# 1. MySQL – MySQLD – MySQLAdmin

\_ MySQLD: is the server executable (one of them), đây là một server dùng để manage database

\_ MySQL: is the command line client.

\_ MySQLAdmin: is a maintainance or administrative utility.

# 2. Storage Engine

**Address:** http://ktmt.github.io/blog/2013/05/07/storageenginemysql/

Storage Engine thực chất là cách MySQL lưu trữ dữ liệu trên đĩa cứng.

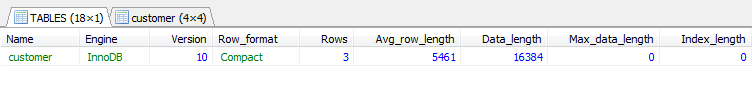
**InnoDB engine:** Là engine phức tạp nhất trong các engine của MySQL

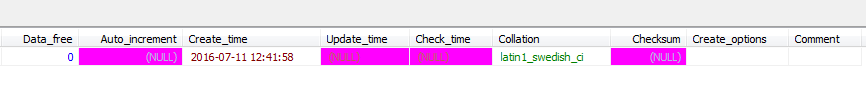
InnoDB engine có hỗ trợ transaction;

Use this query to show information table:

**show** **table** **status** **like** 'customer';

**result:**



****

Transaction define:

http://vietjack.com/sql/transaction\_trong\_sql.jsp

# 3. Select shortest and longest

Query the two cities in **STATION** with the shortest and longest CITY names, as well as their respective lengths (i.e.: number of characters in the name). If there is more than one smallest or largest city, choose the one that comes first when ordered alphabetically:

**select city, char\_length(city) city\_length from station order by city\_length, city limit 1;**

**select city, char\_length(city) city\_length from station order by city\_length desc, city limit 1;**

# 4. Select multiple conditions

Query the list of CITY names starting with vowels (i.e., a, e, i, o, or u) from **STATION**. Your result cannot contain duplicates.

**select distinct city from station where city like 'a%'**

**union**

**select distinct city from station where city like 'e%'**

**union**

**select distinct city from station where city like 'i%'**

**union**

**select distinct city from station where city like 'o%'**

**union**

**select distinct city from station where city like 'u%'**

# 5. Rlike

Query the list of CITY names from **STATION** which have vowels (i.e., a, e, i, o, and u) as both their first and last characters. Your result cannot contain duplicates.

**select distinct city from station where city rlike '^[aeiouAEIOU].\*[aeiouAEIOU]$';**

# 6. RIGHT Substring

**select name from students where marks>75 order by RIGHT(name, 3),id**

# 7. Select case when

**select case**

**when A+B<=C or A+C<=B or B+C<=A then "Not A Triangle"**

**when A=B and A=C then "Equilateral"**

**when A=B or A=C or B=C then "Isosceles"**

**else "Scalene"**

**end as triangle\_type**

**from TRIANGLES;**

# 8. Group by, concat

Generate the following two result sets:

1. Query an *alphabetically ordered* list of all names in **OCCUPATIONS**, immediately followed by the first letter of each profession as a parenthetical (i.e.: enclosed in parentheses). For example: AnActorName(A), ADoctorName(D), AProfessorName(P), and ASingerName(S).
2. Query the number of ocurrences of each occupation in **OCCUPATIONS**. Sort the occurrences in *ascending order*, and output them in the following format:
3. There are a total of [occupation\_count] [occupation]s.

where [occupation\_count] is the number of occurrences of an occupation in **OCCUPATIONS** and [occupation] is the *lowercase* occupation name. If more than one *Occupation* has the same [occupation\_count], they should be ordered alphabetically.

**Note:** There will be at least two entries in the table for each type of occupation.

**select concat(name,"(",substr(occupation,1,1),")") from occupations**

**order by name asc;**

**select concat('There are a total of ',count(occupation),' ',lower(occupation),'s.') as n from occupations**

**group by occupation**

**order by n asc;**

# 9. Đếm giá trị

**set @r1=0, @r2=0, @r3=0, @r4=0;**

**select min(Doctor), min(Professor), min(Singer), min(Actor)**

**from(**

**select case when Occupation='Doctor' then (@r1:=@r1+1)**

**when Occupation='Professor' then (@r2:=@r2+1)**

**when Occupation='Singer' then (@r3:=@r3+1)**

**when Occupation='Actor' then (@r4:=@r4+1) end as RowNumber,**

**case when Occupation='Doctor' then Name end as Doctor,**

**case when Occupation='Professor' then Name end as Professor,**

**case when Occupation='Singer' then Name end as Singer,**

**case when Occupation='Actor' then Name end as Actor**

**from OCCUPATIONS**

**order by Name**

**) Temp**

**group by RowNumber;**

# 10. Binary search

## Tự làm:

**select NN,title from**

**(select**

**case when P is not NULL then P end as PP,**

**case**

**when P is NULL then N**

**when P is not NULL then N**

**end as NN,**

**case**

**when P is NULL then 'Root'**

**when P is not NULL and (select count(P) from BST where P=NN)>0 then 'Inner'**

**else 'Leaf'**

**end as title from BST order by N) TEMP;**

## Có tham khảo:

**select TEMP.n,**

**(**

**CASE WHEN TEMP.p IS NULL THEN 'Root'**

**WHEN (select count(\*) from BST TEMP2 where TEMP2.P = TEMP.N) > 0 THEN "Inner"**

**ELSE "Leaf" END**

**) from BST TEMP**

**order by TEMP.n**

# 11. Ví dụ điển hình join các table

**select c.company\_code,c.founder ,count(distinct e.lead\_manager\_code),count(distinct e.senior\_manager\_code),count(distinct e.manager\_code),count(distinct e.employee\_code)**

**from company c join**

**employee e**

**on**

**c.company\_code=e.company\_code group by c.company\_code,c.founder order by c.company\_code**

# 12. Revising aggregation

## Tự làm

set @total = 0;

select distinct @total from (select case when District='California' then (@total:=@total+population) end from CITY) TEMP;

## Tham khảo hàm sum:

|  |
| --- |
| SELECT SUM(POPULATION) |
|  |

|  |
| --- |
| FROM CITY |
|  |

WHERE DISTRICT = "California";

# 13. Rounded down - FLOOR

select FLOOR(population) from city;

# 14. Round nex integer – CEIL

SELECT CEIL(AVG(Salary)-AVG(REPLACE(Salary,'0',''))) FROM EMPLOYEES;

# 15. TOP Earning

**set @maxSalary = 0;**

**set @maxSalary := (select maxSalary from (select max(salary\*months) as maxSalary from Employee) TEMP);**

**select @maxSalary,count(\*) from Employee where salary\*months = @maxSalary;**

# 16. Round 2 decimal place

select ROUND(sum(LAT\_N),2),ROUND(sum(LONG\_W),2) from STATION;

# 17. select from min

select round(long\_w,4) from station where lat\_n=(select min(lat\_n) from station where lat\_n>38.7780)

# 18. Manhattan distance

set @a = (select min(lat\_n) from station);

set @b = (select min(long\_w) from station);

set @c = (select max(lat\_n) from station);

set @d = (select max(long\_w) from station);

set @distance = abs(@a-@c)+abs(@b-@d);

select round(@distance,4);

# 19. Square Root

set @a = (select min(lat\_n) from station);

set @b = (select min(long\_w) from station);

set @c = (select max(lat\_n) from station);

set @d = (select max(long\_w) from station);

set @distance = SQRT ((@a-@c)\*(@a-@c)+(@b-@d)\*(@b-@d));

select round(@distance,4);

# 20. Sign

Tự làm: ở đây 249 là lấy cái length

SELECT round(lat\_n,4) FROM station order by lat\_n LIMIT 1 OFFSET 249;

Tham khảo: ở đây có lẽ tốn perfomance

SELECT round( x.LAT\_N, 4 ) from STATION x, STATION y GROUP BY x.LAT\_N HAVING SUM( SIGN( 1-SIGN( y.LAT\_N -x.LAT\_N ) ) )/COUNT(\*) > .5 LIMIT 1;

ở đây y GROUP BY x.LAT\_N HAVING SUM( SIGN( 1-SIGN( y.LAT\_N -x.LAT\_N ) ) )/COUNT(\*) > .5 sẽ lấy các giá trị lớn hơn từ phân nửa

# 21. join same as inner join

select sum(c1.population) from city c1 join country c2 on c1.countrycode=c2.code and c2.continent = 'asia';

# \*22. Round down to nearest integer

## Tự làm:Sau khi query ra được các distinct continent

select c2.continent,floor(avg(c1.Population)) from city c1 join country c2 on c1.countrycode=c2.code and c2.continent='Asia';

select c2.continent,floor(avg(c1.Population)) from city c1 join country c2 on c1.countrycode=c2.code and c2.continent='Oceania';

select c2.continent,floor(avg(c1.Population)) from city c1 join country c2 on c1.countrycode=c2.code and c2.continent='Europe';

select c2.continent,floor(avg(c1.Population)) from city c1 join country c2 on c1.countrycode=c2.code and c2.continent='South America';

select c2.continent,floor(avg(c1.Population)) from city c1 join country c2 on c1.countrycode=c2.code and c2.continent='Africa';

## Tham khảo:

**select c2.continent,floor(avg(c1.Population)) from city c1 inner join country c2 on c1.countrycode=c2.code GROUP BY c2.CONTINENT;**

# \*23. join between

**select if(g.Grade < 8,NULL,s.Name),g.Grade,s.Marks**

**from Students s**

**inner join Grades g**

**on s.Marks >= g.Min\_Mark and s.Marks <= g.Max\_Mark**

**order by g.Grade desc,s.Name,s.Marks;**

# \*24. Having

## Có tham khảo 1:

**SELECT h.hacker\_id, h.name**

**FROM submissions s**

**JOIN challenges c**

**ON s.challenge\_id = c.challenge\_id**

**JOIN difficulty d**

**ON c.difficulty\_level = d.difficulty\_level**

**JOIN hackers h**

**ON s.hacker\_id = h.hacker\_id**

**WHERE s.score = d.score**

**AND c.difficulty\_level = d.difficulty\_level**

**GROUP BY h.hacker\_id**

**HAVING COUNT(s.hacker\_id) > 1**

**ORDER BY COUNT(s.hacker\_id) DESC, s.hacker\_id ASC**

## Có tham khảo 2:

**SELECT h.hacker\_id, h.name**

**FROM submissions s**

**inner JOIN challenges c**

**inner JOIN difficulty d**

**inner JOIN hackers h**

**ON s.challenge\_id = c.challenge\_id**

**and c.difficulty\_level = d.difficulty\_level**

**and s.hacker\_id = h.hacker\_id**

**WHERE s.score = d.score**

**AND c.difficulty\_level = d.difficulty\_level**

**GROUP BY h.hacker\_id, h.name**

**HAVING COUNT(s.hacker\_id) > 1**

**ORDER BY COUNT(s.hacker\_id) DESC, s.hacker\_id ASC**

# \*25. Olivander’s wand – select được chỗ min

**select w.id,p.age,w.coins\_needed,w.power from Wands w**

**inner join Wands\_Property p on w.code=p.code**

**where p.is\_evil=0 and**

**w.coins\_needed = (select min(w1.coins\_needed) from Wands w1 join Wands\_Property p1 on w1.code=p1.code where**

**w.power = w1.power and p.age=p1.age)**

**order by w.power desc, p.age desc**

# \*26. Select được chỗ max với 2 điều kiện

**select c.hacker\_id,h.name,count(c.hacker\_id) as c\_count from Challenges c**

**inner join Hackers h**

**on c.hacker\_id=h.hacker\_id**

**group by c.hacker\_id,h.name**

**having**

**/\* output anyone with a count that is equal to... \*/**

**c\_count =**

**/\* the max count that anyone has \*/**

**(SELECT MAX(temp1.cnt)**

**from (SELECT COUNT(hacker\_id) as cnt**

**from Challenges**

**group by hacker\_id**

**order by hacker\_id) temp1)**

**/\* or anyone who's count is in... \*/**

**or c\_count in**

**/\* the set of counts... \*/**

**(select t.cnt**

**from (select count(\*) as cnt**

**from challenges**

**group by hacker\_id) t**

**/\* who's group of counts... \*/**

**group by t.cnt**

**/\* has only one element \*/**

**having count(t.cnt) = 1)**

**/\* finally, the order the rows should be output \*/**

**order by c\_count DESC, c.hacker\_id**

# \*27 Sum điểm, phần cuối cùng trong basic join

**select h.hacker\_id, h.name, sum(score) as total\_score**

**from**

**Hackers as h inner join**

**/\* find max\_score\*/**

**(select hacker\_id, max(score) as score from submissions group by challenge\_id, hacker\_id) Max\_Score\_Table**

**on h.hacker\_id=Max\_Score\_Table.hacker\_id**

**group by h.hacker\_id, h.name**

**/\* don't accept hackers with total\_score=0 \*/**

**having total\_score > 0**

**/\* finally order as required \*/**

**order by total\_score desc, h.hacker\_id**

**;**

## Tự làm tham khảo bên trên:

**select Max\_Table.hacker\_id, h.name,sum(score) as total\_score from Hackers h**

**inner join**

**(select s.hacker\_id, max(score) as score from Submissions s group by s.challenge\_id, s.hacker\_id) Max\_Table**

**on Max\_Table.hacker\_id = h.hacker\_id group by Max\_Table.hacker\_id, h.name**

**having total\_score > 0**

**order by total\_score desc, h.hacker\_id**

**;**

# \*28 DATEDIFF and min cho ngày

**SELECT Start\_Date, MIN(End\_Date)**

**FROM**

**(SELECT Start\_Date FROM Projects WHERE Start\_Date NOT IN (SELECT End\_Date FROM Projects)) a,**

**(SELECT End\_Date FROM Projects WHERE End\_Date NOT IN (SELECT Start\_Date FROM Projects)) b**

**WHERE Start\_Date < End\_Date**

**GROUP BY Start\_Date**

**ORDER BY DATEDIFF(MIN(End\_Date), Start\_Date) ASC, Start\_Date ASC;**

# \*29 Using

Select S.Name

From ( Students S inner join Friends F Using(ID)

join Packages P1 on S.ID=P1.ID

join Packages P2 on F.Friend\_ID=P2.ID)

Where P2.Salary > P1.Salary

Order By P2.Salary;

# \*30 Where exists

select x, y from functions f1

where exists(select \* from functions f2 where f2.y=f1.x

and f2.x=f1.y and f2.x>f1.x) and (x!=y)

union

select x, y from functions f1 where x=y and

((select count(\*) from functions where x=f1.x and y=f1.x)>1)

order by x;

# 30.1 Kiểm tra 1 row có 2 giá trị giống nhau nhưng count lớn hơn 1

select x, y from functions f1 where x=y and

((select count(\*) from functions where x=f1.x and y=f1.x)>1)

order by x;

# \*31 What the f\*ck sql

select e.e1, e.e2,e.e3, e.e4,e.e5,d.s11,d.s22 from

(select c0.contest\_id as e1, c0.hacker\_id as e2, c0.name as e3,s1 as e4,s2 as e5 from Contests c0 join

(select c1.contest\_id,sum(s1) as s1,sum(s2) as s2 from Colleges c1 join

(select c2.college\_id,sum(sum\_total\_submissions) as s1,sum(sum\_total\_accepted\_submissions) as s2 from Challenges c2 join

(select c3.challenge\_id,sum\_total\_submissions,sum\_total\_accepted\_submissions from Challenges c3

join

(select challenge\_id,sum(total\_submissions) as sum\_total\_submissions,sum(total\_accepted\_submissions) as sum\_total\_accepted\_submissions from Submission\_Stats group by challenge\_id) Sum\_Submission\_Stats

on

c3.challenge\_id = Sum\_Submission\_Stats.challenge\_id) a

on c2.challenge\_id = a.challenge\_id group by c2.college\_id) b

on c1.college\_id = b.college\_id group by c1.contest\_id) c

on c.contest\_id = c0.contest\_id) e

join

(select c0.contest\_id as d1,s1 as s11,s2 as s22 from Contests c0 join

(select c1.contest\_id,sum(s1) as s1,sum(s2) as s2 from Colleges c1 join

(select c2.college\_id,sum(sum\_total\_views) as s1,sum(sum\_total\_unique\_views) as s2 from Challenges c2 join

(select c3.challenge\_id,sum\_total\_views,sum\_total\_unique\_views from Challenges c3

join

(select challenge\_id, sum(total\_views) as sum\_total\_views, sum(total\_unique\_views) as sum\_total\_unique\_views from View\_Stats group by challenge\_id) Sum\_View\_Stats

on c3.challenge\_id = Sum\_View\_Stats.challenge\_id) a

on c2.challenge\_id = a.challenge\_id group by c2.college\_id) b

on c1.college\_id = b.college\_id group by c1.contest\_id) c

on c.contest\_id = c0.contest\_id) d

on e.e1=d.d1

# 32. F\*king sql 2 - Datediff

SELECT max\_table.submission\_date,

(SELECT count(distinct hacker\_id)

FROM Submissions S

WHERE S.submission\_date = max\_table.submission\_date

AND (

SELECT COUNT(distinct submission\_date) FROM Submissions s1

WHERE hacker\_id = S.hacker\_id and submission\_date < S.submission\_date

) = DATEDIFF(submission\_date , '2016-03-01')

) as hackercount,

all\_table.hacker\_id,

H.name as hacker\_name

FROM

/\* Store the Max Submission counts for all hackers on daily basis \*/

(SELECT submission\_date, max(HSC\_T.hsc) as maxhsc

FROM

(

SELECT submission\_date, hacker\_id,

count(submission\_id) as hsc

FROM Submissions

GROUP BY submission\_date, hacker\_id

ORDER BY submission\_date, hacker\_id

) HSC\_T

GROUP BY submission\_date ) max\_table

JOIN

/\* Store the hacker with minimum ID for each submission count in each day \*/

(SELECT submission\_date, hsc,

MIN(HSC\_T.hacker\_id) as minhacker

FROM

(

SELECT submission\_date, hacker\_id,

count(submission\_id) as hsc

FROM Submissions

GROUP BY submission\_date, hacker\_id

ORDER BY submission\_date, hacker\_id

) HSC\_T

GROUP BY submission\_date, hsc ) min\_table

ON max\_table.submission\_date = min\_table.submission\_date

JOIN

/\* Store submission count info for each of hacker in each day \*/

(SELECT submission\_date, hacker\_id,

count(submission\_id) as hsc

FROM Submissions

GROUP BY submission\_date, hacker\_id

ORDER BY submission\_date, hacker\_id) all\_table

ON all\_table.submission\_date = max\_table.submission\_date

/\* Finally, join the Hackers table for hacker\_name \*/

JOIN Hackers H

ON H.hacker\_id = all\_table.hacker\_id

WHERE

/\* Filter only the records with min hacker\_ID and max submission\_count \*/

all\_table.hacker\_id = min\_table.minhacker

AND all\_table.hsc = max\_table.maxhsc

ORDER BY max\_table.submission\_date, all\_table.hacker\_id;

## Giải thích

### Lưu giá trị max submission theo từng ngày:

select submission\_date,max(hsc) as maxhsc from

(select submission\_date,hacker\_id,count(submission\_id) as hsc from Submissions group by submission\_date,hacker\_id) HSC\_T group by submission\_date

### Lưu giá trị có hacker\_id nhỏ nhất theo từng ngày

select submission\_date, min(hacker\_id) from

(select submission\_date, hacker\_id, count(submission\_id) from Submissions as total group by submission\_date, hacker\_id) HSC\_T group by submission\_date

# 33. Repeat và gán giá trị vào information\_schema.tables

**SELECT REPEAT('\* ', @a := @a - 1) FROM information\_schema.tables, (SELECT @a:=21) t LIMIT 20**

# 34. Group\_CONCAT

**select GROUP\_CONCAT(valuetempt SEPARATOR '&') from (**

**SELECT**

**FinalResults.OriginalNumber as valuetempt**

**FROM**

**(**

**SELECT**

**DivResults.OriginalNumber,**

**COUNT(\*)**

**FROM**

**(**

**SELECT**

**Sequence.x AS OriginalNumber,**

**Sequence.x % NumberGenerator2.x AS DivMod**

**FROM**

**(**

**SELECT**

**NumberGenerator.x**

**FROM**

**(**

**-- Since MySQL doesn't have a number/sequence generator like other DBMS's,**

**-- I'm using this one that @RolandoMySQLDBA answered in this question:**

**-- http://dba.stackexchange.com/questions/75785/how-to-generate-a-sequence-in-mysql**

**-- This will generate a sequence from 1 to 1000.**

**SELECT**

**(h\*100+t\*10+u+1) x**

**FROM**

**(**

**SELECT 0 h**

**UNION SELECT 1**

**UNION SELECT 2**

**UNION SELECT 3**

**UNION SELECT 4**

**UNION SELECT 5**

**UNION SELECT 6**

**UNION SELECT 7**

**UNION SELECT 8**

**UNION SELECT 9**

**) A,**

**(**

**SELECT 0 t**

**UNION SELECT 1**

**UNION SELECT 2**

**UNION SELECT 3**

**UNION SELECT 4**

**UNION SELECT 5**

**UNION SELECT 6**

**UNION SELECT 7**

**UNION SELECT 8**

**UNION SELECT 9**

**) B,**

**(**

**SELECT 0 u**

**UNION SELECT 1**

**UNION SELECT 2**

**UNION SELECT 3**

**UNION SELECT 4**

**UNION SELECT 5**

**UNION SELECT 6**

**UNION SELECT 7**

**UNION SELECT 8**

**UNION SELECT 9**

**) C**

**) AS NumberGenerator**

**WHERE**

**x > 1**

**ORDER BY**

**x**

**) AS Sequence,**

**(**

**SELECT**

**(h\*100+t\*10+u+1) x**

**FROM**

**(**

**SELECT 0 h**

**UNION SELECT 1**

**UNION SELECT 2**

**UNION SELECT 3**

**UNION SELECT 4**

**UNION SELECT 5**

**UNION SELECT 6**

**UNION SELECT 7**

**UNION SELECT 8**

**UNION SELECT 9**

**) A,**

**(**

**SELECT 0 t**

**UNION SELECT 1**

**UNION SELECT 2**

**UNION SELECT 3**

**UNION SELECT 4**

**UNION SELECT 5**

**UNION SELECT 6**

**UNION SELECT 7**

**UNION SELECT 8**

**UNION SELECT 9**

**) B,**

**(**

**SELECT 0 u**

**UNION SELECT 1**

**UNION SELECT 2**

**UNION SELECT 3**

**UNION SELECT 4**

**UNION SELECT 5**

**UNION SELECT 6**

**UNION SELECT 7**

**UNION SELECT 8**

**UNION SELECT 9**

**) C**

**) AS NumberGenerator2**

**WHERE**

**-- We just need to check numbers that are <= square root of the original number to be tested**

**NumberGenerator2.x <= FLOOR(SQRT(Sequence.x))**

**ORDER BY**

**Sequence.x, NumberGenerator2.x**

**) AS DivResults**

**WHERE**

**DivResults.DivMod = 0**

**GROUP BY**

**DivResults.OriginalNumber**

**HAVING**

**COUNT(\*) = 1**

**) AS FinalResults) temp**