

MODELOS Y BASES DE DATOS

SQL Básico

2025-1

Guía autoestudio 1/ 6

OBJETIVOS

Desarrollar competencias básicas para escribir consultas simples en SQL

- Consultas con proyecciones, restricciones y producto cruz
`SELECT .. FROM .. WHERE ..`
- Dar nuevos nombres
`AS`
- Resultados sin repeticiones
`DISTINCT`
- Orden en el resultado de consulta
`ORDER BY`
- Consultas que requieren agrupamiento
`GROUP BY ... HAVING ...`
- Operadores para expresiones
 - Numéricos: `ABS, ROUND, FLOOR, CEIL, DIV, MOD`
 - Lógicos: `AND, OR, NOT`
 - De comparación: `=, !=, <>, >, <, >=, <= , BETWEEN`
 - Cadenas: `LEN, INSTR, SUBSTR, REPLACE, TRIM, CONCAT, LIKE (% _)`
 - Tiempo: `CURRENT_DATE, CURRENT_TIMESTAMP, EXTRACT, TO_CHAR`
 - Agrupamiento: `AVG, COUNT, MAX, MIN, SUM`
 - Condicionales: `CASE`
 - Cambio de tipo: `CAST`

ENTREGA

Publicar las respuestas en el espacio correspondiente en un archivo **.zip** , el nombre de este archivo debe ser la concatenación en orden alfabético de los primeros apellidos de cada uno de los miembros.

INVESTIGACION

Para que tener conocimiento suficiente sobre la tecnología que vamos a usar en el laboratorio, investiguen las siguientes preguntas. No olviden incluir la bibliografía.

A. SQL

- ¿Qué es? ¿Para qué sirve?
SQL o Structured Query Language es un lenguaje de programación que se utiliza para el almacenamiento, actualización, recuperación, eliminación y para la búsqueda de bases de datos relacionales. Esta es de gran ayuda para la gestión de datos en aplicaciones y plataformas. En sí, con SQL podemos trabajar conjuntos de datos y relaciones entre ellos.
- ¿Qué es DML, DDL, DCL, TCL?
Estos son lenguajes de programación que se suelen usar para las operaciones en bases de datos relacionales y son parte del lenguaje hablado anteriormente SQL y nos son proporcionados por los sistemas gestores de bases de datos.
- En este autoestudio, ¿en qué escribimos? ¿por qué?
En el presente autoestudio escribimos en SQL debido a que estamos en el proceso de aprendizaje de las bases de datos, sus usos y su manejo.

B. Motor de bases de datos y bases de datos

→ ¿Qué son?

Un motor de bases de datos es un componente de software que simplifica la creación, lectura, actualización y eliminación de una base de datos, estas acciones también son llamadas CRUD (create, read, update y delete).

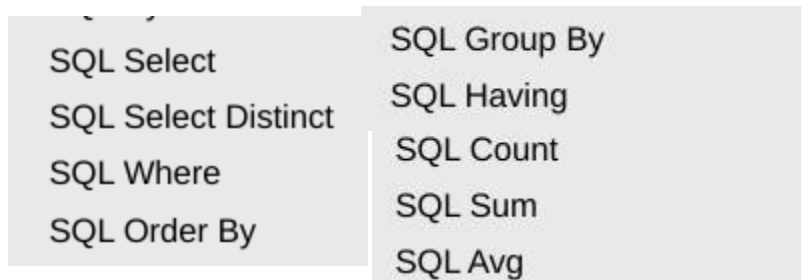
→ ¿Qué motores ofrece sqlzoo.net [<http://sqlzoo.net/>]?



Los motores de bases de datos que ofrece SQLZoo son MySQL, PostgreSQL, Microsoft SQL y MariaDB po.

→ ¿Qué bases de datos ofrece sqlzoo?

Ofrece bases de datos como “World country”, “Nobel Prize winners”, “Movie Database” y “UK general election results”.



PRACTICA

Usando w3schools SQL Tutorial [[SQL Tutorial](#)]

[En [auto01.doc](#)]

A. Estudien las secciones SQL SELECT, SQL SELECT DISTINCT, SQL WHERE, SQL ORDER BY, SQL GROUP BY, SQL HAVING y escriban expresiones las consultas ejemplo en cálculo o algebra. ¹

[Escriban las sentencias en calculo y algebra [auto01.doc](#). Si no lograron escribir alguna sentencia indiquen la razón y el punto de problema]

Usando SQLzoo.net [<http://sqlzoo.net/>]

[En [auto01.doc](#)]

A. Estudien la section FUNCTIONS de la referencia, seleccionen 3 funciones y escriban 3 consultas que usen [event](#) de la base de datos MySQL [University Timetables](#) [Escriban las sentencias en [auto01.doc](#), ejecútenlas en sqlzoo y capturen el resultado. Si no lograron escribir alguna sentencia indiquen el punto de problema]

SQL Functions

Standard SQL functions and some common non-standard function. MS SQL, Oracle, MySQL and PostgreSQL provide support or have alternatives. Where possible alternatives are given.

ABS	CURRENT_TIMESTAMP	LENGTH	+ INTERVAL	SUBSTRING(ansi)
AVG	DATEPART	MAX	+ (string)	SUBSTRING
Strings	DAY	MIN	POSITION	SUM
CASE	DIV	MINUTE	QUARTER	TAN
CAST	EXTRACT	MOD	RANK	TO_CHAR(dates)
CEIL	FLOOR	MONTH	REPLACE	TRIM
COALESCE	HOUR	NULLIF	RIGHT	YEAR
CONCAT	IFNULL	NVL	ROUND	
COS	INSTR	PATINDEX	SECOND	
COUNT	LEFT	% MODULO	SIN	
CURRENT_DATE	LEN	+(dates)	SUBSTR	

Nosotros elegimos la función SUM

With a `GROUP BY region` statement each region shows up just once. The SUM column gives the total for each region.

```
SELECT dow, SUM(duration)
FROM event
GROUP BY dow
```

Submit SQL

restore default

Result:

dow	SUM(duration)
Friday	50
Monday	59
Thursday	67
Tuesday	85
Wednesday	57

La función MIN

With a `GROUP BY region` statement each region shows up just once. The MIN column gives the "smallest" name in the region in the context of strings this is the first name alphabetically.

```
SELECT dow, MIN(name)
FROM event
GROUP BY dow
```

Submit SQL

restore default

Result:

dow	MIN(tod)
Friday	09:00
Monday	09:00
Thursday	09:00
Tuesday	09:00
Wednesday	09:00

Y la función CASE

1.

With a `GROUP BY region` statement each region shows up just once. The `MIN` column gives the "smallest" name in the region in the context of strings this is the first name alphabetically.

```
SELECT id, dow, tod
, CASE WHEN tod < '10:00'
THEN 'Early'
WHEN tod < '13:00'
THEN 'Just At Time'
ELSE 'Late'
END as 'timing'
FROM event
```

Submit SQL

restore default

id	dow	tod	timing
co12004.L01	Wednesday	11:00	Just At Time
co12004.L02	Monday	17:00	Late
co12004.T01	Monday	11:00	Just At Time
co12004.T02	Tuesday	15:00	Late
co12004.T03	Tuesday	13:00	Late
co12004.T04	Wednesday	13:00	Late
co12004.T05	Wednesday	09:00	Early
co12004.T06	Tuesday	13:00	Late
co12005.L01	Monday	14:00	Late
co12005.L02	Friday	10:00	Just At Time
co12005.T01	Tuesday	11:00	Just At Time
co12005.T02	Monday	11:00	Just At Time
co12005.T03	Tuesday	10:00	Just At Time
co12005.T04	Wednesday	14:00	Late
co12005.T05	Monday	15:00	Late

B.

`event(id,mdle,kind,dow,tod,duration,room)`

C. Realicen todos los ejercicios propuestos en los siguientes tutoriales y presente los quices. Utilice el motor My SQL.

- `SELECT basics`, quiz,

Your score is: 7 out of 7

- `SELECT from world`, quiz,

Trillion dollar economies

10. 😊

Show the `name` and per-capita GDP for those countries with a GDP of at least one trillion (1000000000000; that is 12 zeros). Round this value to the nearest 1000.

Show per-capita GDP for the trillion dollar countries to the nearest \$1000.

```
SELECT name, ROUND(gdp/population, -3)
FROM world
WHERE gdp >= 1000000000000;
```

Submit SQL

restore default

Correct answer

name	ROUND(gdp/population, -3)
Australia	66000
Brazil	11000
Canada	45000
China	6000
France	40000
Germany	42000
India	2000

7. Select the result that would be obtained from this code:

```
SELECT name FROM world
WHERE continent = 'South America'
AND population > 40000000
```

Afghanistan
Brazil
Colombia

Brazil

✓

Brazil

Colombia

Brazil South America
Colombia South America

Brazil 182800000
Colombia 45600000

Score the test

Your score is: 7 out of 7

- `SELECT from nobel`, quiz

Albert Einstein

3.



Show the year and subject that won 'Albert Einstein' his prize.

```
SELECT yr, subject FROM nobel
WHERE winner = 'Albert Einstein'
```

Submit SQL

restore default

Correct answer

yr	subject
1921	physics

Recent Peace Prizes

4.



Give the name of the 'peace' winners since the year 2000, including 2000.

```
SELECT winner FROM nobel
WHERE yr >= 2000 AND subject = 'peace'
```

Submit SQL

restore default

Correct answer

winner
Kim Dae-jung
Kofi Annan
United Nations
Jimmy Carter
Shirin Ebadi
Wangari Maathai
International Atomic Energy Agency

Literature in the 1980's

5.



Show all details (**yr, subject, winner**) of the literature prize winners for 1980 to 1989 inclusive.

```
SELECT yr, subject, winner FROM nobel
WHERE subject = 'literature' AND yr >= 1980 AND yr <= 1989
```

Submit SQL

restore default

Correct answer

yr	subject	winner
1980	literature	Czesław Miłosz
1981	literature	Elias Canetti
1982	literature	Gabriel García Márquez
1983	literature	William Golding
1984	literature	Jaroslav Seifert
1985	literature	Claude Simon
1986	literature	Wole Soyinka

Chemistry and Physics from different years

8.



Show the year, subject, and name of physics winners for 1980 together with the chemistry winners for 1984.

```
SELECT yr, subject, winner FROM nobel
WHERE (subject = 'physics' AND yr = 1980) OR (subject =
'chemistry' AND yr = 1984)
```

Submit SQL

restore default

Correct answer

yr	subject	winner
1980	physics	James Cronin
1980	physics	Val Fitch
1984	chemistry	Bruce Merrifield

Exclude Chemists and Medics

9. 😊

Show the year, subject, and name of winners for 1980
excluding chemistry and medicine

```
SELECT yr, subject, winner FROM nobel
WHERE subject In ("literature", "peace", "physics") AND yr =
1980
```

Submit SQL

restore default

Correct answer

yr	subject	winner
1980	literature	Czesław Miłosz
1980	peace	Adolfo Pérez Esquivel
1980	physics	James Cronin
1980	physics	Val Fitch

Early Medicine, Late Literature

10. 😊

Show year, subject, and name of people who won a 'Medicine'
prize in an early year (before 1910, not including 1910) together
with winners of a 'Literature' prize in a later year (after 2004,
including 2004)

```
SELECT yr, subject, winner
FROM nobel
WHERE (subject = 'Medicine' AND yr < 1910) OR (subject =
'Literature' AND yr >= 2004);
```

Submit SQL

restore default

Correct answer

yr	subject	winner
1901	medicine	Emil von Behring
1902	medicine	Ronald Ross
1903	medicine	Niels Ryberg Finsen
1904	medicine	Ivan Pavlov
1905	medicine	Robert Koch
1906	medicine	Camillo Golgi
1906	medicine	Santiago Ramón y Cajal

✓	Chemistry	1
	Literature	1
	Medicine	2
	Peace	1
	Physics	1

Chemistry	1
Literature	1
Peace	1
Physics	1

Score the test

Your score is: 7 out of 7

- SELECT in SELECT, quiz

Richer than UK

2. 😊

Show the countries in Europe with a per capita GDP greater than 'United Kingdom'.

Per Capita GDP

The per capita GDP is the gdp/population

```
SELECT name FROM world
WHERE continent = 'Europe'
AND gdp/population > (SELECT gdp/population FROM world WHERE
name = 'United Kingdom')
```

Submit SQL

restore default

Correct answer

name
Andorra
Austria
Belgium
Denmark
Finland
France
Germany

Neighbours of Argentina and Australia

3. 😊

List the name and continent of countries in the continents containing either Argentina or Australia. Order by name of the country.

```
SELECT name, continent FROM world
WHERE continent IN (SELECT continent FROM world WHERE name IN
('Argentina', 'Australia'))
ORDER BY name;
```

Submit SQL

restore default

Correct answer

name	continent
Argentina	South America
Australia	Oceania
Bolivia	South America
Brazil	South America
Chile	South America
Colombia	South America
Ecuador	South America

Between Canada and Poland

4. 😊

Which country has a population that is more than United Kingdom but less than Germany? Show the name and the population.

```
SELECT name, population FROM world
WHERE population > (SELECT population FROM world WHERE name =
'United Kingdom')
AND population < (SELECT population FROM world WHERE name =
'Germany');
```

Submit SQL

restore default

Correct answer

name	population
Congo, Democratic Republic of	69360000
France	65906000
Iran	77552000
Thailand	64456700
Turkey	76667864

Percentages of Germany

5. 😞

Germany (population 80 million) has the largest population of the countries in Europe. Austria (population 8.5 million) has 11% of the population of Germany.

Show the name and the population of each country in Europe. Show the population as a percentage of the population of Germany.

The format should be *Name, Percentage* for example:

name	percentage
Albania	3%
Andorra	0%
Austria	11%
...	...

Decimal places

You can use the function `ROUND` to remove the decimal places.

Percent symbol %

You can use the function `CONCAT` to add the percentage symbol.

```
SELECT name, CONCAT(ROUND((population * 100)/(SELECT population FROM world
WHERE name = 'Germany')), '%') FROM world
WHERE continent = 'Europe';
```

Submit SQL

restore default

Correct answer

name	CONCAT(ROUND((population * 100)/(SELECT population FROM world WHERE name = 'Germany')), '%')
Albania	3%
Andorra	0%
Austria	11%
Belarus	12%
Belgium	14%

Bigger than every country in Europe

6. 😊

Which countries have a GDP greater than every country in Europe? (Give the name only.) (Some countries may have NULL gdp values)

```
SELECT name FROM world
WHERE gdp > (SELECT MAX(gdp) FROM world WHERE continent = 'Europe') AND gdp
IS NOT NULL;
```

Submit SQL

restore default

Correct answer

name
China
Japan
United States

First country of each continent (alphabetically)

8. 😊

List each continent and the name of the country that comes first alphabetically.

```
SELECT continent, name FROM world x
WHERE name = (SELECT MIN(name) FROM world y WHERE x.continent =
y.continent);
```

Submit SQL

restore default

Correct answer

continent	name
Africa	Algeria
Asia	Afghanistan
Caribbean	Antigua and Barbuda
Eurasia	Armenia
Europe	Albania
North America	Belize
Oceania	Australia

Difficult Questions That Utilize Techniques Not Covered In Prior Sections

9. 😊

Find the continents where all countries have a population <= 25000000. Then find the names of the countries associated with these continents. Show name, continent and population.

```
SELECT name, continent, population FROM world
WHERE continent IN (SELECT continent FROM world
GROUP BY continent
HAVING MAX(population) <= 25000000)
```

Submit SQL

restore default

Correct answer

name	continent	population
Antigua and Barbuda	Caribbean	86295
Australia	Oceania	23545500
Bahamas	Caribbean	351461
Barbados	Caribbean	285000
Cuba	Caribbean	11167325
Dominica	Caribbean	71293
Dominican Republic	Caribbean	9445281

Table-C

China
India

Table-D

Brazil
Bangladesh
China
India

Table-E

France
Germany
Russia
Trukey

Score the test

Your score is: 7 out of 7

- SUM and COUNT, quiz

List of continents

2. 🧐

List all the continents - just once each.

```
SELECT DISTINCT continent FROM world;
```

Submit SQL

restore default

Correct answer

continent
Africa
Asia
Caribbean
Eurasia
Europe
North America
Oceania

GDP of Africa

3. 😊

Give the total GDP of Africa

```
SELECT SUM(gdp) FROM world
WHERE continent = 'Africa'
```

Submit SQL

restore default

Correct answer

SUM(gdp)
1811788000000

Count the big countries

4. 😊

How many countries have an **area** of at least 1000000

```
SELECT COUNT(*) FROM world
WHERE Area >= 1000000;
```

Submit SQL

restore default

Correct answer

COUNT(*)
29

Baltic states population

5. 😊

What is the total **population** of ('Estonia', 'Latvia', 'Lithuania')

```
SELECT SUM(population) FROM world
WHERE name IN ('Estonia', 'Latvia', 'Lithuania');
```

Submit SQL

restore default

Correct answer

SUM(population)
6251750

Counting the countries of each continent

6. 😊

For each **continent** show the **continent** and number of countries.

```
SELECT continent, COUNT(name) FROM world
GROUP BY continent;
```

Submit SQL

restore default

Correct answer

continent	COUNT(name)
Africa	53
Asia	47
Caribbean	11
Eurasia	2
Europe	44
North America	11
Oceania	14

Counting big countries in each continent

7. 😊

For each **continent** show the **continent** and number of countries with populations of at least 10 million.

```
SELECT continent, COUNT(name) FROM world
WHERE population >= 10000000
GROUP BY continent;
```

Submit SQL

restore default

Correct answer

continent	COUNT(name)
Africa	29
Asia	26
Caribbean	2
Eurasia	1
Europe	14
North America	4
Oceania	1

Counting big continents

8. 😊

List the continents that **have** a total population of at least 100 million.

```
SELECT continent FROM world
GROUP BY continent
HAVING SUM(population) >= 100000000;
```

Submit SQL

restore default

Correct answer

continent
Africa
Asia
Eurasia
Europe
North America
South America

✓

Table-D

Americas	732240
Middle East	13403102
South America	17740392
South Asia	9437710

Table-E

Americas
Middle East
South America
South Asia

Score the test

Your score is: 8 out of 8

[Tutoriales: escriban las respuestas a las preguntas que no la tienen respuesta en **auto01.doc**, ejecútenlas en sqlzoo y capturen el resultado. Quices: escriban en **auto01.doc** el resultado obtenido de los quices]

D. Propongan consultas que cumplan los siguientes requerimientos. Usen **event** de la base de datos MySQL [University Timetables](#)

[Escriban la consulta en lenguaje natural y la sentencia en SQL en **auto01.doc** y ejecuten la sentencia SQL en sqlzoo. Si no lograron escribir alguna sentencia indiquen el punto de problema]

SELECT * FROM event

Submit SQL restore default

Result:

id	modle	kind	dow	tod	duration	room
co12004.L01	co12004	L	Wednesday	11:00	1	cr.SMH
co12004.L02	co12004	L	Monday	17:00	1	cr.B13
co12004.T01	co12004	T	Monday	11:00	2	co.G78+G82
co12004.T02	co12004	T	Tuesday	15:00	2	co.B7
co12004.T03	co12004	T	Tuesday	13:00	2	co.G78+G82
co12004.T04	co12004	T	Wednesday	13:00	2	co.LB42+LB46
co12004.T05	co12004	T	Wednesday	09:00	2	co.117+118
co12004.T06	co12004	T	Tuesday	13:00	2	co.LB47
co12005.L01	co12005	L	Monday	14:00	1	cr.SMH
co12005.L02	co12005	L	Friday	10:00	1	cr.SMH
co12005.T01	co12005	T	Tuesday	11:00	2	co.G78+G82
co12005.T02	co12005	T	Monday	11:00	2	cr.G90+116
co12005.T03	co12005	T	Tuesday	10:00	2	co.LB47
co12005.T04	co12005	T	Wednesday	14:00	2	co.B7
co12005.T05	co12005	T	Monday	15:00	2	co.117+118
co12006.L01	co12006	L	Wednesday	10:00	1	cr.SMH
co12006.L02	co12006	L	Thursday	09:00	2	cr.G6

- 8 consultas: una para cada uno de los tipos de operadores para expresiones.

- Operadores para expresiones
 - Numéricos: ABS, ROUND, FLOOR, CEIL, DIV, MOD
 - Lógicos: AND, OR, NOT
 - De comparación: =, !=, <>, >, <, >=, <=, BETWEEN
 - Cadenas: LEN, INSTR, SUBSTR, REPLACE, TRIM, CONCAT, LIKE (% _)
 - Tiempo: CURRENT_DATE, CURRENT_TIMESTAMP, EXTRACT, TO_CHAR
 - Agrupamiento: AVG, COUNT, MAX, MIN, SUM
 - Condicionales: CASE
 - Cambio de tipo: CAST

- Numéricos

- Lógicos

6. 😊

Which countries have a GDP greater than every country in Europe? [Give the name only.] (Some countries may have NULL gdp values)

```
SELECT name FROM world
WHERE gdp > (SELECT MAX(gdp) FROM world WHERE continent = 'Europe') AND gdp
IS NOT NULL;
```

Submit SQL

restore default

Correct answer

name
China
Japan
United States

- De comparación

9. 😊

Find the continents where all countries have a population <= 25000000. Then find the names of the countries associated with these continents. Show name, continent and population.

```
SELECT name, continent, population FROM world
WHERE continent IN (SELECT continent FROM world
GROUP BY continent
HAVING MAX(population) <= 25000000)
```

Submit SQL

restore default

Correct answer

name	continent	population
Antigua and Barbuda	Caribbean	86295
Australia	Oceania	23545500
Bahamas	Caribbean	351461
Barbados	Caribbean	285000
Cuba	Caribbean	11167325
Dominica	Caribbean	71293
Dominican Republic	Caribbean	9445281

- Cadenas

- Tiempo

- Agrupamiento

With a `GROUP BY region` statement each region shows up just once. The `MIN` column gives the "smallest" name in the region in the context of strings this is the first name alphabetically.

```
SELECT dow, MIN(name)
FROM event
GROUP BY dow
```

Submit SQL

restore default

Result:

dow	MIN(tod)
Friday	09:00
Monday	09:00
Thursday	09:00
Tuesday	09:00
Wednesday	09:00

- Condicionales
 - Cambio de tipo
 - 3 consultas anidadas que usen otra consulta: 1) (SELECT ...) en FROM, 2) SELECT en WHERE y 3) SELECT ... en SELECT
1. SELECT ____ FROM ____;

1.

```
SELECT id, dow, tod FROM event;
```

Submit SQL

restore default

Result:

id	dow	tod
co12004.L01	Wednesday	11:00
co12004.L02	Monday	17:00
co12004.T01	Monday	11:00
co12004.T02	Tuesday	15:00
co12004.T03	Tuesday	13:00
co12004.T04	Wednesday	13:00
co12004.T05	Wednesday	09:00
co12004.T06	Tuesday	13:00

2. SELECT ____ WHERE ____;

1.

```
SELECT id, dow, tod, duration FROM event
WHERE duration = 1;
```

Submit SQL

restore default

Result:

id	dow	tod	duration
co12004.L01	Wednesday	11:00	1
co12004.L02	Monday	17:00	1
co12005.L01	Monday	14:00	1
co12005.L02	Friday	10:00	1
co12006.L01	Wednesday	10:00	1
co12006.L03	Wednesday	13:00	1
co12012.L01	Wednesday	12:00	1
co22005.T01	Thursday	14:00	1
co22005.T02	Wednesday	13:00	1
co22005.T03	Wednesday	11:00	1
co22005.T04	Tuesday	09:00	1
co22005.T05	Friday	09:00	1
co22005.T06	Wednesday	11:00	1

3. SELECT ____ SELECT ____;

1.

```
SELECT FirstTable.id, kind, tod FROM (
  SELECT * FROM event
  WHERE tod = '11:00'
) as FirstTable;
```

Submit SQL

restore default

Result:

id	kind	tod
co12004.L01	L	11:00
co12004.T01	T	11:00
co12005.T01	T	11:00
co12005.T02	T	11:00
co12006.T04	T	11:00
co12008.L01	L	11:00
co22005.T03	T	11:00
co22005.T06	T	11:00
co22005.T08	T	11:00
co22007.T01	T	11:00
co22020.T04	T	11:00

- 3 consultas con el siguiente esquema: 1) GROUP BY ... HAVING ... 2) ORDER BY 3) DISTINCT

1. GROUP BY . . . HAVING

1.

```
SELECT kind, room, tod FROM event
GROUP BY kind, room, tod
HAVING tod = '13:00';
```

Submit SQL

restore default

Result:

kind	room	tod
L	cr.203	13:00
L	cr.204	13:00
L	cr.B1	13:00
L	cr.B9	13:00
L	cr.G6	13:00
L	cr.SMH	13:00
T	null	13:00
T	co.117+118	13:00

2. ORDER BY

1.

```
SELECT id, kind, tod FROM event
ORDER BY tod;
```

Submit SQL

restore default

Result:

id	kind	tod
co12006.L02	L	09:00
coh8412555.L01	L	09:00
coh6412255.L01	L	09:00
coh2451.T01	T	09:00
co12006.T05	T	09:00
coh8412585.T03	T	09:00
co72006.L01	L	09:00

3. DISTINCT

1.

```
SELECT DISTINCT(tod) FROM event
```

Submit SQL

restore default

Result:

tod
11:00
17:00
15:00
13:00
09:00
14:00
10:00
12:00
16:00
18:00
20:00