DBMS Lab Assignment #2
Indian Institute of Technology Kharagpur

Retrieving information from tables using SQL.

Consider a database for storing information about different projects being executed by the institute along with the faculty investigating these projects and the staff working in them. Each project has the following fields:

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PROJECT(Code, Type, Title, Sponsor, Value, PI)
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The project code is a 4 letter word – each project has a unique code. Projects are of two types, namely S (for sponsored projects) and C (for consultancy projects). The title of a project is not more than 50 characters. The value of the project is given in rupees. PI indicates the employee code of the principal investigator of the project (a faculty).

A faculty has the following fields:

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FACULTY(EC, Name, Dept, Dob)
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EC denotes the (unique) employee code (an integer) of a faculty. Name is not more than 20 characters. Dept represents the department code (not more than 4 characters). Dob represents the date of birth of the faculty member.

A project can have several faculty members as investigators (including the principal investigator). Also, a faculty member may investigate several projects (as PI or as an investigator). This information is contained in the following relation:

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INVESTIGATOR(Code, EC)
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A project staff has the following fields:

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STAFF(EC, Name, Code, Dob, Salary)
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A project staff is affiliated to a single project (indicated by the Code field). The monthly salary (in rupees) is fixed for each staff.

a) Create the above tables and insert data as provided.

WRITING QUERIES IN SQL:

b) Sorting the order of appearance of results (using ORDER BY clause)

1) List the codes of consultancy projects in descending order of project value.
2) List all projects with title containing the word VLSI in ascending order of value.
3) List all faculty members in ascending order of Dept, and within each category in ascending order of age.
4) List all staff members born between Jan 1, 1980 and Dec 31, 1985 in ascending order of name.

c) Using group functions.

1) List the total number of staff working in projects.
2) List the total number of faculty members in the CSE, ECE and EE departments taken together.
3) List each project code with the number of staff in that project.
4) List the maximum, minimum and average salary of staff working in the project having code MAFV.
5) List the sponsor names, and the maximum, minimum and average values of the projects sponsored by each sponsor.
6) List the codes of projects having less than 3 staff members.
7) List the top five projects with the highest value.
8) List the staff members earning more than the average salary.

d) Retrieving information from multiple tables

1) List the titles of projects where the PI is from the CSE department.
2) List the names of staff members of projects for which the PI is from the CSE dept.
3) List the names of faculty members who are investigating projects having titles with the word VLSI in it.
4) List the names of faculty members indicating whether they are investigating sponsored projects, consultancy projects, both, or none.
5) List the names of staff members who are working in the same project as ANSUMAN BANERJEE.

e) Using set operations

1) List the names of faculty members who are investigating sponsored projects, but not any consultancy projects.
2) List the names of faculty members who are investigating both sponsored projects as well as consultancy projects.
3) List the names of faculty and staff members in projects sponsored by INTEL.

f) SQL sub-queries

1) List the names of sponsors who have projects under PIs from all departments.
2) List the projects where the youngest faculty member is a PI.
3) List the departments from which no one is a PI of a consultancy project.
4) List the department having the maximum total value of projects under its faculty members (as PIs).
5) List the names of faculty members in each department who are not associated with any projects.
6) List the names of projects that involve all faculty members of a department.
7) List the departments where the oldest faculty member (in the dept) is also associated with the maximum number of projects (among other faculty members in the same dept).

g) Application of Integrity constraints

1) Delete all the relevant records from the affected tables when a faculty with employee code *EC = 1001* leaves the institute.
2) Set the value to NULL for the affected columns of relevant records from the affected tables when a project with project code *Code = 'VSS1'* is terminated.
3) Update the PI for the project with project code *Code = 'SRC1'* to 1012.
4) Apply CHECK constraints at the column level to ensure that value of any project is not less than Rs. 100,000/-.
5) Apply CHECK constraints at the column level to ensure that every staff working on projects is at least 18 years old. (use system date)