Databases
Announcements
Create Table and Drop Table
Create Table
CREATE TABLE

CREATE TABLE expression syntax:

```
CREATE TABLE [TEMP | TEMPORARY] IF NOT EXISTS

schema-name . table-name

(column-def | table-constraint | WITHOUT ROWID)

AS select-stmt
```
Create Table

CREATE TABLE expression syntax:

```
CREATE TABLE [TEMP | TEMPORARY] [IF NOT EXISTS] schema-name . table-name (column-def) [AS select-stmt] [WHILEOUT ROWID] [column-constraint]
```

column-def:

```
column-name : type-name [column-constraint]
```
Create Table

CREATE TABLE expression syntax:

column-def:

column-constraint:
CREATE TABLE expression syntax:

- `CREATE TABLE` statement
- `IF NOT EXISTS` clause
- `schema-name` and `table-name`
- `column-def`s (with `AS select-stmt` or without)
- `column-constraint`s (such as `PRIMARY`, `KEY`, `NOT NULL`, `CHECK(expr)`, `DEFAULT(literal-value)`, `UNIQUE`, `COLLATE collation-name`)
- `CONFLICT-clause`s (such as `ASC` or `DESC`)

`column-def`: contains `column-name` and `type-name`
Create Table

CREATE TABLE expression syntax:

Examples:
Create Table

CREATE TABLE expression syntax:

```
CREATE TABLE numbers (n, note);
CREATE TABLE numbers (n UNIQUE, note);
CREATE TABLE numbers (n, note DEFAULT "No comment");
```

Examples:
Drop Table
Modifying Tables
Insert
For a table t with two columns...
For a table $t$ with two columns...

To insert into one column:
For a table t with two columns...

To insert into one column:

\[
\text{INSERT INTO } t(\text{column}) \text{ VALUES (value);} 
\]
For a table t with two columns...

To insert into one column:

INSERT INTO t(column) VALUES (value);

To insert into both columns:
For a table \( t \) with two columns...

To insert into one column:

\[
\text{INSERT INTO } t(\text{column}) \text{ VALUES (value);}\\
\]

To insert into both columns:

\[
\text{INSERT INTO } t \text{ VALUES (value0, value1);}\\
\]
For a table \( t \) with two columns...

To insert into one column:

\[
\text{INSERT INTO } t(\text{column}) \text{ VALUES (value);}\
\]

To insert into both columns:

\[
\text{INSERT INTO } t \text{ VALUES (value0, value1);}\
\]

(Demo)
Update

Update sets all entries in certain columns to new values, just for some subset of rows.
Update sets all entries in certain columns to new values, just for some subset of rows.

(Demo)
Delete

Delete removes some or all rows from a table.
Delete removes some or all rows from a table.

(Demo)
Python and SQL
Python and SQL

(Demo)
SQL Injection Attack
A Program Vulnerable to a SQL Injection Attack

![A Program Vulnerable to a SQL Injection Attack](https://xkcd.com/327/)

--

https://xkcd.com/327/
A Program Vulnerable to a SQL Injection Attack

name = "Robert'); DROP TABLE Students; --"

https://xkcd.com/327/
A Program Vulnerable to a SQL Injection Attack

```
name = "Robert'); DROP TABLE Students; --"
```

```
cmd = "INSERT INTO Students VALUES ('" + name + "]'";"
```
A Program Vulnerable to a SQL Injection Attack

```python
db.executescript(cmd)
```

https://xkcd.com/327/
A Program Vulnerable to a SQL Injection Attack

```python
db.executescript(cmd)

INSERT INTO Students VALUES ('Robert'); DROP TABLE Students; --
```

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A Program Vulnerable to a SQL Injection Attack

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name = "Robert'); DROP TABLE Students; --"

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https://xkcd.com/327/
A Program Vulnerable to a SQL Injection Attack

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name = "Robert''); DROP TABLE Students; --"

cmd = "INSERT INTO Students VALUES ('name');"

db.executescript(cmd)

```

```
INSERT INTO Students VALUES ('Robert'); DROP TABLE Students; --');
```

https://xkcd.com/327/
A Program Vulnerable to a SQL Injection Attack

```python
name = "Robert''); DROP TABLE Students; --"
```

```sql
db.executescript(cmd)
```

```sql
INSERT INTO Students VALUES ('Robert'); DROP TABLE Students; --');
```

https://xkcd.com/327/
A Program Vulnerable to a SQL Injection Attack

```
name = "Robert''); DROP TABLE Students; --"

cmd = "INSERT INTO Students VALUES ('" + name + "');"

db.executescript(cmd)
```

![Image of a comic about SQL injection](https://xkcd.com/327/)

```
INSERT INTO Students VALUES ('Robert'); DROP TABLE Students; --
```

https://xkcd.com/327/
A Program Vulnerable to a SQL Injection Attack

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name = "Robert'); DROP TABLE Students; --"

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---

INSERT INTO Students VALUES ('Robert'); DROP TABLE Students; --

https://xkcd.com/327/
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A Program Vulnerable to a SQL Injection Attack

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name = "Robert'); DROP TABLE Students; --"

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A Program Vulnerable to a SQL Injection Attack

```
name = 'Robert'); DROP TABLE Students; --'

cmd = 'INSERT INTO Students VALUES (' + name + ');

db.executescript(cmd)
```

```
INSERT INTO Students VALUES ('Robert'); DROP TABLE Students; --');
INSERT INTO Students VALUES ('Robert'); DROP TABLE Students; --');
```

https://xkcd.com/327/
Database Connections
Casino Blackjack

Player:

Dealer:
Casino Blackjack

Player:

Dealer:
Casino Blackjack

Player:

Dealer:
Casino Blackjack

Player:

Dealer:
Casino Blackjack

Player:

Dealer:
Casino Blackjack

**Player:**

![Player's cards](image)

**Dealer:**

![Dealer's cards](image)
Casino Blackjack

Player:

Dealer:
Casino Blackjack

**Player:**

![Player's cards](image1)

**Dealer:**

![Dealer's cards](image2)
Casino Blackjack

Player:

Dealer:
Casino Blackjack

Player:

7
9
5

Dealer:

J
3
A
10

(Demo)