

```
select title
from course
where dept_name='Comp. Sci.' and credits=3;
```

```
practice1=# select title from course where dept_name='Comp. Sci.' and credits=3;
           title
-----
Robotics
Image Processing
Database System Concepts
(3 rows)
```

```
select distinct student.ID
from (student join takes using(ID))
join (instructor join teaches using(ID))
using(course_id, sec_id, semester, year)
where instructor.name = 'Srinivasan';
```

```
practice1=# select distinct student.ID
from (student join takes using(ID))
join (instructor join teaches using(ID))
using(course_id, sec_id, semester, year)
where instructor.name = 'Srinivasan';
           id
-----
00128
12345
45678
54321
76543
98765
(6 rows)
```

```
select max(salary)
from instructor;
```

```
practice1=# select max(salary)
from instructor;
           max
-----
95000.00
(1 row)
```

```
select course_id, sec_id, count(ID)
from section natural join takes
where semester = 'Fall' and year = 2017
group by course_id, sec_id;
```

```
practice1=# select course_id, sec_id, count(ID)
from section natural join takes
where semester = 'Fall' and year = 2017
group by course_id, sec_id;
 course_id | sec_id | count
-----+-----+-----
CS-101    | 1      | 6
CS-347    | 1      | 2
PHY-101   | 1      | 1
(3 rows)
```

```
create table grade_points (
    grade varchar(20) primary key,
    points numeric(2,1) not null
);
```

```
practice1=# create table grade_points (
    grade varchar(20) primary key,
    points numeric(2,1) not null
);
```

```
CREATE TABLE
```

```
practice1=# \d
```

```
List of relations
```

Schema	Name	Type	Owner
public	advisor	table	yhw
public	classroom	table	yhw
public	course	table	yhw
public	department	table	yhw
public	grade_points	table	yhw
public	instructor	table	yhw
public	prereq	table	yhw
public	section	table	yhw
public	student	table	yhw
public	takes	table	yhw
public	teaches	table	yhw
public	time_slot	table	yhw

(12 rows)

```
practice1=# \d grade_points
```

```
Table "public.grade_points"
```

Column	Type	Collation	Nullable	Default
grade	character varying(20)		not null	
points	numeric(2,1)		not null	

```
Indexes:
```

```
"grade_points_pkey" PRIMARY KEY, btree (grade)
```

```
insert into grade_points (grade, points) values
('A+', 4.3),
('A', 4.0),
('A-', 3.7),
('B+', 3.3),
('B', 3.0),
('B-', 2.7),
('C+', 2.3),
('C', 2.0),
('C-', 1.7),
('D+', 1.3),
('D', 1.0),
('D-', 0.7),
('F', 0.0);
```

```
practicle1=# insert into grade_points (grade, points) values
('A+', 4.3),
('A', 4.0),
('A-', 3.7),
('B+', 3.3),
('B', 3.0),
('B-', 2.7),
('C+', 2.3),
('C', 2.0),
('C-', 1.7),
('D+', 1.3),
('D', 1.0),
('D-', 0.7),
('F', 0.0);
INSERT 0 13
```

```
alter table takes
add constraint takes_grade_fkey
foreign key (grade) references grade_points(grade);
```

```
practicle1=# alter table takes
add constraint takes_grade_fkey
foreign key (grade) references grade_points(grade);
ALTER TABLE
practicle1=# \d takes
```

Column	Type	Collation	Nullable	Default
id	character varying(5)		not null	
course_id	character varying(8)		not null	
sec_id	character varying(8)		not null	
semester	character varying(6)		not null	
year	numeric(4,0)		not null	
grade	character varying(2)			

```
Indexes:
    "takes_pkey" PRIMARY KEY, btree (id, course_id, sec_id, semester, year)
Foreign-key constraints:
    "takes_course_id_sec_id_semester_year_fkey" FOREIGN KEY (course_id, sec_id, semester, year) REFERENCES section(course_id, sec_id, semester, year) ON DELETE CASCADE
    "takes_grade_fkey" FOREIGN KEY (grade) REFERENCES grade_points(grade)
    "takes_id_fkey" FOREIGN KEY (id) REFERENCES student(id) ON DELETE CASCADE
```

```
select sum(credits * points) as Scored
from takes natural join course natural join grade_points
where ID='12345';
```

```
practicle1=# select sum(credits * points) as Scored
from takes natural join course natural join grade_points
where ID='12345';
scored
-----
 48.0
(1 row)
```

```
select sum(credits * points) / sum(credits) as GPA
from takes natural join course natural join grade_points
where ID='12345';
```

```
practice1=# select sum(credits * points) / sum(credits) as GPA
from takes natural join course natural join grade_points
where ID='12345';
      gpa
-----
3.4285714285714286
(1 row)
```

```
select ID, sum(credits * points) / sum(credits) as GPA
from takes natural join course natural join grade_points
group by ID;
```

```
practice1=# select ID, sum(credits * points) / sum(credits) as GPA
from takes natural join course natural join grade_points
group by ID;
 id  |      gpa
-----+-----
76653 | 2.0000000000000000
19991 | 3.0000000000000000
76543 | 4.0000000000000000
54321 | 3.5000000000000000
44553 | 2.7000000000000000
55739 | 3.7000000000000000
45678 | 2.0181818181818182
12345 | 3.4285714285714286
98988 | 4.0000000000000000
98765 | 2.2571428571428571
00128 | 3.8714285714285714
23121 | 2.3000000000000000
(12 rows)
```

```
select ID, sum(credits * points) / sum(credits) as GPA
from takes natural join course natural join grade_points
group by ID
having sum(credits * points) / sum(credits) > 3.0;
```

```
practice1=# select ID, sum(credits * points) / sum(credits) as GPA
from takes natural join course natural join grade_points
group by ID
having sum(credits * points) / sum(credits) > 3.0;
```

id	gpa
76543	4.0000000000000000
54321	3.5000000000000000
55739	3.7000000000000000
12345	3.4285714285714286
98988	4.0000000000000000
00128	3.8714285714285714

(6 rows)