Quiz 6: SQL

Consider the following corporate project management dataset, where Emp.mgrno is a foreign key for Emp(eno) used to model the management chain in the company, Work.empno is a foreign key for Emp.eno, and Work.pno is a foreign key for Proj.pno. (Note: Some employees near the top of the management chain will not have an official manager.) Assume that employee salaries and project budgets are given in dollars (per year) and that employee ages are optional and given in years when they are available. Also assume that some employees may not currently be assigned to projects, and some projects may be empty of employees. Write each of the queries that follow in SQL.

Emp(eno, ename, salary, age, mgrno) -- the usual info about employees
Work(empno, pno, pcttime) -- emps can split their time between projects
Proj(pno, pname, category, budget) -- some basic info about projects

1. (2 points) Print the numbers and names of all employees who are less than half as old as their manager:

   SELECT eno,ename
   FROM Emp E1
   WHERE EXISTS (SELECT *
                   FROM Emp E2
                   WHERE E1.mgrno = E2.eno AND E1.age <= (E2.age/2))
   OR
   SELECT e.eno, e.ename
   FROM Emp E, EMP M
   WHERE E.mgrno = M.eno AND E.age < (M.age/2)

2. (3 points) Print the names of employees who spend some part of their time working in every project in the ‘Mission Critical’ category.

   SELECT eno,ename
   FROM Emp E1
   WHERE EXISTS (SELECT *
                   FROM Work W
                   WHERE W.empno = E1.eno)
   AND E1.category = 'Mission Critical'
   ORDER BY eno
SELECT ename FROM Emp E
WHERE NOT EXISTS (SELECT * FROM Proj P
    WHERE category = 'Mission Critical'
    AND NOT EXISTS (SELECT *
        FROM Works W
        WHERE W.empno = E.eno AND W.pno = P.pno))

OR
SELECT ename
FROM Emp, Works, Proj
WHERE Emp.eno = Works.empno AND Works.pno = Proj.pno
AND Proj.category = 'Mission Critical'
group by Emp.eno
having count(*) = (SELECT count(*) From Proj where category = 'Mission Critical');

3. (2 points) Print a list of projects and staffing that includes the project numbers, project names, project budgets, employee numbers, employee names, and percent times of all project employees. Be sure to include projects that are currently unstaffed in your list.

SELECT P.pno,pname,eno,ename,pcttime
FROM Proj P LEFT OUTER JOIN (Works W JOIN Emp E ON empno = eno) ON P.pno = W.pno

4. (3 points) Print a project metrics report that lists, for each project, all of the project’s attributes plus its number of assigned employees (regardless of the percent-time of their assignment to the project) and also their average age.

SELECT P.pno, P.pname, P.category, P.budget, COUNT(eno), AVG(age)
FROM Proj P LEFT OUTER JOIN (Works W JOIN Emp On empno = eno) ON P.pno = W.pno
GROUP BY P.pno, P.pname, P.category, P.budget