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Module/Subject Title: Advanced Programming Techniques

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1. INTRODUCTION

In this assignment , I developed four applications in Python and C#. I developed a file extension information system and a contact book in C#. I wrote a hotel web-scraping application in Python which writes information to CSV file and a client-server application in Python to record student admission. These tasks helped me to practice programming, working with data, and solve real-life problems.

2. PART I: C# PROGRAMMING

2.1 Contact Book

In this assignment, I developed a C# contact book program . This project consisted of two files :

a) **Program.cs** for the main menu and all functions.

b) **ContactBook.cs** for the **ContactBook** class.

I created a **ContactBook** class with a name, company , phone , email and birthdate of each contact . The program starts with 20 contacts in an array . The menu lets the user to **add , view , update , or delete** a contact , also it checks that the phone number is 9 digits. I used basic **OOP concepts** and tested the program using **dotnet run** , which keeps going until the user exits .

Visual Studio Code interface showing a C# console application named "Que.1".

Explorer:

- QUE.1
 - bin
 - obj
 - ConsoleApp1.csproj
 - ContactBook.cs
 - Program.cs
 - Que.1.sln

Program.cs:

```
6 class MainClass
```

Terminal:

```
PS C:\Users\Admin\Desktop\sakshi20079303\Que.1> dotnet run

Person13 lastname13 -- 12345678913
Person14 lastname14 -- 12345678914
Person15 lastname15 -- 12345678915
Person16 lastname16 -- 12345678916
Person17 lastname17 -- 12345678917
Person18 lastname18 -- 12345678918
Person19 lastname19 -- 12345678919
Person20 lastname20 -- 12345678920
Sakshi teli -- 123456789

--- Contact Book Menu ---
1. Add contact
2. Show All Contacts
3. Show one Contacts
4. Update Contact
5. Delete Contact
0. Exit
Enter Option
3
Enter Mobile Number :123456789

---Contact Details ----
First Name :Sakshi
Last Name : teli
Company : TMV
Mobile : 123456789
Email : sakshi@gmail.com
Birthdate : 01-03-2004

--- Contact Book Menu ---
1. Add contact
2. Show All Contacts
3. Show one Contacts
4. Update Contact
5. Delete Contact
0. Exit
Enter Option
4
Enter Mobile Number To Update : 123456789
New First Name :Tanvi
New Last Name :pashilkar
New Company :MTC
New Email:tnavi@gmail.com
New Birthdate :22-02-2004
Contact Updated !

Contact Book Menu
```

File Edit Selection ...

EXPLORER

- QUE.1
 - bin
 - obj
 - ConsoleApp1.csproj
 - ContactBook.cs
 - Program.cs
 - Que.1.sln

Program.cs

```
6 class MainClass
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS POLYGLOT NOTEBOOK

PS C:\Users\Admin\Desktop\sakshi20079303\Que.1> dotnet run

1. Add contact
2. Show All Contacts
3. Show one Contacts
4. Update Contact
5. Delete Contact
0. Exit
Enter Option
1
First Name :Sakshi
Last Name :teli
Company : TMV
Mobile Number (9 digits) : 123456789
Email : sakshi@gmail.com
Birthdate :01-03-2004
Contact Added !

--- Contact Book Menu ---
1. Add contact
2. Show All Contacts
3. Show one Contacts
4. Update Contact
5. Delete Contact
0. Exit
Enter Option
2
Person1 lastname1 -- 1234567891
Person2 lastname2 -- 1234567892
Person3 lastname3 -- 1234567893
Person4 lastname4 -- 1234567894
Person5 lastname5 -- 1234567895
Person6 lastname6 -- 1234567896
Person7 lastname7 -- 1234567897
Person8 lastname8 -- 1234567898
Person9 lastname9 -- 1234567899
Person10 lastname10 -- 12345678910
Person11 lastname11 -- 12345678911
Person12 lastname12 -- 12345678912
Person13 lastname13 -- 12345678913
Person14 lastname14 -- 12345678914
Person15 lastname15 -- 12345678915
Person16 lastname16 -- 12345678916
Person17 lastname17 -- 12345678917
Person18 lastname18 -- 12345678918
Person19 lastname19 -- 12345678919
Person20 lastname20 -- 12345678920
Sakshi teli -- 123456789

> OUTLINE
> TIMELINE
> MYSQL
> SOLUTION EXPLORER

Visual Studio Code interface showing a C# console application named "Que.1".

EXPLORER:

- QUE.1
 - bin
 - obj
 - ConsoleApp1.csproj
 - ContactBook.cs
 - Program.cs
 - Que.1.sln

Program.cs:

```
6 class MainClass
```

TERMINAL:

```
PS C:\Users\Admin\Desktop\sakshi20079303\Que.1> dotnet run
4. Update Contact
5. Delete Contact
0. Exit
Enter Option
5
Enter Mobile Number To Delete : 123456789
Contact Deleted !

--- Contact Book Menu ---
1. Add contact
2. Show All Contacts
3. Show one Contacts
4. Update Contact
5. Delete Contact
0. Exit
Enter Option
2
Person1 lastname1 -- 1234567891
Person2 lastname2 -- 1234567892
Person3 lastname3 -- 1234567893
Person4 lastname4 -- 1234567894
Person5 lastname5 -- 1234567895
Person6 lastname6 -- 1234567896
Person7 lastname7 -- 1234567897
Person8 lastname8 -- 1234567898
Person9 lastname9 -- 1234567899
Person10 lastname10 -- 12345678910
Person11 lastname11 -- 12345678911
Person12 lastname12 -- 12345678912
Person13 lastname13 -- 12345678913
Person14 lastname14 -- 12345678914
Person15 lastname15 -- 12345678915
Person16 lastname16 -- 12345678916
Person17 lastname17 -- 12345678917
Person18 lastname18 -- 12345678918
Person19 lastname19 -- 12345678919
Person20 lastname20 -- 12345678920

--- Contact Book Menu ---
1. Add contact
2. Show All Contacts
3. Show one Contacts
4. Update Contact
5. Delete Contact
0. Exit
Enter Option
```

2.2 File Extension System

In response to this question, I created a C# console application that displays the information about different file extensions. In this project .

I was working with two files :

- a) **Program. cs** – The menu and all functions are contained here.
- b) **FileExtension. cs** – The class contains the FileExtension .

FileExtension class contains two aspects:

- a) The file extension (like .mp4,.pdf)
- b) Its description (like video file, document , audio file)

I did a program where 20 default file extensions were created by default with the help of the **AddDefaultExtension()** method. The menu will allow the user to **view , add, delete ,update** or search an extension . In case the user enters an extension but forgets to add a dot , the program will add it automatically . In case there is no extension , a message stating not found is displayed . I was able to apply simple OOP principles such as classes , objects , and methods and debugged all of them by dotnet run .

File Edit Selection ... < > Que.2

EXPLORER

- QUE.2
 - ConsoleApp1
 - bin
 - obj
 - ConsoleApp1.csproj
 - FileExtension.cs
 - Program.cs
 - ConsoleApp1.sln

Program.cs

```

class MainClass

```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS POLYGLOT NOTEBOOK

PS C:\Users\Admin\Desktop\sakshi20079303\Que.2> cd "C:\Users\Admin\Desktop\sakshi20079303\Que.2\ConsoleApp1"

>>

PS C:\Users\Admin\Desktop\sakshi20079303\Que.2\ConsoleApp1> dotnet run

```

---File Extension ---
1.Show All Extensions
2.Show One Extensions
3.Add Extensions
4.Update Extensions
5.Delete Extensions
0.Exit
Enter option: 1

Supported Extensions :
.mp4 - Video File
.avi - Video File
.mov - Video File
.mkv - Video File
.webm - Video File
.mp3 - Audio File
.wav - Audio File
.flac - Audio File
.jpg - Image File
.jpeg - Image File
.png - Image File
.gif - Image File
.pdf - Document
.docx - Word Document
.xlsx - Excel Sheet
.pptx - PowerPoint
.txt - Text File
.zip - Compressed File
.rar - Compressed File
.7z - Compressed File

---File Extension ---
1.Show All Extensions
2.Show One Extensions
3.Add Extensions
4.Update Extensions
5.Delete Extensions
0.Exit
Enter option: 2
Enter Extension : .7z
Extension : .7z
Description: Compressed File

---File Extension ---
1.Show All Extensions

```

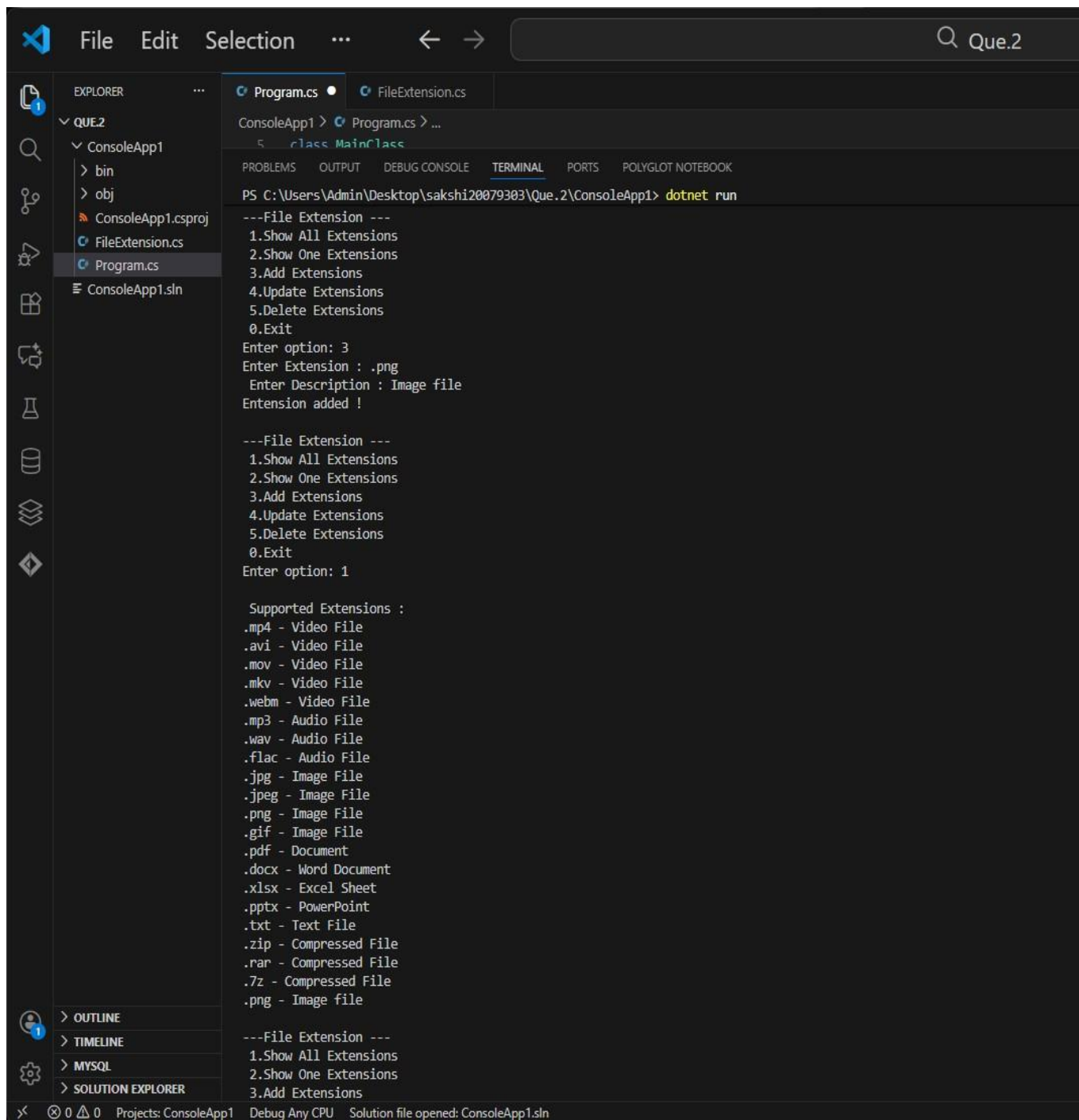
OUTLINE

TIMELINE

MYSQL

SOLUTION EXPLORER

0 0 Projects: ConsoleApp1 Debug Any CPU Solution file opened: ConsoleApp1.sln



Visual Studio interface showing a C# console application named ConsoleApp1. The Explorer pane on the left shows the project structure, including ConsoleApp1.csproj, FileExtension.cs, Program.cs, and ConsoleApp1.sln. The Solution Explorer pane at the bottom shows the Outline, Timeline, MySQL, and Solution Explorer views.

The main editor area displays the Program.cs file, which contains the following code:

```
using System;
using System.Collections.Generic;
using System.Linq;
using System.Text;
using System.Threading.Tasks;

class MainClass
{
    static void Main()
    {
        Console.WriteLine("2.Show One Extensions");
        Console.WriteLine("3.Add Extensions");
        Console.WriteLine("4.Update Extensions");
        Console.WriteLine("5.Delete Extensions");
        Console.WriteLine("0.Exit");
        Console.WriteLine("Enter option: ");
        int option = int.Parse(Console.ReadLine());
        switch (option)
        {
            case 2:
                ShowOneExtensions();
                break;
            case 3:
                AddExtensions();
                break;
            case 4:
                UpdateExtensions();
                break;
            case 5:
                DeleteExtensions();
                break;
            case 0:
                Exit();
                break;
        }
    }

    static void ShowOneExtensions()
    {
        Console.WriteLine("Supported Extensions :");
        foreach (var extension in SupportedExtensions)
        {
            Console.WriteLine(extension);
        }
    }

    static void AddExtensions()
    {
        Console.WriteLine("1.Show All Extensions");
        Console.WriteLine("2.Show One Extensions");
        Console.WriteLine("3.Add Extensions");
        Console.WriteLine("4.Update Extensions");
        Console.WriteLine("5.Delete Extensions");
        Console.WriteLine("0.Exit");
        Console.WriteLine("Enter option: ");
        int option = int.Parse(Console.ReadLine());
        switch (option)
        {
            case 1:
                ShowAllExtensions();
                break;
            case 2:
                ShowOneExtensions();
                break;
            case 3:
                AddExtensions();
                break;
            case 4:
                UpdateExtensions();
                break;
            case 5:
                DeleteExtensions();
                break;
            case 0:
                Exit();
                break;
        }
    }

    static void ShowAllExtensions()
    {
        Console.WriteLine("Supported Extensions :");
        foreach (var extension in SupportedExtensions)
        {
            Console.WriteLine(extension);
        }
    }

    static void UpdateExtensions()
    {
        Console.WriteLine("Supported Extensions :");
        foreach (var extension in SupportedExtensions)
        {
            Console.WriteLine(extension);
        }
    }

    static void DeleteExtensions()
    {
        Console.WriteLine("Supported Extensions :");
        foreach (var extension in SupportedExtensions)
        {
            Console.WriteLine(extension);
        }
    }

    static void Exit()
    {
        Console.WriteLine("Exiting...");
    }

    static List<string> SupportedExtensions = new List<string>
    {
        ".mp4 - Video File",
        ".avi - Video File",
        ".mov - Video File",
        ".mkv - Video File",
        ".webm - Video File",
        ".mp3 - Audio File",
        ".wav - Audio File",
        ".flac - Audio File",
        ".jpg - Image File",
        ".jpeg - Image File",
        ".png - Picture",
        ".gif - Image File",
        ".pdf - Document",
        ".docx - Word Document",
        ".xlsx - Excel Sheet",
        ".pptx - PowerPoint",
        ".txt - Text File",
        ".zip - Compressed File",
        ".rar - Compressed File",
        ".7z - Compressed File",
        ".png - Image file"
    };
}
```

The terminal window shows the output of the program, including the menu options and the supported extensions list.

File Edit Selection ...

EXPLORER

QUE.2

ConsoleApp1

- bin
- obj
- ConsoleApp1.csproj
- FileExtension.cs
- Program.cs
- ConsoleApp1.sln

Program.cs

```

class MainClass

```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS POLYGLOT NOTEBOOK

PS C:\Users\Admin\Desktop\sakshi20079303\Que.2\ConsoleApp1> dotnet run

```

2.Show One Extensions
3.Add Extensions
4.Update Extensions
5.Delete Extensions
0.Exit
Enter option: 5
Extension : .png
Extension Deleted :

---File Extension ---
1.Show All Extensions
2.Show One Extensions
3.Add Extensions
4.Update Extensions
5.Delete Extensions
0.Exit
Enter option: 1

Supported Extensions :
.mp4 - Video File
.avi - Video File
.mov - Video File
.mkv - Video File
.webm - Video File
.mp3 - Audio File
.wav - Audio File
.flac - Audio File
.jpg - Image File
.jpeg - Image File
.gif - Image File
.pdf - Document
.docx - Word Document
.xlsx - Excel Sheet
.pptx - PowerPoint
.txt - Text File
.zip - Compressed File
.rar - Compressed File
.7z - Compressed File
.png - Image file

---File Extension ---
1.Show All Extensions
2.Show One Extensions
3.Add Extensions
4.Update Extensions
5.Delete Extensions
0.Exit
Enter option:

```

OUTLINE

TIMELINE

MYSQL

SOLUTION EXPLORER

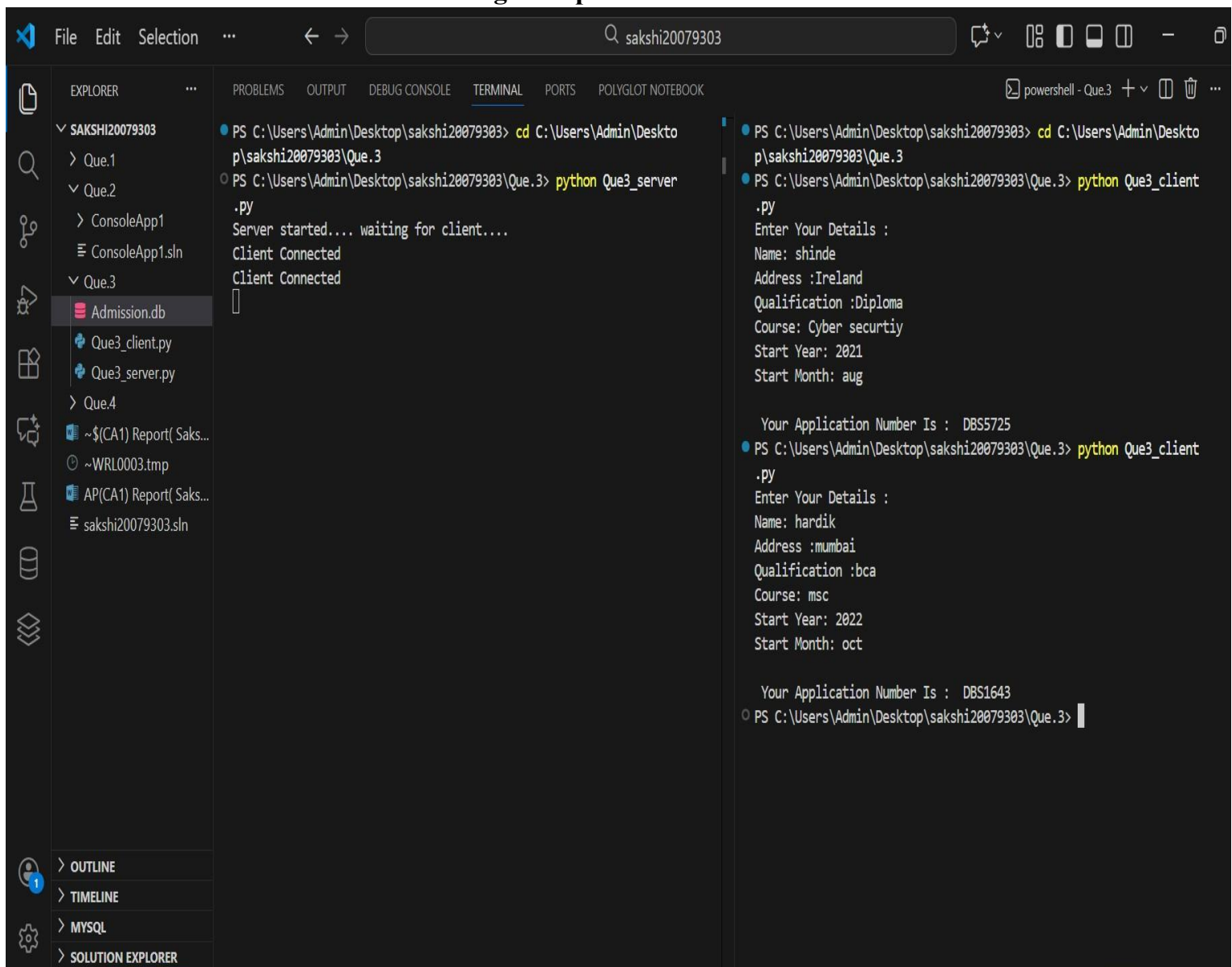
Projects: ConsoleApp1 Debug Any CPU Solution file opened: ConsoleApp1.sln

3. PART II: PYTHON PROGRAMMING

3.1 Client–Server Application

I created a server program based on **Python Sockets**, which waits to have a client . I created a client program that sends information about student admission to the server . I used **SQLite** to create a database file that contains all of the student data .

Once the data is received by the server , a unique application number is created and stored . The server sends the application number to the client . The client is sent back the application number by the server. The client shows the application number to the user . This work makes use of **databases**, **TCP communication** and **basic string manipulation**.



```
File Edit Selection ... sakshi20079303
```

```
EXPLORER
```

- SAKSHI20079303
 - Que.1
 - Que.2
 - ConsoleApp1
 - ConsoleApp1.sln
 - Que.3
 - Admission.db
 - Que3_client.py
 - Que3_server.py
 - Que.4
- ~\$(CA1) Report(Saks...
- ~WRL0003.tmp
- AP(CA1) Report(Saks...
- sakshi20079303.sln

```
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS POLYGLOT NOTEBOOK
```

```
PS C:\Users\Admin\Desktop\sakshi20079303> cd C:\Users\Admin\Desktop\sakshi20079303\Que.3
```

```
PS C:\Users\Admin\Desktop\sakshi20079303\Que.3> python Que3_server.py
```

```
Server started.... waiting for client....
```

```
Client Connected
```

```
Client Connected
```

```
PS C:\Users\Admin\Desktop\sakshi20079303\Que.3> python Que3_client.py
```

```
Enter Your Details :
```

```
Name: shinde
```

```
Address :Ireland
```

```
Qualification :Diploma
```

```
Course: Cyber securtiy
```

```
Start Year: 2021
```

```
Start Month: aug
```

```
Your Application Number Is : DBS5725
```

```
PS C:\Users\Admin\Desktop\sakshi20079303\Que.3> python Que3_client.py
```

```
Enter Your Details :
```

```
Name: hardik
```

```
Address :mumbai
```

```
Qualification :bca
```

```
Course: msc
```

```
Start Year: 2022
```

```
Start Month: oct
```

```
Your Application Number Is : DBS1643
```

```
PS C:\Users\Admin\Desktop\sakshi20079303\Que.3>
```

Admission.db X

Que.3 > Admission.db

Filter 1 t Rows: 5 Filter 5 rows...

TABLES

> students

	Applicati...	Name	Address	Qualificat...	Course	Year	Month
	Filter	Filter	Filter	Filter	Filter	Filter	Filter
1	DBS6026	sakshi	pune	BCA	cyber security	2025	sep
2	DBS8901	tanvi	mumbai	bca	AI	2025	02
3	DBS8739	shinde	ireland	diploma	cyber	2021	03
4	DBS5725	shinde	Ireland	Diploma	Cyber securtiy	2021	aug
5	DBS1643	hardik	mumbai	bca	msc	2022	oct
6							

SQLITE VIEWER v0.10.6 Page 1 / 1

Try Hydejack, a Jekyll theme for hackers, nerds, and academics

3.2 Web Scraping and CSV Handling

I created two sample **Hotel Webpages (hotelA.html and hotelB.html)** containing the names of rooms and prices since scraping of actual hotel websites is not possible . Then I wrote Python program which scraped these two pages with **BeautifulSoup** and collected the room data which was then stored in a CSV file and finally read the CSV file to display the results . This also enabled me to show safe and legal web scraping .

File Edit Selection View ... ← → sakshi20079303

EXPLORER

SAKSHI20079303

- Que.1
- Que.2
- Que.3
 - Admission.db
 - Que3_client.py
 - Que3_server.py
- Que.4
 - hotelA.html
 - hotelB.html
 - HotelRooms.csv
 - webScraping.py

webScraping.py X

Que.4 > webScraping.py > ...

```
1 import requests
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS POLYGLOT NOTEBOOK powershell - Que.4

```
PS C:\Users\Admin\Desktop\sakshi20079303> cd C:\Users\Admin\Desktop\sakshi20079303\Que.4
PS C:\Users\Admin\Desktop\sakshi20079303\Que.4> python webScraping.py
Scraping Hotel A...
Scraping Hotel B...
Saving to csv...
CSV saved as HotelRooms.csv

Reading csv data:

{'Hotel': 'Hotel A', 'Room': 'Deluxe Sea View', 'Price': '$120'}
{'Hotel': 'Hotel A', 'Room': 'Luxury Suite', 'Price': '$199'}
{'Hotel': 'Hotel A', 'Room': 'Family Room', 'Price': '$150'}
{'Hotel': 'Hotel B', 'Room': 'Standard Room', 'Price': '$89'}
{'Hotel': 'Hotel B', 'Room': 'Premium King', 'Price': '$140'}
{'Hotel': 'Hotel B', 'Room': 'Executive Suite', 'Price': '$210'}

Done!
PS C:\Users\Admin\Desktop\sakshi20079303\Que.4>
```

Visual Studio Code interface showing a project named "sakshi20079303". The Explorer sidebar on the left displays the file structure, including a folder "SAKS..." containing subfolders "Que.1", "Que.2", "Que.3", and "Que.4". Under "Que.4", there are files "hotelA.html", "hotelB.html", and "HotelRooms.csv" (which is selected). Other files in the project include "webScraping.py", "~\$(CA1) Report(Saks...", "~WRL0003.tmp", "AP(CA1) Report(Saks...", and "sakshi20079303.sln". The bottom sidebar shows "OUTLINE", "TIMELINE", "MYSQL", and "SOLUTION EXPLORER".

The main editor area displays the content of "HotelRooms.csv":

```
Que.4 > HotelRooms.csv
1 Hotel,Room,Price
2 Hotel A,Deluxe Sea View,$120
3 Hotel A,Luxury Suite,$199
4 Hotel A,Family Room,$150
5 Hotel B,Standard Room,$89
6 Hotel B,Premium King,$140
7 Hotel B,Executive Suite,$210
8
```

The status bar at the bottom indicates "Projects: 1", "Debug Any CPU", "Solution file opened: sakshi20079303.sln", and "readle_db readle_db (readle_db) CRLF {} Plain Text".

4. CONCLUSION

I was able to practice C# and Python by creating basic applications for this assignment. I learned how to use OOP , data management , database administration , and client-server communication.

5. REFERENCE

- a) **Microsoft. (2024)** *C# Documentation: Classes and Objects*. Available at:
<https://learn.microsoft.com/en-us/dotnet/csharp/fundamentals/object-oriented/classes>
- b) **Python Software Foundation. (2024)** *socket — Low-level networking interface*.
Available at: <https://docs.python.org/3/library/socket.html>
- c) **SQLite. (2024)** *SQLite Language Documentation*. Available at:
<https://www.sqlite.org/lang.html>

6. GITHUB REPOSITORY LINK

<https://github.com/sakshi220122/sakshiteli20079303-AdvanceProgrammingCA1-.git>