list the names of departments that have no employees.

SELECT dname, count(\*)

FROM EMPLOYEE

GROUP BY dname;

1. Find the total number of employees born in 2000.

SELECT COUNT(\*)

FROM EMPLOYEE

WHERE YEAR(DOB) = ‘2000’;

1. Find the first names (fname) of all employees who work in the department headed by Charlie. (Assuming Charlie only head one department)

SELECT fname

FROM EMPLOYEE

WHERE dname = (

SELECT dname

FROM DEPARTMENT

WHERE head-of-department = ‘Charlie’);