

ICT Curriculum Elective Module A

Using different DBMS tools in teaching database concepts and

Running MySQL on Cloud Environment

高中資訊及通訊科技修訂課程選修單元 A

運用不同工具教授數據庫及

在雲環境上運行 MySQL 講座/工作坊

SQL: From theory to practical

SQL: 從理論到實踐

23/03/2024

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溫華恩老師



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Agenda

0. Download MySQL WorkBench

1. Import data

2. Data types & Constraints

3. Queries

4. Index & View

5. Export data

6. Reverse Engineering (ERD)

<https://drive.google.com/drive/folders/19poXGBpl0GsX7x2ltxirL7VZ345cTfq0?usp=sharing>



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0. Download MySQL WorkBench



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mysql workbench download



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約 7,640,000 項搜尋結果 (0.34 秒)



MySQL :: Developer Zone

https://dev.mysql.com > downloads > w... · 翻譯這個網頁

Download MySQL Workbench

The following LGPL libraries are used by **MySQL Workbench** and their sources are provided for **download** in compliance with the LGPL.



MySQL

https://www.mysql.com > products > wo... · 翻譯這個網頁

MySQL Workbench

Download Now ». **MySQL Workbench** is a unified visual tool for database architects, developers, and DBAs. **MySQL Workbench** provides data modeling, SQL development, ...



MySQL

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General Availability (GA) Releases

Archives



MySQL Workbench 8.0.36

Select Operating System:

Microsoft Windows

Recommended Download:

MySQL Installer for Windows

All MySQL Products. For All Windows Platforms. In One Package.



Starting with MySQL 5.6 the MySQL Installer package replaces the standalone MSI packages.

Windows (x86, 32 & 64-bit), MySQL Installer MSI

Go to Download Page >

MySQL Community Downloads

MySQL Installer

General Availability (GA) Releases

Archives



MySQL Installer 5.7.44



Note: MySQL 8.0 is the final series with MySQL Installer. As of MySQL 8.1, use a MySQL product's MSI or Zip archive for installation. MySQL Server 8.1 and higher also bundle MySQL Configurator, a tool that helps configure MySQL Server.

Select Version:

5.7.44

Select Operating System:

Microsoft Windows

Windows (x86, 32-bit), MSI Installer

5.7.44

2.1M

Download

(mysql-installer-web-community-5.7.44.0.msi)

MDS: 6cc27e2a42a54b93a9d3544f2529a53 | Signature

Windows (x86, 32-bit), MSI Installer

5.7.44

373.7M

Download

(mysql-installer-community-5.7.44.0.msi)

MDS: e89af3ba9bb4716ff5e647b0fd2edab2 | Signature



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1. Below shows part of the database tables that Dr. Lee used to store the records of patients in his page clinic.

PATIENT INFO

PCode	Name	HKID	Gender	DOB	Contact
103325	Chan Tracy	Z123546 (7)	M	2000/4/14	26542587
103685	Lee Kitty	C254412 (A)	F	1980/9/15	25456588
104521	Ho Rachel	Z298545 (5)	F	1991/3/18	98221445
012354	Keung Son	K254654 (3)	M	1975/9/15	62541254
085455	Yau Sheng	P456875 (4)	M	1960/8/26	65412555

VISIT RECORD

PCode	Date_of_Consultancy	Illness_ID	Symptom
103325	11/4/2021	0003	Fever, coughing
103685	14/1/2021	0001	A lot of coughing
104521	28/6/2021	0002	Bleeding at forehead
103685	28/6/2021	0003	High temperature Fever
012354	30/7/2022	0004	Cannot stop crying
085455	31/3/2020	0004	Not willing to eat
103658	7/5/2022	0001	Low Grade Fever

ILLNESS

Illness ID	Illness name
0001	Flu
0002	Injury
0003	COVID-19
0004	Mental illness
0005	Broken bones
0006	AIDS

- (a) Complete the following SQL statement to increase the length of the field Illness_ID from 4 to 5.

_____ ILLNESS

ALTER COLUMN _____

(2 marks)

Write SQL statements to complete the tasks from (b) to (f) below.

- (b) List the Name and PCode of male patients. Display the result in descending order of Name.

(2 marks)

- (c) Dr. Lee promotes his clinic by giving a 10% discount to patients that have visited over 10 times. List the PCode of the patient that got a discount.

(2 marks)

- (d) List the names of the patients that are infected with COVID-19.

(2 marks)

- (e) list all the illness names that have fever symptoms without duplication.

(3 marks)

- (f) The Centre for health Protection of the Department of Health requires the clinic to provide the name of patients that visited the clinic on the same day as those infected with COVID-19 for other illnesses. Extract the list for the Centre for health Protection.

(4 marks)

2. Peter works in a food delivery company. There are two database tables D1 and D2 that store information on the food items offered by two restaurants respectively.

D1

Field name	Type	Description
ACODE	Character	Identity code of food
ANAME	Character	Food name
PRICE	Real	Price of food

Primary key: ACODE

Sample data:

ACODE	ANAME	PRICE
K01	Banana pancake	48.5
K08	Strawberry pancake	48.5
L62	Brownie	39.9

D2

Field name	Type	Description
BCODE	Character	Identity code of food
BNAME	Character	Food name
PRICE	Integer	Price of food

Primary key: BCODE

Sample data:

BCODE	BNAME	PRICE
K01	Chicken rice	90
K08	Beef noodle	70
GP5	Fried vegetable	58

1. Import data

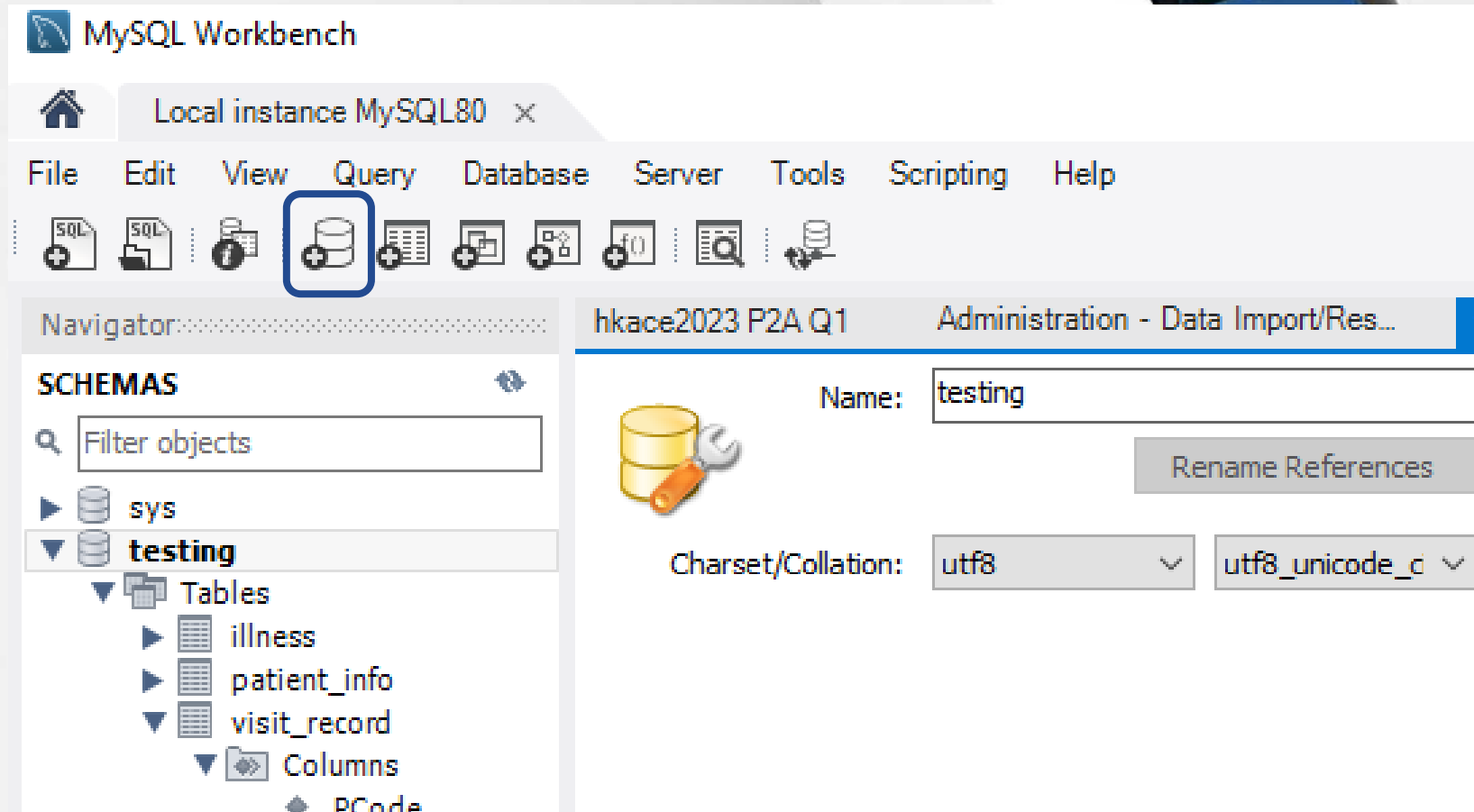


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1.1 Create a new schema



1.2 Create table & import data

The screenshot shows the SQL Server Enterprise Manager interface. On the left, the 'Navigator' pane displays the 'SCHEMAS' tree with 'testing' expanded to show 'Tables'. A blue box highlights the 'Tables' folder. A context menu is open over it, with 'Table Data Import Wizard' selected and highlighted by another blue box. The main pane shows the 'testing' schema with a table named 'testing' and a 'Charset/Collation' of 'utf8'.

Select .csv file

The 'Table Data Import' wizard is shown in the 'Select File to Import' step. The 'File Path' field is populated with 'C:\Users\why\Desktop\VISIT_RECORD.csv'. A 'Browse...' button is visible to the right of the field. The wizard text states: 'Table Data Import allows you to easily import CSV, JSON datafiles. You can also create destination table on the fly.'

Select Create new table

The 'Table Data Import' wizard is shown in the 'Select Destination' step. The 'Select destination table and additional options.' section has the 'Create new table' radio button selected. The 'testing' schema and 'ILLNESS' table name are entered in the respective fields. The 'Drop table if exists' checkbox is checked.

1.2 Create table & import data

Table Data Import

Configure Import Settings

Detected file format: csv

Encoding: utf-8

Select Encoding

Columns:

Source Column	Field Type
<input checked="" type="checkbox"/> Illness_ID	int
<input checked="" type="checkbox"/> Illness_name	int

Select data type

Illness_ID	Illness_name
1	Flu
2	Injury
3	COVID-19
4	Mental illness
5	Broken bones

< Back Next > Cancel

Table Data Import

Import Data

The following tasks will now be performed. Please monitor the execution.

Prepare Import

Import data file

Click [Next >] to execute.



2. Data types & Constraints

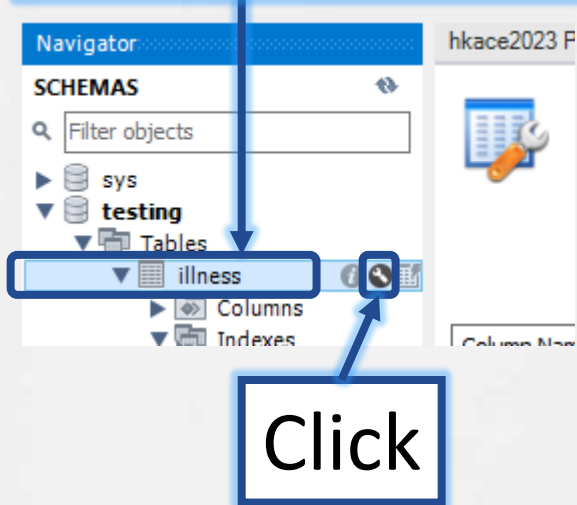


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Mouse-over on table name



hkace2023 P2A Q1 Administration - Data Import/Res... testing - Schema illness - Table illness - Table

Table Name: Schema: **testing**

Charset/Collation: Engine:

Comments:

Column Name	Datatype	PK	NN	UQ	B	UN	ZF	AI	G	Default/Expression
Illness_ID	VARCHAR(5)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Illness_name	TEXT	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	NULL

Data types

Constraints

Column Name: Data Type:

Charset/Collation: Default:

Comments:

Storage: Virtual Stored

Primary Key Not Null Unique
 Binary Unsigned Zero Fill
 Auto Increment Generated

Columns Indexes Foreign Keys Triggers Partitioning Options

Apply Revert

3. Queries



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Local instance MySQL80 x

File Edit View Query Database Server Tools Scripting Help

Navigator

SCHEMAS

Filter objects

- sys
- testing
 - Tables
 - illness
 - Columns
 - Indexes
 - PRIMARY
 - Foreign Keys
 - Triggers
 - patient_info
 - visit_record
 - Views
 - Stored Procedures

hkace2023 P2A Q1 x Administration - Data Import/Res... testing - Schema illness - Tab

```
1 /****HKACE Mock 2023 P2A****/  
2 • use testing;  
3  
4 /****Q1a****/  
5 • ALTER TABLE ILLNESS  
6 MODIFY Illness_ID VARCHAR(5);  
7  
8  
9 /****Q1b****/  
10 • SELECT NAME, PCODE FROM PATIENT_INFO  
11 WHERE GENDER = "M"  
12 ORDER BY NAME DESC;  
13  
14 /****Q1c****/  
15 • SELECT PCODE FROM VISIT_RECORD GROUP BY PCODE  
16 HAVING COUNT(*) > 10;  
17
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content: |

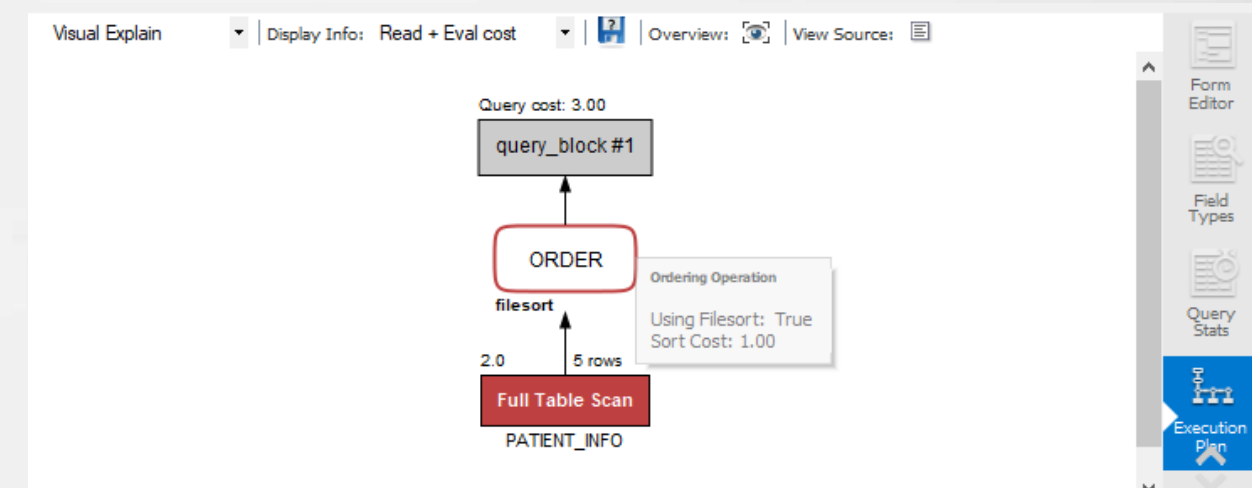
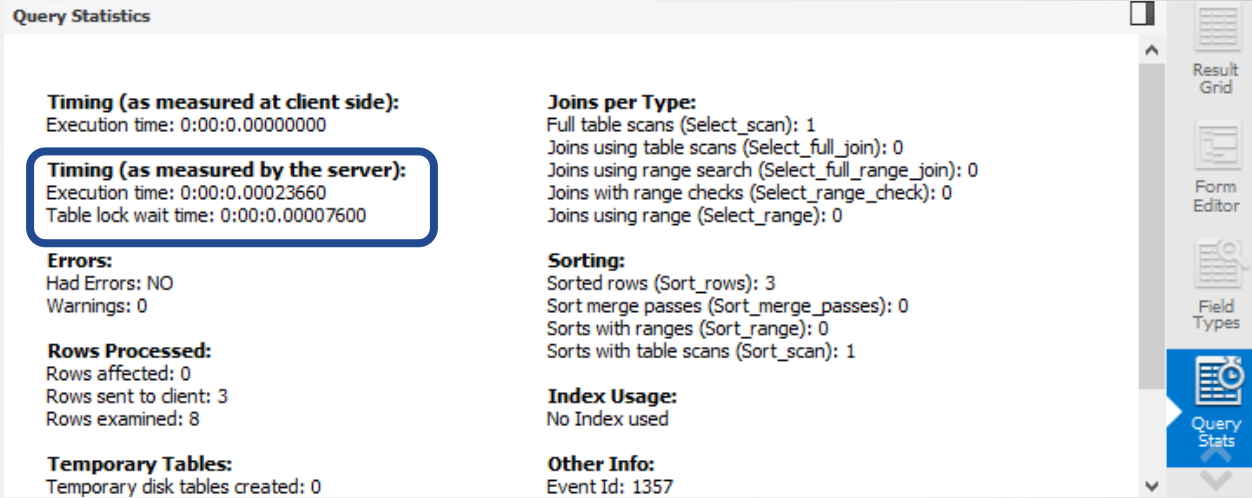
NAME
Chan Tracy
Lee Kitty

Form Editor | Navigate: 1 / 2

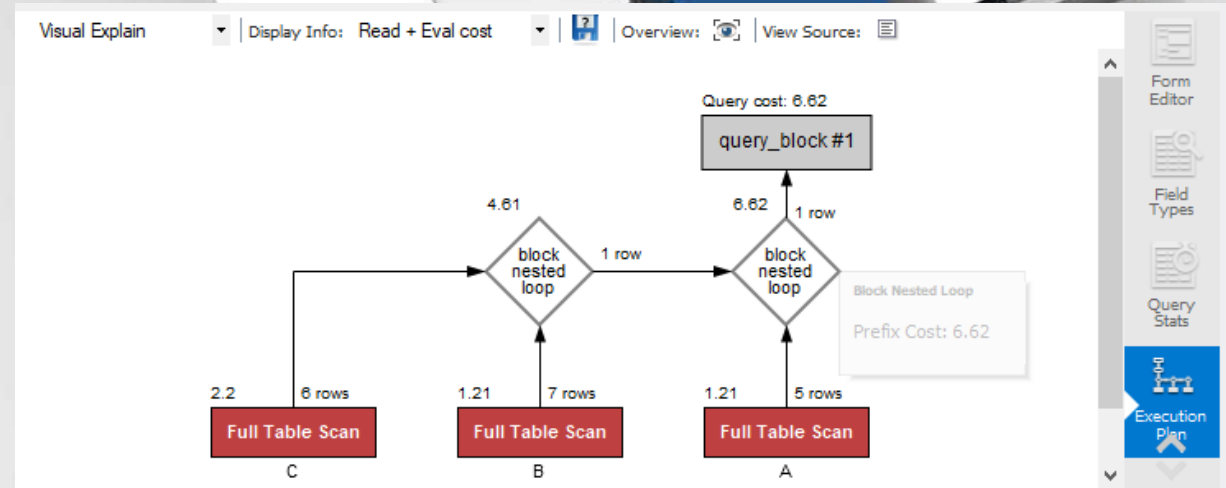
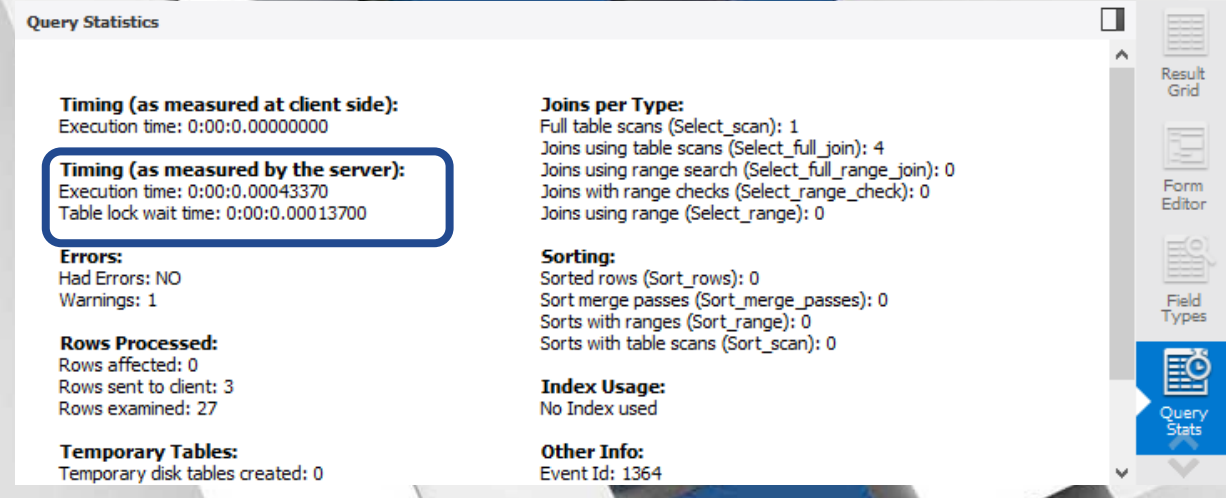
NAME: Chan Tracy

Comparison of different queries

Without joining tables



With joining tables



4. Index & View



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Create Index

The screenshot shows the SQL Server Enterprise Manager interface. The left pane shows the 'testing' schema with a table named 'illness'. A context menu is open over the 'PRIMARY' index, with 'Create Index' selected. The main pane shows the 'Indexes in Table' for 'illness', listing a 'PRIMARY' index of type 'BTREE' on the 'Illness_ID' column. The 'Index Details' pane shows the index name, type, and other properties. The bottom pane shows the 'Definition' of the index, including its type, uniqueness, and the column it is applied to.

Key	Type	Uni...	Columns
PRIMARY	BTREE	YES	Illness_ID

Column	Type	Nullable	Indexes
Illness_ID	varchar(5)	NO	PRIMARY
Illness_name	text	YES	

Index: **PRIMARY**

Definition:

- Type: BTREE
- Unique: Yes
- Visible: Yes
- Columns: Illness_ID

Create Index for Selected Columns...

Create View

The screenshot shows the SQL Server Enterprise Manager interface. The left pane shows the 'testing' schema with a table named 'illness'. A context menu is open over the 'Views' folder, with 'Create View...' selected. The main pane shows the 'Create View' wizard. The 'Name' field is set to 'new_view'. The 'DDL' pane shows the SQL statement: 'CREATE VIEW `new_view` AS'. The 'Refresh All' button is visible at the bottom.

Name: new_view

DDL:

```
1 CREATE VIEW `new_view` AS  
2
```

Create View...

Refresh All



Comparison of different queries using index

With Index

Without Index

Query Statistics

Timing (as measured at client side):
Execution time: 0:00:0.00000000

Timing (as measured by the server):
Execution time: 0:00:0.00131090
Table lock wait time: 0:00:0.00097400

Errors:
Had Errors: NO
Warnings: 0

Rows Processed:
Rows affected: 0
Rows sent to client: 2
Rows examined: 15

Temporary Tables:
Temporary disk tables created: 1

Joins per Type:
Full table scans (Select_scan): 1
Joins using table scans (Select_full_join): 1
Joins using range search (Select_full_range_join): 0
Joins with range checks (Select_range_check): 0
Joins using range (Select_range): 0

Sorting:
Sorted rows (Sort_rows): 0
Sort merge passes (Sort_merge_passes): 0
Sorts with ranges (Sort_range): 0
Sorts with table scans (Sort_scan): 0

Index Usage:
No Index used

Other Info:
Event Id: 1368

Query Statistics

Timing (as measured at client side):
Execution time: 0:00:0.00000000

Timing (as measured by the server):
Execution time: 0:00:0.00094620
Table lock wait time: 0:00:0.00013400

Errors:
Had Errors: NO
Warnings: 2

Rows Processed:
Rows affected: 0
Rows sent to client: 2
Rows examined: 15

Temporary Tables:
Temporary disk tables created: 1

Joins per Type:
Full table scans (Select_scan): 1
Joins using table scans (Select_full_join): 1
Joins using range search (Select_full_range_join): 0
Joins with range checks (Select_range_check): 0
Joins using range (Select_range): 0

Sorting:
Sorted rows (Sort_rows): 0
Sort merge passes (Sort_merge_passes): 0
Sorts with ranges (Sort_range): 0
Sorts with table scans (Sort_scan): 0

Index Usage:
No Index used

Other Info:
Event Id: 1366



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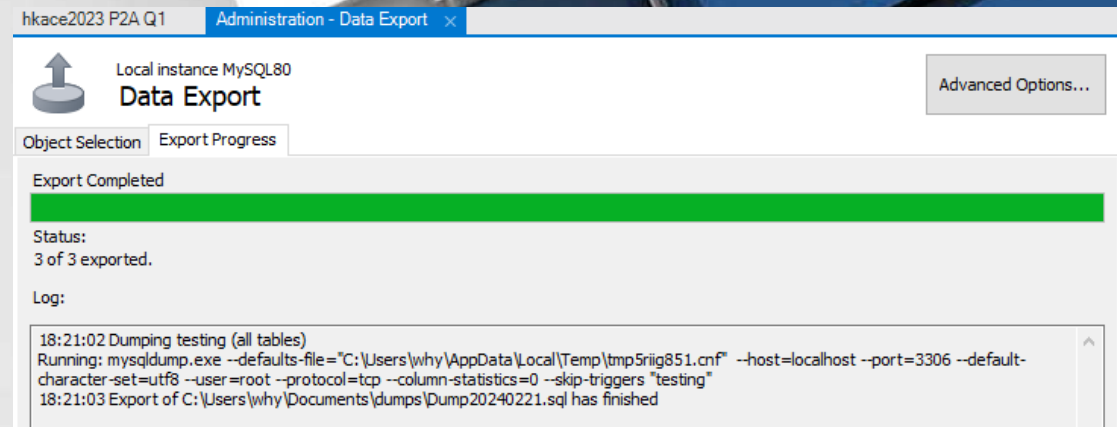
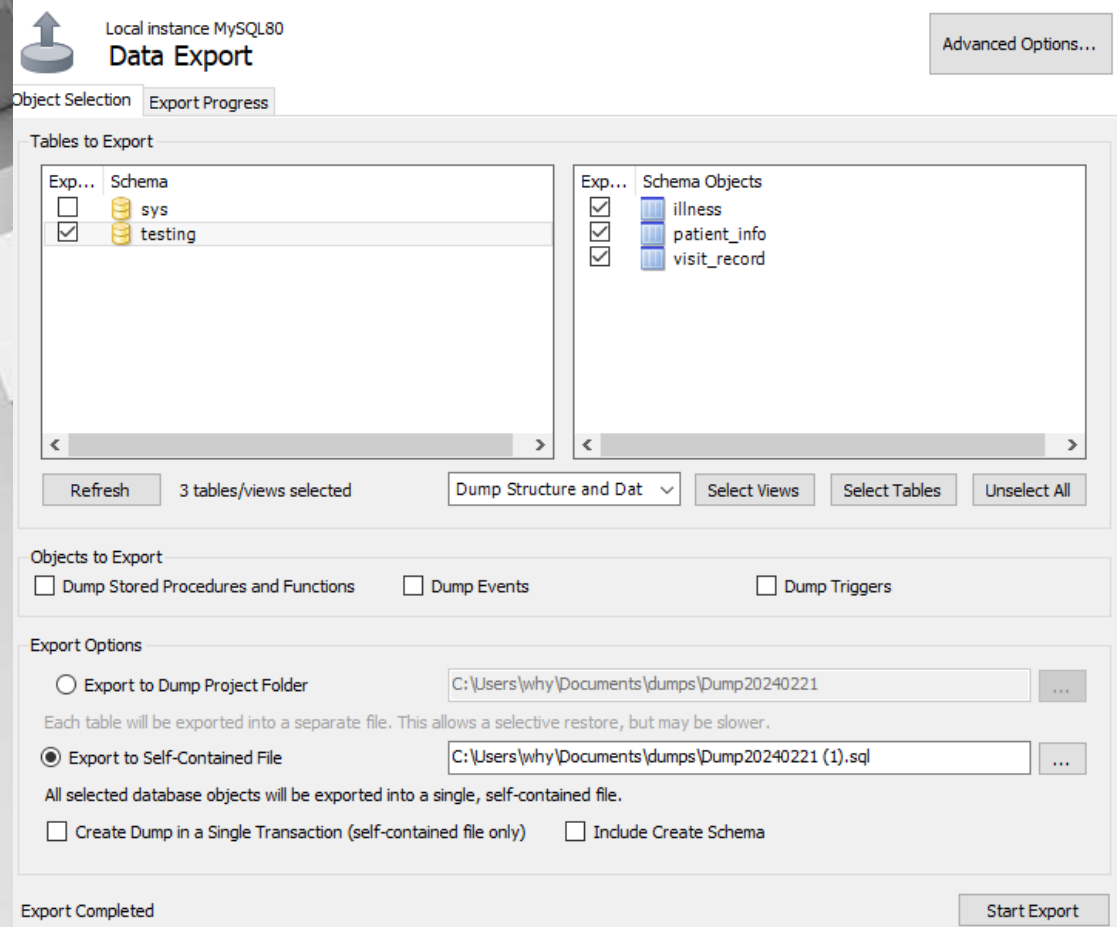
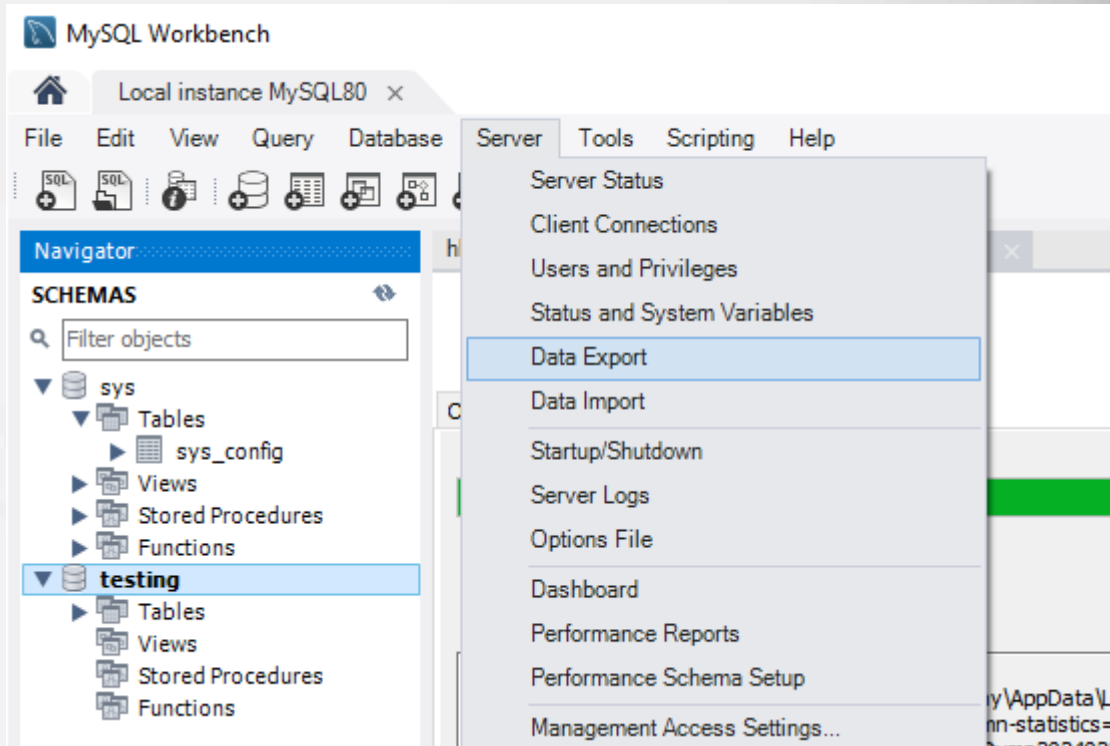
5. Export data



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Import to other DBMSs

```
File Owner DB Run Export Import Client
SQLite
MariaDB
PostgreSQL
MS SQL

MS SQL MsSQL_DDL.sql
1 CREATE TABLE illness (
2   Illness_ID varchar(5) NOT NULL,
3   Illness_name varchar(20),
4   PRIMARY KEY (Illness_ID)
5 );
6 INSERT INTO illness VALUES ('1','Flu')
7
8
```

```
File Owner DB Run Export Import Client
SQLite
MariaDB
PostgreSQL
MS SQL
0.15.1 beta
Table
demo
illness
patient_info
visit_record

MS SQL MsSQL_DDL.sql
1 CREATE TABLE illness (
2   Illness_ID varchar(5) NOT NULL,
3   Illness_name varchar(20),
4   PRIMARY KEY (Illness_ID)
5 );
6 INSERT INTO illness VALUES ('1','Flu'),('2','Injury'),('3','COVID-19'),('4','Mental illness'),('5','Broken
7
8
9 CREATE TABLE patient_info (
10  PCode varchar(8) NOT NULL,
11  Name varchar(20),
12  HKID varchar(20),
13  ...
demo - TABLE
illness - TABLE
patient_info - TABLE
visit_record - TABLE
-- Change first wor
SELECT → LINE-SELE
-- labels - first c
-- values - all col
-- color column key
-- Example ↗:
LINE-SELECT name AS
-- Example ↘:
AREA-SELECT id AS x, id AS y FROM demo;
-- Example ↘:
```



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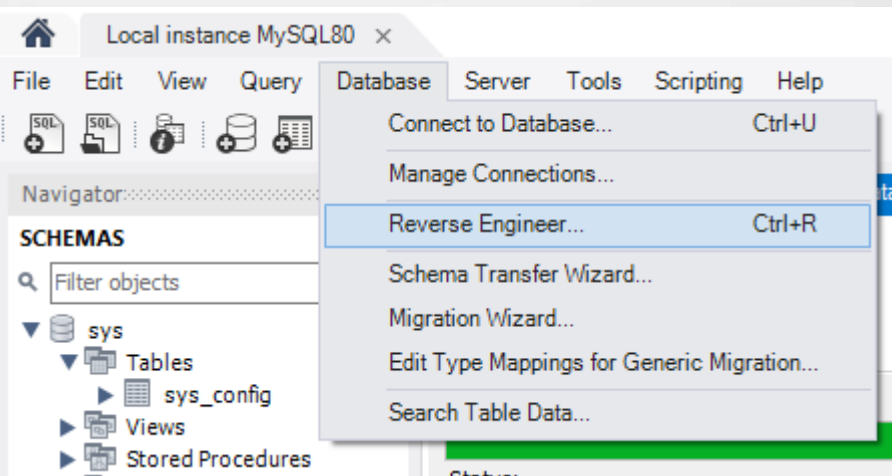
*6. Reverse Engineering (ERD)



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Reverse Engineer Database

Connection Options

Connect to DBMS

Select Schemas

Retrieve Objects

Select Objects

Reverse Engineer

Results

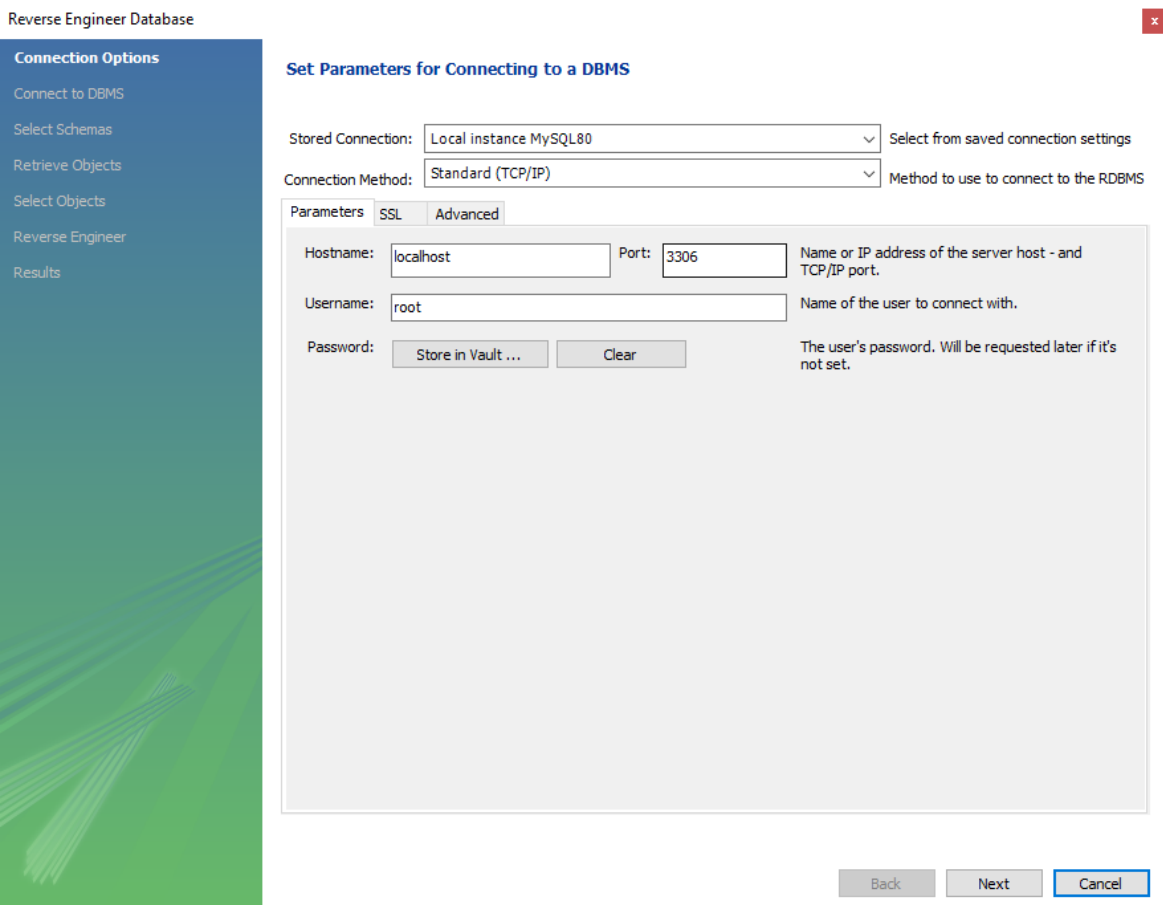
Connect to DBMS and Fetch Information

The following tasks will now be executed. Please monitor the execution. Press Show Logs to see the execution logs.

- Connect to DBMS
- Retrieve Schema List from Database
- Check Common Server Configuration Issues

Execution Completed Successfully

Fetch finished.



Reverse Engineer Database

Connection Options

Connect to DBMS

Select Schemas

Retrieve Objects

Select Objects

Reverse Engineer

Select Schemas to Reverse Engineer



Select the schemas you want to include:

- testing

Reverse Engineer Database

Connection Options

Connect to DBMS

Select Schemas

Retrieve Objects

Select Objects

Reverse Engineer

Results

Retrieve and Reverse Engineer Schema Objects

The following tasks will now be executed. Please monitor the execution. Press Show Logs to see the execution logs.

- Retrieve Objects from Selected Schemas
- Check Results

Retrieval Completed Successfully

Finished.

Reverse Engineer Database

- Connection Options
- Connect to DBMS
- Select Schemas
- Retrieve Objects
- Select Objects**
- Reverse Engineer
- Results

Select Objects to Reverse Engineer



Import MySQL Table Objects

3 Total Objects, 3 Selected

Reverse Engineer Database

- Connection Options
- Connect to DBMS
- Select Schemas
- Retrieve Objects
- Select Objects
- Reverse Engineer**
- Results

Reverse Engineering Progress

The following tasks will now be executed. Please monitor the execution. Press Show Logs to see the execution logs.

- Reverse Engineer Selected Objects
- Place Objects on Diagram

Operation Completed Successfully

Reverse Engineer Database

- Connection Options
- Connect to DBMS
- Select Schemas
- Retrieve Objects
- Select Objects
- Reverse Engineer
- Results**

Reverse Engineering Results

Summary of Reverse Engineered Objects:
- 3 tables from schema 'testing'

MySQL Workbench

Local instance MySQL80 x MySQL Model* x EER Diagram x

File Edit View Arrange Model Database Tools Scripting Help

Bird's Eye Diagram

Zoom: 100%

illness

- Illness_ID VARCHAR(5)
- Illness_name TEXT
- Indexes

visit_record

- PCode VARCHAR(8)
- Date_of_Consultancy DATE
- Illness_ID INT(11)
- Symptom TEXT
- Indexes

patient_info

- PCode VARCHAR(8)
- Name TEXT
- HKID TEXT
- Gender TEXT
- DOB TEXT
- Contact INT(11)

Catalog Tree

- mydb
 - Tables
 - Views
 - Routine Groups
 - testing

Description Editor



Other resources

The screenshot displays the HHO Online Judge interface. On the left is a navigation sidebar with options like 'Tasks', 'Your Submissions', 'School Submissions', 'Judge Status', 'Code', 'Contests', 'Leaderboard', 'Attendance', and 'School Admin'. The main content area shows a list of 'SQL Exercises' with columns for ID, Name, and # Solved. Exercise Q204, 'Operators: Specialised computers', is highlighted. To the right, a detailed view of Q204 is shown, including the problem description, a list of four SQL tasks, a 'DATABASE SCHEMA' section with a table of computer attributes, and a query editor with results. The query editor shows four SQL statements and their corresponding results for 'model_name'.

ID	Name	# Solved
☆ Q201	SELECT: Library collection	331
☆ Q202	SELECT: Finding specific books	302
☆ Q203	Operators: Computer inventory	277
☆ Q204	Operators: Specialised computers	255
☆ Q205	Operators: Term report	230
☆ Q206	Order: Cake shop	227
☆ Q207	Order: Hotel reservation	150
☆ Q208	Aggregation: Sports Day (A.M.)	184
☆ Q209	Aggregation: Sports Day (P.M.)	121
☆ Q211	Operators: Mark Six	115
☆ Q212	String: Scrabble	84
☆ Q213	Dates: Travel log	97

Operators: Specialised computers

There are too many different computer models at your school. Tom is having a hard time finding a model that is suitable for specific purposes. Can you help him?

Write 4 SQL statements:

- Get the model name of the computers that has exactly 4 CPU cores and 8 GB of RAM.
- Get the model name of the computers that the total storage is between 512 and 1024 GB inclusive.
- Get the model name of the computers that has an Intel or AMD CPU.
- Get the model name of the computers that has an Intel or AMD CPU. The CPU must have at least 8 cores.

DATABASE SCHEMA

Field name	Type	Description
model_name	Character	Model name of the computer
cpu_name	Character	CPU name of the computer
cpu_cores	Integer	Number of CPU cores
ram	Integer	Amount of RAM in GB
ssd	Integer	Amount of SSD storage in GB
hdd	Integer	Amount of HDD storage in GB

Primary Key: model_name

```
1 select model_name from computer where cpu_cores = 4 and ram = 8;
2 select model_name from computer where (ssd+hdd) between 512 and 1024;
3 select model_name from computer where cpu_name like 'Intel%' or cpu_name like 'AMD%';
4 select model_name from computer where (cpu_name like 'Intel%' or cpu_name like 'AMD%')
```

SQL

Submit Up to date
Loaded 2024-02-22 18:10:14

No problems found.

Data Use sample data Run

Query Result OK (0.006s)

Statement #1 select model_name from computer where cpu_cores = 4 and ram = 8;

model_name
Bell 2000

Statement #2 select model_name from computer where (ssd+hdd) between 512 and 1024;

model_name
Bell 2000
BananaBook Pro 14
BananaBook Pro 15

Statement #3 select model_name from computer where cpu_name like 'Intel%' or cpu_name like 'AMD%';

model_name
Bell 2000

<https://judge.hkoi.org/>



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Reference

1. Sqliteonline

<https://sqliteonline.com/>

2. SQLite

<https://www.sqlite.org/lang.html>

3. SQL Server Basics

<https://www.sqlservertutorial.net/sql-server-basics/>

4. Open data

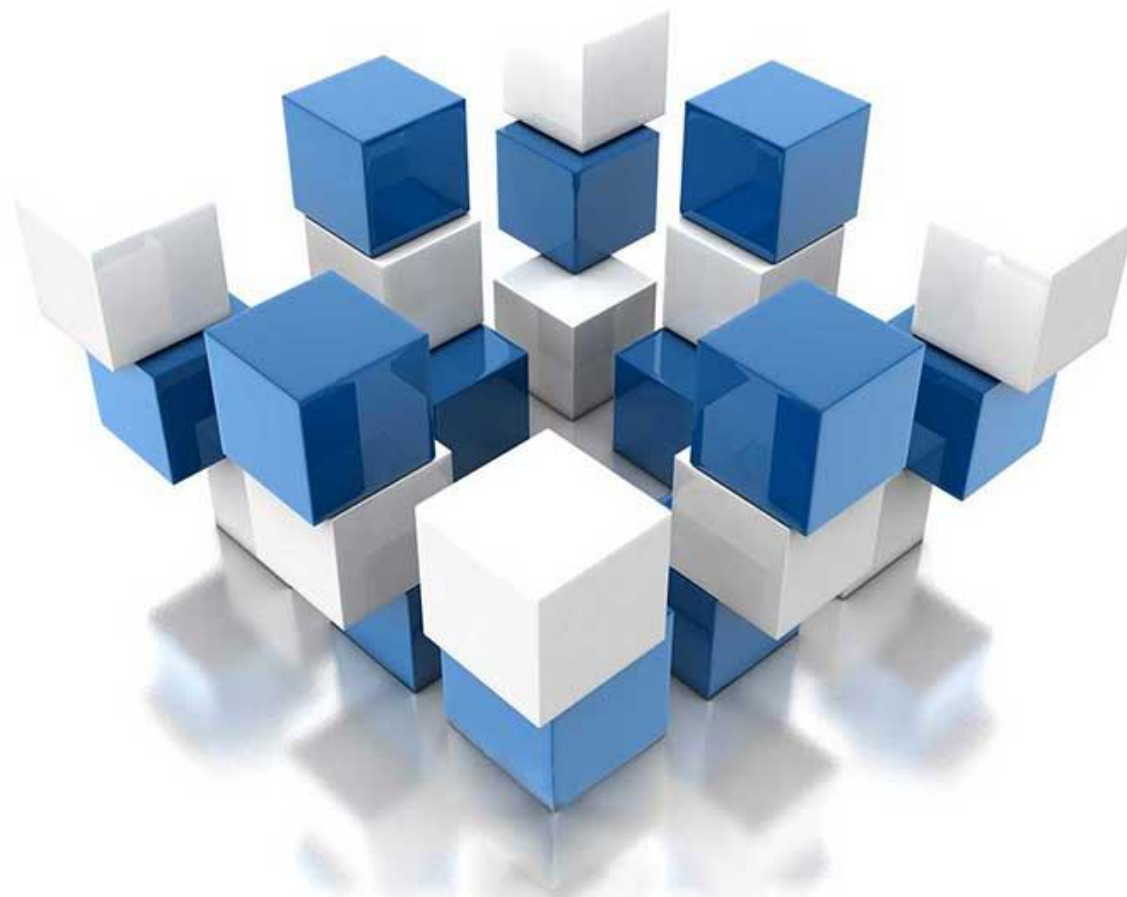
<https://data.gov.hk/en/>



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