**Week 5. Database Schema for a student-Lab scenario**

**class:**

class(VARCHAR): Unique identifier for the class or grade.

descrip(VARCHAR): Description of the class or grade.

**student:**

stud\_no(INT): Unique identifier for each student.

stud\_name(VARCHAR): Name of the student.

class(VARCHAR): Class or grade level of the student, foreign key referencing class.

**lab:**

mach\_no(INT): Unique identifier for each lab machine.

lab\_no(INT): Lab number where the machine is located.

description(VARCHAR): Description of the lab machine.

**allotment:**

stud\_no(INT): Student identifier, foreign key referencing student.

mach\_no(INT): Machine identifier, foreign key referencing lab.

day\_of\_week(VARCHAR): Day of the week when the machine is allotted to the student.

**For the above schema, perform the following—**

1. **Create Tables:** Write the SQL statements to create the student, class, lab, and allotment tables as described above. Include appropriate primary keys, foreign keys, and basic integrity constraints.

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| CREATE TABLE student(  stud\_no INT PRIMARY KEY,  stud\_name VARCHAR(50),  class VARCHAR(50));    CREATE TABLE class (  class VARCHAR(50),  descrip VARCHAR(50));    CREATE TABLE lab(  mach\_no INT PRIMARY KEY,  lab\_no INT,  description VARCHAR(50));    CREATE TABLE allotment(  stud\_no INT REFERENCES student(stud\_no),  mach\_no INT REFERENCES lab(mach\_no),  day\_of\_week VARCHAR(50)); |

1. **Insert Data**: Insert 5 records into each of the tables with the given data.

**student:**

|  |  |  |
| --- | --- | --- |
| **stud\_no** | **stud\_name** | **class** |
| 1 | Alice Smith | Biology 101 |
| 2 | Bob Johnson | Chemistry 101 |
| 3 | Carol Williams | Physics 101 |
| 4 | David Brown | Mathematics 101 |
| 5 | Eva Davis | Computer Science 101 |

**class:**

|  |  |
| --- | --- |
| **class** | **descrip** |
| Biology 101 | Introduction to Biology |
| Chemistry 101 | Basics of Chemistry |
| Physics 101 | Fundamentals of Physics |
| Mathematics 101 | Basic Mathematics |
| Computer Science 101 | Introduction to Computer Science |

**lab:**

|  |  |  |
| --- | --- | --- |
| **mach\_no** | **lab\_no** | **description** |
| 1 | 101 | Microscope |
| 2 | 101 | Centrifuge |
| 3 | 102 | Spectrometer |
| 4 | 103 | Oscilloscope |
| 5 | 104 | Computer Workstation |

**allotment:**

|  |  |  |
| --- | --- | --- |
| **stud\_no** | **mach\_no** | **day\_of\_week** |
| 1 | 1 | Monday |
| 2 | 2 | Wednesday |
| 3 | 3 | Tuesday |
| 4 | 4 | Thursday |
| 5 | 5 | Friday |

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| INSERT INTO student VALUES(1,'Alice Smith','Biology 101');  INSERT INTO student VALUES(2,'Bob Johnson','Chemistry 101');  INSERT INTO student VALUES(3,'Carol Williams','Physics 101');  INSERT INTO student VALUES(4,'David Brown','Mathematics 101');  INSERT INTO student VALUES(5,'Eva Davis','Computer Science 101');    INSERT INTO class VALUES('Biology 101','Introduction to Biology');  INSERT INTO class VALUES('Chemistry 101','Basics of Chemistry');  INSERT INTO class VALUES('Physics 101','Fundamentals of Physics');  INSERT INTO class VALUES('Mathematics 101','Basic Mathematics');  INSERT INTO class VALUES('Computer Science 101','Introduction to Computer Science');    INSERT INTO lab VALUES(1,101,'Microscope');  INSERT INTO lab VALUES(2,101,'Centrifuge');  INSERT INTO lab VALUES(3,102,'Spectrometer');  INSERT INTO lab VALUES(4,103,'Oscilloscope');  INSERT INTO lab VALUES(5,104,'Computer Workstation');    INSERT INTO allotment VALUES(1,1,'Monday');  INSERT INTO allotment VALUES(2,2,'Wednesday');  INSERT INTO allotment VALUES(3,3,'Tuesday');  INSERT INTO allotment VALUES(4,4,'Thursday');  INSERT INTO allotment VALUES(5,5,'Friday'); |

1. List the student names, machine numbers, and lab numbers for each machine allotment.

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| SELECT s.stud\_name,l.mach\_no,l.lab\_no  FROM student s,lab l,allotment a  WHERE a.stud\_no=s.stud\_no AND l.mach\_no=a.mach\_no; |

1. List the total number of lab allotments day-wise. Ensure that the output includes each day of the week and the corresponding count of allotments, with the count column labeled as total\_allotments. Group the results by day\_of\_week.

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| SELECT a.day\_of\_week,  COUNT(l.lab\_no) AS total\_allotments  FROM student s,class c,lab l,allotment a  WHERE a.stud\_no=s.stud\_no AND c.class=s.class  AND l.mach\_no=a.mach\_no  GROUP BY a.day\_of\_week ; |

1. Count how many machines have been allocated to students in the Biology class. The output should provide the total count of machine allocations, with the count column labeled as total\_allocations.

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| SELECT COUNT(a.mach\_no)  AS total\_allocations  FROM student s,class c,lab l,allotment a  WHERE a.stud\_no=s.stud\_no AND c.class=s.class  AND l.mach\_no=a.mach\_no AND c.class='Biology 101'  GROUP BY c.class,a.mach\_no ; |

1. Retrieve the machine allotment details for the student with stud\_no 5. Your query should include the student's details (name and class), class description, machine details (machine number, lab number, and machine description), and the day of the week the machine is allotted.

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| SELECT s.stud\_no,s.stud\_name,c.class,c.descrip,a.mach\_no,l.lab\_no,l.description,  a.day\_of\_week  FROM student s,class c,lab l,allotment a  WHERE a.stud\_no=s.stud\_no AND c.class=s.class  AND l.mach\_no=a.mach\_no AND a.stud\_no=5; |

1. Count the number of students who have been allocated machines, grouped by their class. The count column should be labeled as student\_count

|  |
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| SELECT c.class,  COUNT(s.stud\_no)  AS student\_count  FROM student s,class c  WHERE s.class=c.class  GROUP BY c.class; |

1. Create a view named student\_machine\_allocations that lists out stud\_no, stud\_name, mach\_no, lab\_no, and day\_of\_week

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| CREATE VIEW student\_machine\_allocations  AS SELECT s.stud\_no,s.stud\_name,a.mach\_no,l.lab\_no,a.day\_of\_week  FROM student s,lab l,allotment a  WHERE a.stud\_no=s.stud\_no AND l.mach\_no=a.mach\_no;  SELECT \* FROM student\_machine\_allocations; |

1. Create a view named thursday\_machine\_allocations that lists out stud\_no, stud\_name, mach\_no , lab\_no , description, and day\_of\_week

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| --- |
| CREATE VIEW thursday\_machine\_allocations  AS SELECT s.stud\_no,s.stud\_name,a.mach\_no,l.lab\_no,l.description,a.day\_of\_week  FROM allotment a,student s, lab l  WHERE s.stud\_no=a.stud\_no AND l.mach\_no=a.mach\_no  AND a.day\_of\_week='Thursday';  SELECT \* FROM thursday\_machine\_allocations; |