

Title:-School Management System

Scope of the Database:-

We have decided to create a database on school management system. It covers all the data about school such as students, employees, teachers, classes, subjects, examination, results, labs, libraries, books and instruments.

Description or Requirements:-

- 1) School has its unique school_ID which differentiates it from other branches of school, it has name, city where it is located and address.
- 2) School has several students identified by unique student_ID. Each student has its First name, Last name, Date of Birth, Residential Address, Contact Number, Year in which they joined the institution, total fees which they are supposed to pay, fees they paid till now and class_id in which they are studying.
- 3) School has several employees which are identified by uniquely through their PAN Number. Each employee has its first name, Last name, Designation, Address, Contact number, Salary, Gender, Date of Birth, and a derived attribute Age.
- 4) Employee has attributes like teacher_id, qualification and experience. These attributes have value equal to null if employee is not a teacher. To uniquely identify each teacher we use teacher_id.
- 5) Employee has attribute like incharge_id. It has value null if employee is not an incharge. It is used to uniquely identify an incharge among other incharges.
- 6) Employee and School are related through Works-in relationship.
- 7) A class is uniquely identified by Class_ID. Each class is present in specific building which has building_id and it has specific room_id. Each class has standard and section which is associated by the students who are studying in that class.
- 8) Students are related to class through enrolls relationship.
- 9) Class is related to school through relationship.
- 10) Subject has subject_id to uniquely identify each subject of each standard. It also has subject name.
- 11) Class and Subject are related through many to many relationship. Class and Subject are related through subject_class relationship.
- 12) Here Teacher, Class and Subject are related through ternary relationship. So Class and Subject are related through subject_class relationship and this aggregation is related To employee through

Teaches relationship.

- 13) Examination table stores the record of different exams which are taken for different subjects. So examination table has exam_id and subject_id as primary attributes to uniquely identify each row. It also has record of date of exam which stores the date on which exam was taken.
- 14) Each examination has its result to be announced. It has Exam_ID and Student_ID so that marks of each exam for each student can be differentiated.
- 15) Here Result entity is a weak entity. Here we use Exam and Student as strong entity.
- 16) Result_exam has attributes like total_marks and mark_scored.
- 17) Information about student's guardians is also kept in the records for any emergency. Guardians have their name, address, contact number and PAN Number to uniquely differentiate them. Here contact number is a multi value attribute.
- 18) Parent and student are related through relation relationship and it is many to many relationship.
- 19) School has library which has Library_ID to uniquely identify each library. Library and employee are related through works_in relationship.
- 20) Library has many books. So Book is another entity which are uniquely defined through Book_ID. Other attributes are Book_description, Author_Name, Arrival_Date. Here Author_Name is a multi-value attribute.
- 21) Similarly school has Labs which are identified uniquely through Lab_code. Labs have Lab_Incharge so Employee and Lab is related through Incharges relationship.
- 22) Lab has different types of Instruments.
- 23) Instruments is an entity whose attributes are Instrument_ID to identify each instrument uniquely. Then we have another attribute named Lab_Type which stores information about which library particular instrument belongs to. For chemicals of Chemistry Lab we give them Instrument_ID to uniquely identify them but instead of Instrument_Name we describe its name in Chemical_Name attribute. So for chemicals Instrument_Name stores Null value but for objects belonging to Physics Lab or Computer Lab or Chemistry Lab (other than chemicals) we have Null value in Chemical_Name attribute and name of object is stored in Instrument_Name attribute.
- 24) Condition_Status attribute is to check if any chemical is

required to be brought or any instrument is required to be repaired or replaced or not.

Queries Our database is going to answer:-

- 1) Given a class retrieve number of students studying in it.
- 2) Find the names and student ids of students who scored minimum marks for each exam.
- 3) Find the names and student ids of students who scored maximum marks for each exam.
- 4) Find average marks for each subject for each examination.
- 5) Find number of Classrooms in given school branch.
- 6) Find the number of instruments which are in good condition.
- 7) Find the number of instruments which are to be repaired.
- 8) Find the number of instruments which are to be replaced.
- 9) Find the number of chemicals which are to be replaced.
- 10) List the names of chemicals which are to be replaced.
- 11) List the names of instruments which are to be replaced.
- 12) List the names of instruments which are to be repaired.
- 13) List the names of instruments which are in good condition.
- 14) List the names of employees whose salary is more than the average salary.
- 15) List the names of employees whose salary is less than the average salary
- 16) Find the names of students who scored more than average marks.
- 17) Find the information about student's guardian for a given student id.
- 18) Find the list of students who are studying in class_id='20210110B'
- 19) Find the teachers who teaches in class_id='20210110A'.
- 20) List down all the books which arrived before 20 years.
- 21) Find the teachers whose salary is greater than average salary of teachers.
- 22) Find all the students who didn't paid any fees(excluding those whose total fees is zero).
- 23) Find all the book names and book_codes for books written by HC Verma.

- 24) Find all the books written by HC Verma and all the other authors who wrote the same book.
- 25) Find the student name and id who scored minimum marks in the maximum number of subjects.
- 26) Find percentage of all the exams given by a particular student_id.
- 27) Find employees whose salary is more than given salary.
- 28) Increment salary of an employee with given employee id and given percentage of increment.