

# SQL LANGUAGE

- Structured query language (SQL) is the standard means of defining and accessing relational databases
- Two parts to SQL language:
  1. Data definition language (DDL)
    - CREATE
    - DROP
    - ALTER
  2. DATA MANIPULATION LANGUAGE (DML)
    - SELECT
    - INSERT
    - DELETE
    - UPDATE

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# CREATING TABLES IN SQL

- Use CREATE TABLE statement
- Specify data type to define the **domain** of each attribute
- Specify the primary key
- Not null specifies that a value must be supplied on row insert
- DEFAULT specifies that the value to be assigned on insert if none is given
- AUTO\_INCREMENT causes key to be automatically numbered

```
CREATE TABLE STUDENTS
(
    studentId INT AUTO_INCREMENT,
    studentName VARCHAR(30) NOT NULL,
    email      VARCHAR(40),
    gpa        FLOAT DEFAULT 0.0,
    PRIMARY KEY (studentId)
);
```

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# MYSQL DATA TYPES

|             |                                      |
|-------------|--------------------------------------|
| VARCHAR (N) | - Variable length ASCII strings      |
| CHAR (N)    | - fixed-length ASCII strings         |
| INT         | - integer data (4 bytes)             |
| FLOAT       | - real number calculations           |
| DATETIME    | - contains date and time (timestamp) |
| TEXT        | - large text documents (>8000 bytes) |
| BLOB        | - large binary files                 |

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# CHECK CONSTRAINTS

- Used to enforce domain constraints
- Checked whenever table is modified

```
CREATE TABLE Students
(
    studentId   INT AUTO_INCREMENT,
    stName      VARCHAR(30) NOT NULL,
    email       VARCHAR(40),
    gpa         FLOAT DEFAULT 0.0,
    PRIMARY KEY (studentId),
    CONSTRAINT CHECK_GPA
        CHECK (gpa BETWEEN 0 AND 4.3)
);
```

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# DEFINING FOREIGN KEYS

- NO ACTION prevents delete on the primary table if child rows exist
- CASCADE deletes/updates child rows if matching primary rows are deleted/updated

```
CREATE TABLE Enrollments
( studentId    INT,
  courseId      INT,
  letterGrade   CHAR(2),
  PRIMARY KEY (studentId, courseId),
  FOREIGN KEY (studentId)
    REFERENCES Students(studentId)
    ON DELETE NO ACTION
    ON UPDATE CASCADE
) ;
```

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# ALTERING SCHEMA

```
DROP TABLE Students;
```

- Deletes data from table and definition from catalog
- Deletes any dependent objects (indices)

```
ALTER TABLE Students ADD dateOfBirth DATETIME;
```

- creates new column in table with null values
- existing applications will work without changes

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