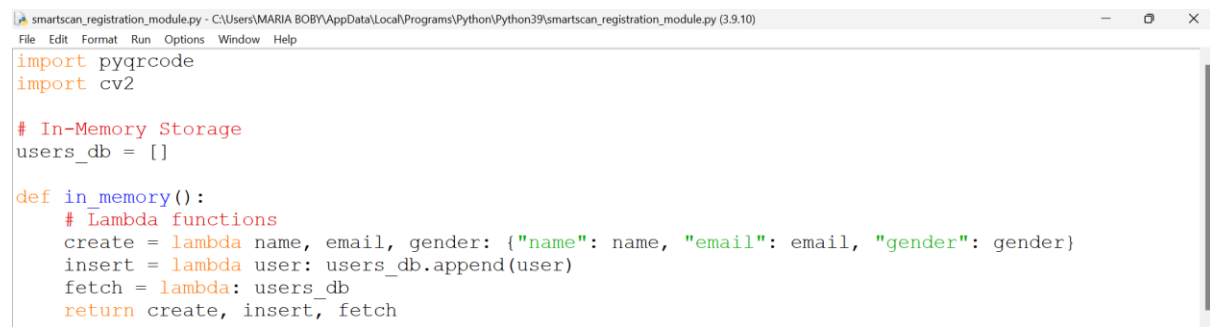


SMARTSCAN CODES

Smartscan codes contain a module named **smartscan_registration_module.py** in python which has functions for creating a database, inserting data and then fetching data using lambda functions and also functions for reading and writing QR codes. This module also has functions to decode the data in QR code to insert it to the database. This module is imported to a main.py named **Lab3McaMain.py** to run the Smartcard Codes system. The module is created with help of two inbuilt modules, pyqrcode and cv2 which helped in coding and decoding of QR code.

The **smartscan_registration_module.py** is shown below:

in_memory() is the function used to create the database, to insert data and to fetch data using lambda. The data contains name, email and gender of the employee.



```
smartscan_registration_module.py - C:\Users\MARIA BOBY\AppData\Local\Programs\Python\Python39\smartscan_registration_module.py (3.9.10)
File Edit Format Run Options Window Help

import pyqrcode
import cv2

# In-Memory Storage
users_db = []

def in_memory():
    # Lambda functions
    create = lambda name, email, gender: {"name": name, "email": email, "gender": gender}
    insert = lambda user: users_db.append(user)
    fetch = lambda: users_db
    return create, insert, fetch
```

generate_smartscan(name,email,gender,filename) is the function used to generate the QR code with the data name, email and gender from the employee with the file name with the help of inbuilt module pyqrcode.



```
smartscan_registration_module.py - C:\Users\MARIA BOBY\AppData\Local\Programs\Python\Python39\smartscan_registration_module.py (3.9.10)
File Edit Format Run Options Window Help

# SmartScan Code Generation
def generate_smartscan(name, email, gender, filename):
    data = f"{name},{email},{gender}"
    qrcode = pyqrcode.create(data)
    qrcode.png(filename, scale=8)
    print(f"QR code saved to {filename}")
```

decode_smartscan(path) is the function to decode the QR code with the help of cv2 inbuilt module. The path parameter is the filename of QR code.

decode_smartscan_code(code) decodes the data to readable format.

```
smartscan_registration_module.py - C:\Users\MARIA BOBY\AppData\Local\Programs\Python\Python39\smartscan_registration_module.py (3.9.10)
File Edit Format Run Options Window Help

# SmartScan Code Decoding
def decode_smartscan(path):
    img = cv2.imread(path)
    detector = cv2.QRCodeDetector()
    data, vertices_array, _ = detector.detectAndDecode(img)
    if vertices_array is not None:
        return data
    else:
        return None

# Decode User Data
def decode_smartscan_code(code):
    name, email, gender = code.split(',')
    return {"name": name, "email": email, "gender": gender}
```

RegisterUserFromSmartScan (path, create, insert, fetch) is the used to decode the data from QR code and insert it to the database.

```
smartscan_registration_module.py - C:\Users\MARIA BOBY\AppData\Local\Programs\Python\Python39\smartscan_registration_module.py (3.9.10)
File Edit Format Run Options Window Help

    return {"name": name, "email": email, "gender": gender}

# User Registration Function
def RegisterUserFromSmartScan(path, create, insert, fetch):
    # Decode the SmartScan Code
    decoded_data = decode_smartscan(path)
    if not decoded_data:
        print("No user data found in the SmartScan code.")
        return

    # Extract user data from the decoded SmartScan code
    user_data = decode_smartscan_code(decoded_data)
    name = user_data['name']
    email = user_data['email']
    gender = user_data['gender']

    # Create a new user record
    new_user = create(name, email, gender)

    # Insert the user record into the in-memory list
    insert(new_user)
```

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Lab3McaMain.py, the main function of the Smartscan code display the data already existing in the database, inserts new data from user, creates a QR coder with details from user and also with the file name preferred by the user. Finally, the data existing in the database is displayed.

```
Lab3McaMain.py - C:/Users/MARIA BOBY/AppData/Local/Programs/Python/Python39/Lab3McaMain.py (3.9.10)
File Edit Format Run Options Window Help
from smartscan_registration_module
import generate_smartscan, RegisterUserFromSmartScan, in_memory

# Define lambda functions
create, insert, fetch = in_memory()

# Print existing users
print("\nExisting users in the in-memory database:")
exusers = fetch()
for user in exusers:
    print(f"Name: {user['name']}, Email: {user['email']}, Gender: {user['gender']}")
else:
    print("No User")

# Prompt the user for their details to add directly to the in-memory database
print("\nEnter user details to add directly to the in-memory database:")
name = input("Name: ")
email = input("Email: ")
gender = input("Gender: ")

# Insert the user data directly into the in-memory storage
direct_user = create(name, email, gender)
insert(direct_user)

# Prompt the user for details to generate a SmartScan code
print("\nEnter details for SmartScan code generation:")
scan_name = input("Name: ")
scan_email = input("Email: ")
scan_gender = input("Gender: ")

# Prompt for QR code filename
filename = input("Enter the QR code file name (e.g., 'smartscan.png'): ")
if not filename.lower().endswith(".png"):
    print("Filename should end with '.png'. Appending '.png' to the filename.")
    filename += ".png"

# Generate a SmartScan Code with user input
generate_smartscan(scan_name, scan_email, scan_gender, filename)

# Register user from the generated SmartScan Code
print("\nRegistering user from SmartScan code...\n")
RegisterUserFromSmartScan(filename, create, insert, fetch)
users = fetch() # Fetch data again to see the updated list
for user in users:
    print(f"Name: {user['name']}, Email: {user['email']}, Gender: {user['gender']}")
```

The **input/output** of the above programs are shown below:

```
IDLE Shell 3.9.10
File Edit Shell Debug Options Window Help
Python 3.9.10 (tags/v3.9.10:f2f3f53, Jan 17 2022, 15:14:21) [MSC v.1929 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
= RESTART: C:/Users/MARIA BOBY/AppData/Local/Programs/Python/Python39/Lab3McaMain.py
Existing users in the in-memory database:
No User

Enter user details to add directly to the in-memory database:
Name: John
Email: john@gmail.com
Gender: Male

Updated users in the in-memory database after direct entry:
Name: John, Email: john@gmail.com, Gender: Male

Enter details for SmartScan code generation:
Name: Rose
Email: rose@gmail.com
Gender: Female
Enter the QR code file name (e.g., 'smartscan.png'): qrcode.png
QR code saved to qrcode.png

Registering user from SmartScan code...

Name: John, Email: john@gmail.com, Gender: Male
Name: Rose, Email: rose@gmail.com, Gender: Female
>>> |
```

Qrcode.png



SUBMITTED BY

MARIA BOBY

REG NO 2447130

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