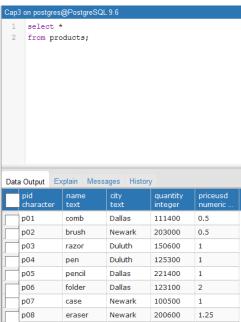


1.





- 2. A primary key, candidate key, and superkey are all closely related. A superkey is the set of all attributes or all sets of attributes that can uniquely identify an element in a relation. All candidate keys and primary keys are superkeys, however, not every superkey is a candidate or a primary key. A candidate key is a minimal superkey. Removing any attribute from a candidate key would cease to maintain uniqueness. Any candidate key can serve as a primary key. Candidate keys that are not chosen as primary keys are referred to as alternate keys.
- 3. SQL supports the data types CHAR, VARCHAR, BIT, BIT VARYING, BOOLEAN, INT, SHORTINT, DATE, TIME, FLOAT/REAL, and DECIMAL/NUMERIC.

In a catalog of *Star Trek* films, the following fields would be needed:

Table Name: Official Star Trek films

Fields	Data Type	Nullable?
Movie Number (Primary Key)	SHORTINT	No
Movie Name	VARCHAR	No
Director	VARCHAR	No
IMDb Rating	DECIMAL	Yes
Release Date	DATE	No
MPAA Rating	CHAR	Yes

- 4. a. The "first normal form" rule stats that all fields in a relation are atomic, or indivisible. This means that no fields may have multiple values. This is important for making sure that a database is organized and searchable. If we are storing email addresses belonging to students in Alan's Database class, rather than having a table with attributes id, name, and email address, we should have two tables. One table should have the attributes student\_id and name and the other should have the attributes email\_id, student\_id, and email.
  - b. The "access rows by content" rule means that we should access the data in the database by what it is rather than where it is, as location is not always static. If the database is updated or reordered in any way, attempting to access a record by its location may return a completely different record. Take a database of Alan's Database students. When organized alphabetically by first name, Alliyah Taylor may be in row 3. If the database is sorted alphabetically by last name and someone searches for the entry in row 3, they may instead find Nicholas Barranco.
  - c. The "all rows must be unique" rule removes redundancy in a table and makes a database more organized and searchable. In the database of email addresses belonging to Alan's students, repeating entities in a column would be redundant, and potentially make it seem like the Alliyah Taylor who owns <a href="mailto:alliyah.taylor1@marist.edu">alliyah.taylor1@marist.edu</a> is different than the Alliyah Taylor who owns <a href="mailto:27ARTaylor@gmail.com">27ARTaylor@gmail.com</a>, when that is not the case. This problem can be solved in the same manner as the problem presented in 4a, by making two tables.