

Relation (Table)

Row/Tuple/Record

Column/Attribute/Field

name	birth	gpa	grad
Anderson	1987-10-22	3.9	2009
Jones	1990-4-16	2.4	2012
Hernandez	1989-8-12	3.1	2011
Chen	1990-2-4	3.2	2011

Column Types →

VARCHAR(30)

DATE

FLOAT

INT

Primary Key

Unique For Each Row



id	name	birth	gpa	grad
14	Anderson	1987-10-22	3.9	2009
38	Jones	1990-4-16	2.4	2012
77	Hernandez	1989-8-12	3.1	2011
104	Chen	1990-2-4	3.2	2011
INT	VARCHAR(30)	DATE	FLOAT	INT

Basic Table Operations

```
CREATE TABLE students (  
    id INT AUTO_INCREMENT,  
    name VARCHAR(30),  
    birth DATE,  
    gpa FLOAT,  
    grad INT,  
    PRIMARY KEY(id));
```

```
INSERT INTO students(name, birth, gpa, grad)  
VALUES ('Anderson', '1987-10-22', 3.9, 2009);
```

```
INSERT INTO students(name, birth, gpa, grad)  
VALUES ('Jones', '1990-4-16', 2.4, 2012);
```

```
DELETE FROM students WHERE name='Anderson';
```

```
DROP TABLE students;
```

Query: Display Entire Table

id	name	birth	gpa	grad
1	Anderson	1987-10-22	3.9	2009
2	Jones	1990-4-16	2.4	2012
3	Hernandez	1989-8-12	3.1	2011
4	Chen	1990-2-4	3.2	2011

```
SELECT * FROM students;
```

```
+-----+-----+-----+-----+
| id | name      | birth      | gpa  | grad  |
+-----+-----+-----+-----+
|  1 | Anderson  | 1987-10-22 | 3.9  | 2009  |
|  2 | Jones     | 1990-04-16 | 2.4  | 2012  |
|  3 | Hernandez | 1989-08-12 | 3.1  | 2011  |
|  4 | Chen      | 1990-02-04 | 3.2  | 2011  |
+-----+-----+-----+-----+
```

Query: Select Columns

id	name	birth	gpa	grad
1	Anderson	1987-10-22	3.9	2009
2	Jones	1990-4-16	2.4	2012
3	Hernandez	1989-8-12	3.1	2011
4	Chen	1990-2-4	3.2	2011

```
SELECT name, gpa FROM students;
```

```
+-----+-----+
| name      | gpa  |
+-----+-----+
| Anderson  | 3.9  |
| Jones     | 2.4  |
| Hernandez | 3.1  |
| Chen      | 3.2  |
+-----+-----+
```

Query: Filter Rows

id	name	birth	gpa	grad
1	Anderson	1987-10-22	3.9	2009
2	Jones	1990-4-16	2.4	2012
3	Hernandez	1989-8-12	3.1	2011
4	Chen	1990-2-4	3.2	2011

```
SELECT name, gpa FROM students WHERE gpa > 3.0;
```

```
+-----+-----+
| name      | gpa  |
+-----+-----+
| Anderson  | 3.9  |
| Hernandez | 3.1  |
| Chen      | 3.2  |
+-----+-----+
```

Query: Sort Output

id	name	birth	gpa	grad
1	Anderson	1987-10-22	3.9	2009
2	Jones	1990-4-16	2.4	2012
3	Hernandez	1989-8-12	3.1	2011
4	Chen	1990-2-4	3.2	2011

```
SELECT gpa, name, grad FROM students
WHERE gpa > 3.0
ORDER BY gpa DESC;
```

```
+-----+-----+-----+
| gpa   | name           | grad  |
+-----+-----+-----+
| 3.9   | Anderson      | 2009  |
| 3.2   | Chen          | 2011  |
| 3.1   | Hernandez     | 2011  |
+-----+-----+-----+
```

Update Value(s)

id	name	birth	gpa	grad
1	Anderson	1987-10-22	3.9	2009
2	Jones	1990-4-16	2.4	2012
3	Hernandez	1989-8-12	3.1	2011
4	Chen	1990-2-4	3.2	2011

```
UPDATE students
  SET gpa = 2.6, grad = 2013
  WHERE id = 2
```


Foreign Key 

students

id	name	birth	gpa	grad	advisor_id
1	Anderson	1987-10-22	3.9	2009	2
2	Jones	1990-4-16	2.4	2012	1
3	Hernandez	1989-8-12	3.1	2011	1
4	Chen	1990-2-4	3.2	2011	1

advisors

id	name	title
1	Fujimura	assocprof
2	Bolosky	prof

```
SELECT s.name, s.gpa
FROM students s, advisors p
WHERE s.advisor_id = p.id AND p.name = 'Fujimura';
```

s.id	s.name	s.birth	s.gpa	s.grad	s.advisor_id	p.id	p.name	p.title
1	Anderson	1987-10-22	3.9	2009	2	1	Fujimura	assocprof
1	Anderson	1987-10-22	3.9	2009	2	2	Bolosky	prof
2	Jones	1990-4-16	2.4	2012	1	1	Fujimura	assocprof
2	Jones	1990-4-16	2.4	2012	1	2	Bolosky	prof
3	Hernandez	1989-8-12	3.1	2011	1	1	Fujimura	assocprof
3	Hernandez	1989-8-12	3.1	2011	1	2	Bolosky	prof
4	Chen	1990-2-4	3.2	2011	1	1	Fujimura	assocprof
4	Chen	1990-2-4	3.2	2011	1	2	Bolosky	prof

id	name	birth	gpa	grad	advisor_id
1	Anderson	1987-10-22	3.9	2009	2
2	Jones	1990-4-16	2.4	2012	1
3	Hernandez	1989-8-12	3.1	2011	1
4	Chen	1990-2-4	3.2	2011	1

id	name	title
1	Fujimura	assocprof
2	Bolosky	prof

```

SELECT s.name, s.gpa
FROM students s, advisors p
WHERE s.advisor_id = p.id AND p.name = 'Fujimura';

```

s.id	s.name	s.birth	s.gpa	s.grad	s.advisor_id	p.id	p.name	p.title
1	Anderson	1987-10-22	3.9	2009	2	1	Fujimura	assocprof
1	Anderson	1987-10-22	3.9	2009	2	2	Bolosky	prof
2	Jones	1990-4-16	2.4	2012	1	1	Fujimura	assocprof
2	Jones	1990-4-16	2.4	2012	1	2	Bolosky	prof
3	Hernandez	1989-8-12	3.1	2011	1	1	Fujimura	assocprof
3	Hernandez	1989-8-12	3.1	2011	1	2	Bolosky	prof
4	Chen	1990-2-4	3.2	2011	1	1	Fujimura	assocprof
4	Chen	1990-2-4	3.2	2011	1	2	Bolosky	prof

id	name	birth	gpa	grad	advisor_id
1	Anderson	1987-10-22	3.9	2009	2
2	Jones	1990-4-16	2.4	2012	1
3	Hernandez	1989-8-12	3.1	2011	1
4	Chen	1990-2-4	3.2	2011	1

id	name	title
1	Fujimura	assocprof
2	Bolosky	prof

```

SELECT s.name, s.gpa
      FROM students s, advisors p
      WHERE s.advisor_id = p.id AND p.name = 'Fujimura';

```

```

+-----+-----+
| name      | gpa  |
+-----+-----+
| Jones     | 2.4  |
| Hernandez | 3.1  |
| Chen      | 3.2  |
+-----+-----+

```

	id	name	birth	gpa	grad
students	1	Anderson	1987-10-22	3.9	2009
	2	Jones	1990-4-16	2.4	2012
	3	Hernandez	1989-8-12	3.1	2011
	4	Chen	1990-2-4	3.2	2011

	id	number	name	quarter
courses	1	CS142	Web stuff	Winter 2009
	2	ART101	Finger painting	Fall 2008
	3	ART101	Finger painting	Winter 2009
	4	PE204	Mud wrestling	Winter 2009

	course_id	student_id
courses_students	1	1
	3	1
	4	1
	1	2
	2	2
	1	3
	2	4
	4	4

```

SELECT s.name, c.quarter
  FROM students s, courses c, courses_students cs
 WHERE c.id = cs.course_id AND s.id = cs.student_id
        AND c.number = 'ART101';

```

```

+-----+-----+
| name      | quarter  |
+-----+-----+
| Jones     | Fall 2008 |
| Chen      | Fall 2008 |
| Anderson  | Winter 2009 |
+-----+-----+

```

