資料庫應用期末報告

使用Python實作SQL Server資料庫的基礎操作

許宏韜
900032762

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簡報大綱

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緣起

1. 113年上學期修習空大開設「Python程式設計與實務應用」課程，深感python的有趣與強大，故想繼續學習。
2. 爰以python實作SQL server的創建資料庫、建立資料表、增刪查改（CRUD） 及刪除資料庫等功能，做為期末報告的題目。

Try it

下載程式碼：

https://github.com/taipeihugo/python_sql_server

```
>pip install pyodbc, customtkinter
```

安裝模組

```
>pip install pyodbc, customtkinter
```

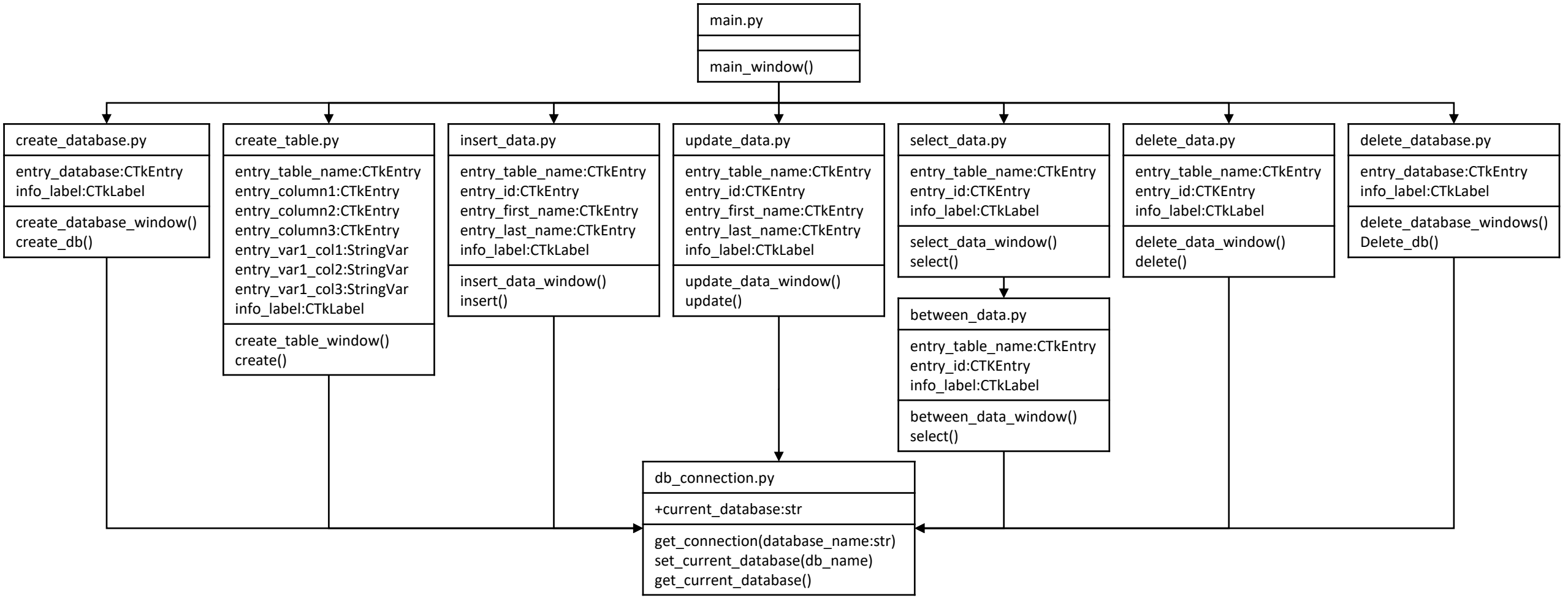
pyodbc是一個開源Python模組，可讓存取ODBC資料庫變得簡單。

customtkinter是一個基於Tkinter的Python桌面UI（User Interface）函式庫，它提供現代外觀和可自訂小工具的功能。

參考資料：

1. https://pypi.org/project/pyodbc/
2. https://customtkinter.tomschimansky.com/
3. https://steam.oxxostudio.tw/category/python/tkinter/index.html

程式碼重點解說



main_Window() 作為主要入口，連接所有功能視窗，各功能視窗依賴（以箭頭表示）

db_connection 管理資料庫連接，並包含特定的 UI 元素與操作方法。

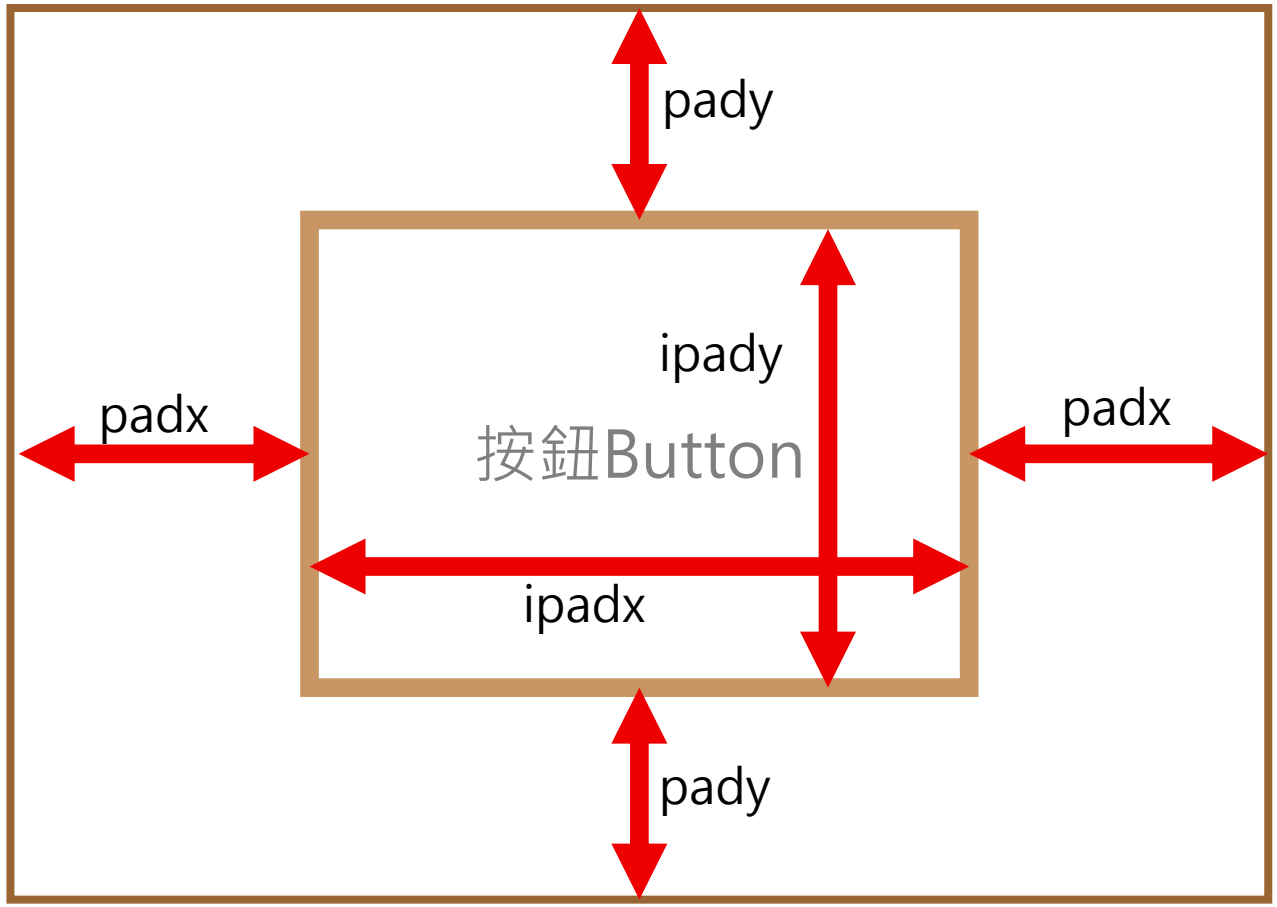
主視窗 main.py

```
import customtkinter as tk
……
def main_window():
app = tk.CTk()                    #產生視窗物件
app.geometry(“300x400”)           #設定視窗大小
app.title(“資料庫管理系統”)        #設定視窗標題
……
tk.CTkButton(app,
             text="創建資料庫",
             command=create_database_window).pack(pady=10)
……
app.mainloop()
```

pack()基本佈局

```
tk.CTkButton(app,text="abc").pack(pady=10)
```

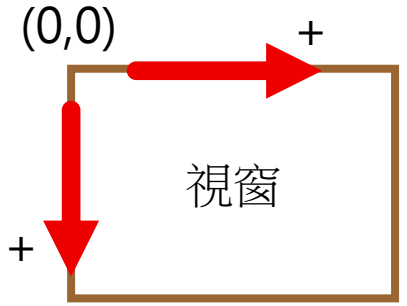
padx 左、右外邊距
pady 上、下外邊距
ipadx 左、右內邊距
ipady 上、下內邊距



place()位置佈局

絕對位置

```
tk.CTkButton(app,text="A").place(x=50, y=50)
```



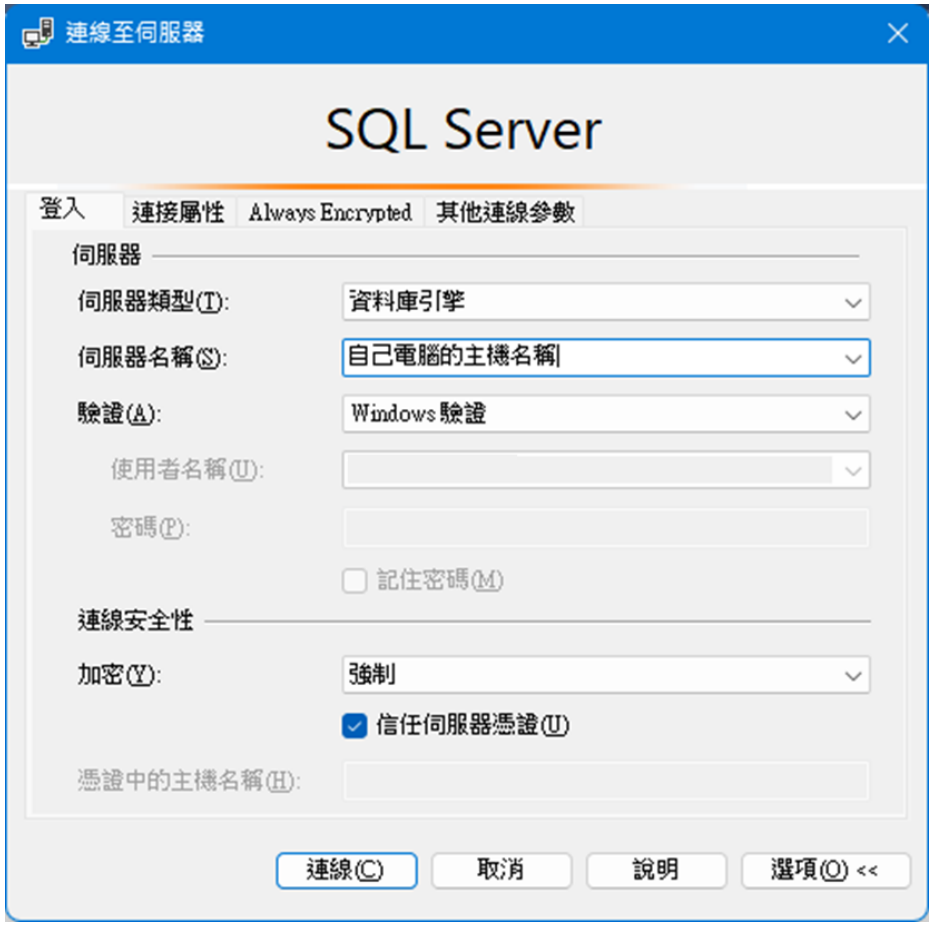
相對位置

```
tk.CTkButton(app,text="A").place(relx=0.5, rely=0.5)
```

延伸閱讀：https://steam.oxxostudio.tw/category/python/tkinter/place.html

連接資料庫 db_connection.py

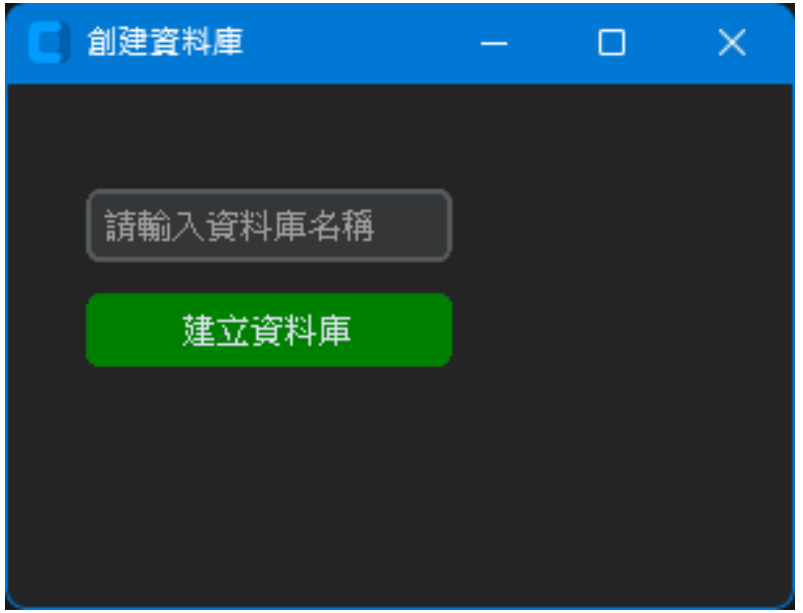
```
import pyodbc
……
def get_connection(database_name):
……
pyodbc.connect(
  'DRIVER={SQL Server};' +
  'SERVER=主機名稱;' +
f'DATABASE={database_name};' +
  'Trusted_Connection=True;')
……
```



創建資料庫 create_database.py

```
Import pyodbc
……
Def create_db():
……
connection.autocommit = True
db_name = entry_database.get()
connection.execute(f"CREATE DATABASE {db_name}")
set_current_database(db_name)
info_label.configure(text="創建資料庫成功，當前資料庫: " + db_name)
……
```

ch14



創建工作表 create_table.py

```
def create():
……
connection = get_connection(current_db)
if connection:
  connection.autocommit = True
  sql_stmt = ( f"CREATE TABLE {entry_table_name.get()} ("
               f"{entry_column1.get()} {radio_var_col1.get()}, "
               f"{entry_column2.get()} {radio_var_col2.get()}, "
               f"{entry_column3.get()} {radio_var_col3.get()}) " )
  connection.execute(sql_stmt)
  info_label.configure(text="創建資料表成功")
……
```

ch14

CREATE TABLE students (id INTEGER, first_name VARCHAR(50), last_name VARCHAR(50))

新增資料 insert_data.py

```
def insert():
……
cursor = connection.cursor()
cursor.execute(
f"SELECT COUNT(*)
  FROM {entry_table_name.get()}
  WHERE id = {entry_id.get()}" )
if cursor.fetchone()[0] > 0:  # 防呆
    info_label.configure(text="資料已存在，請勿重複新增")
    return
……
```

ch11

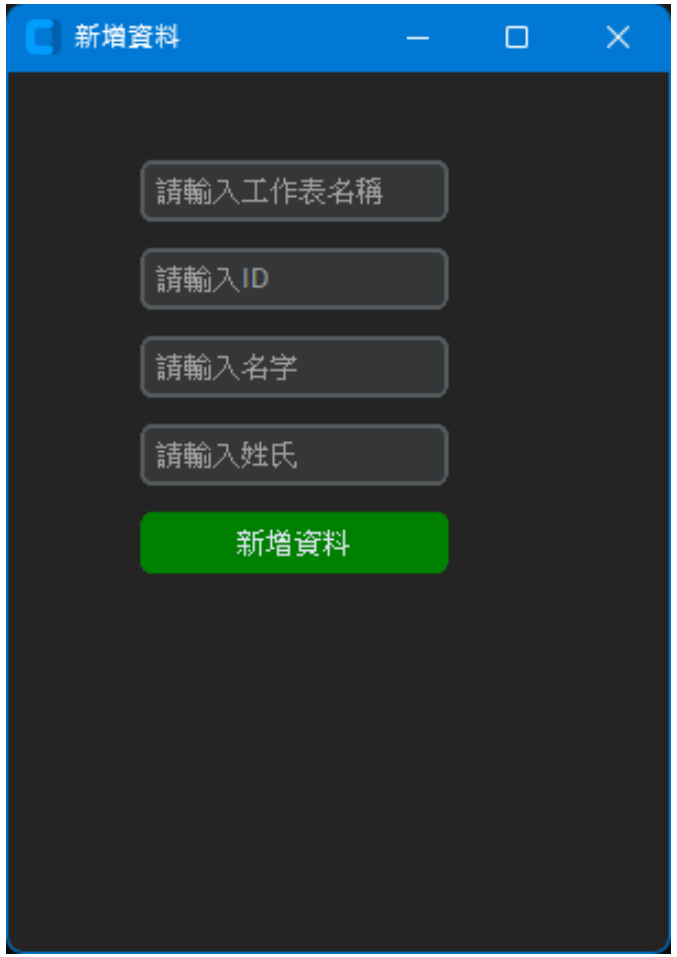

```
SELECT COUNT(*) FROM stu WHERE id = 1
```

新增資料 insert_data.py

```
def insert():
……
connection.autocommit = True
connection.execute(
f"INSERT INTO {entry_table_name.get()}
 VALUES ({entry_id.get()},
  '{entry_first_name.get()}',
  '{entry_last_name.get()}')"
)
info_label.configure(text="新增資料成功")
……
```

ch13

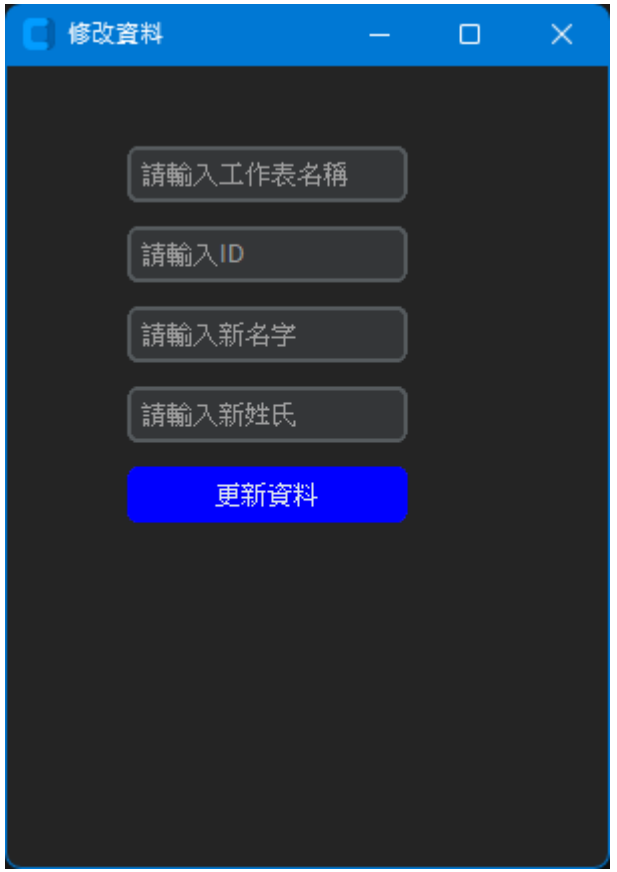
```
INSERT INTO students VALUES (1, '小明', '王')
```



修改資料 update_data.py

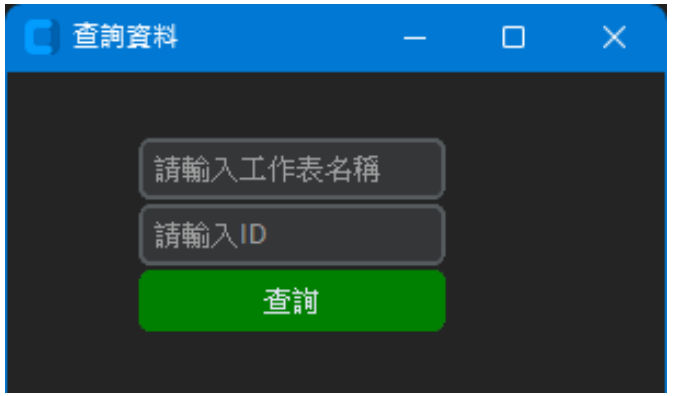
```
def update():
……
connection.autocommit = True
connection.execute(
f"UPDATE {entry_table_name.get()} "
f"SET first_name = '{entry_first_name.get()}',
       last_name = '{entry_last_name.get()}' "
f"WHERE id = {entry_id.get()}"
)
info_label.configure(text="新增資料成功")
……
```

ch13




```
UPDATE stu SET first_name = '大明', last_name = '許' WHERE id = 1
```

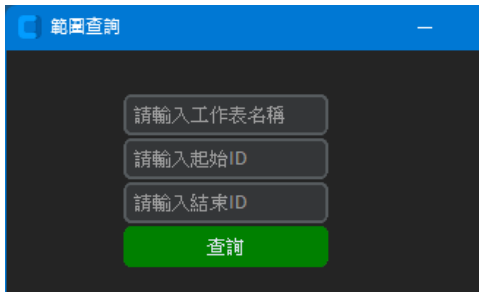
查詢資料 select_data.py




```
def select():
……
❶ cursor = connection.cursor()
cursor.execute(f"SELECT *
               FROM {entry_table_name.get()}
               WHERE id = {entry_id.get()} AND {entry_id_2.get()}")
result = ""
for data in cursor:
    result += f"{data[0]} {data[1]} {data[2]}\n"
info_label.configure(text=result if result else "查無資料")
……
```

ch11

❷



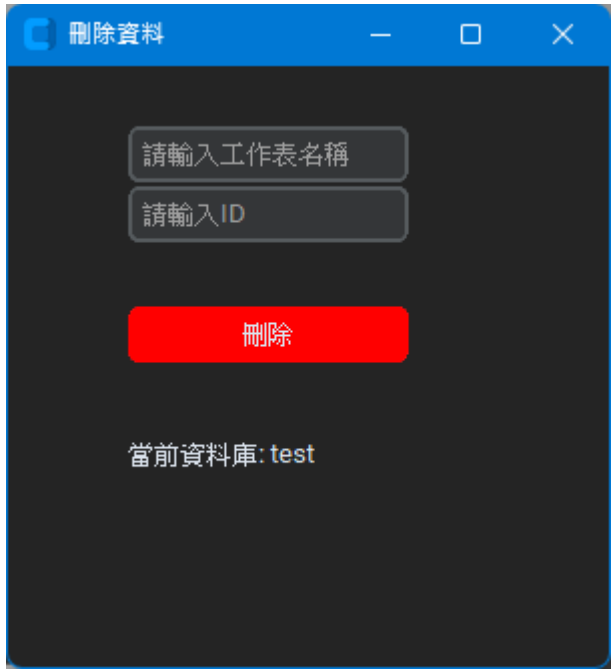
Word Cloud

```
SELECT * FROM stu WHERE id = 1 AND 2
```

刪除資料 delete_data.py

```
def delete():
……
connection.autocommit = True
connection.execute(
f"DELETE FROM {entry_table_name.get()}
 WHERE id = {entry_id.get()}")
info_label.configure(text="刪除成功")
……
```

ch13




```
DELETE FROM stu WHERE id = 1
```

刪除資料庫 delete_database.py

```
def delete_db():
……

connection.autocommit = True
db_name = entry_database.get()
❶ connection.execute(
f"""ALTER DATABASE {db_name}   # 設為單一用戶模式以便刪除
SET SINGLE_USER WITH ROLLBACK IMMEDIATE;""")
❷ connection.execute(f"DROP DATABASE {db_name}")
……
```

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```
ALTER DATABASE [test] SET SINGLE_USER WITH ROLLBACK IMMEDIATE;
DROP DATABASE test
```

延伸閱讀： https://steam.oxxostudio.tw/category/python/basic/string.html

感謝聆聽
敬請指教

參考資料： https://www.youtube.com/watch?v=YwjlHvzSl_c&list=PLMi6KgK4_mk0yXrfyLJfxcSoyXHxQJq8K