



Student Name and Number : Sakshi Umesh Teli (20079303)

Course Title : M.Sc. Cyber Security

Lecturer Name: Swati Dongre

Module/Subject Title: Advanced Programming Techniques

Assignment Title: CA_ONE_(30%)

No of Words: 698

TABLE OF CONTENTS

1. Introduction.....	2
2. Part I: C# Programming.....	3-10
2.1 Contact Book.....	3-5
2.2 File Extension System.....	6-10
3. Part II: Python Programming.....	11-14
3.1 Client–Server Application.....	11-12
3.2 Web Scraping and CSV Handling.....	12-14
4. Conclusion.....	15
5. Reference.....	15
6. GitHub Repository Link.....	15

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 .

```
File Edit Selection ... ← → Que.1  
EXPLORER Programs.cs ContactBooks.cs  
QUE.1 bin obj ConsoleApp1.csproj ContactBooks.cs  
Programs Que.1.sln  
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS POLYGLOT NOTEBOOK  
PS: C:\Users\Admin\Desktop\sakshi120079303\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 tell -- 123456789  
--- Contact Book Menu ---  
1. Add contact  
2. Show All Contacts  
3. Show one Contacts  
4. Update Contact  
5. Delete Contact  
6. Exit  
Enter Option:  
3  
Enter Mobile Number :123456789  
---Contact Details ---  
First Name :Sakshi  
Last Name : tell  
Company : TMV  
Mobile : 123456789  
Email : sakshi@gmail.com  
Birthdate : 01-01-2004  
--- Contact Book Menu ---  
1. Add contact  
2. Show All Contacts  
3. Show one Contacts  
4. Update Contact  
5. Delete Contact  
6. Exit  
Enter Option:  
4  
Enter Mobile Number To Update : 123456789  
New First Name :Tanvi  
New Last Name :pashikar  
New Company :HTC  
New Email:tanvi@gmail.com  
New Birthdate :22-02-2004  
Contact Updated !
```

File Edit Selection ... ← →

EXPLORER

QUE.1

bin

obj

ConsoleApp1.csproj

ContactBook.cs

Program.cs

Que.1.sln

Program.cs

ContactBook.cs

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

```
Program.cs • ContactBook.cs
Program.cs > ...
  class MainClass
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS POLYGLOT NOTEBOOK
PS: C:\Users\ADMIN\Desktop\sakshi20079303\Que.1> dotnet run
4. Update Contact
5. Delete Contact
6. Exit
Enter Option
5
Enter Mobile Number To Delete : 1234567899
Contact Deleted !

--- Contact Book Menu ---
1. Add contact
2. Show All Contacts
3. Show one Contacts
4. Update Contact
5. Delete Contact
6. 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
6. 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 .

The screenshot shows a dark-themed IDE interface. The top menu includes File, Edit, Selection, ..., <-, and -. The search bar on the right contains the text "Que.2".

The left sidebar features a file explorer with a tree view. The root node is "QUE.2", which contains "ConsoleApp1". "ConsoleApp1" has sub-folders "bin" and "obj", and files "ConsoleApp1.csproj", "FileExtension.cs", and "Program.cs". "Program.cs" is currently selected. Other items in the sidebar include "OUTLINE", "TIMELINE", "MYSQL", and "SOLUTION EXPLORER".

The main area consists of several panes:

- EXPLORER**: Shows the project structure.
- PROBLEMS**: No problems listed.
- OUTPUT**: No output listed.
- DEBUG CONSOLE**: Displays command-line history:

```
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
```
- TERMINAL**: Displays a menu for file extensions:

```
--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
```
- PORTS**: No ports listed.
- POLYGLOT NOTEBOOK**: No notebook listed.

```
File Edit Selection ... ← → Q Que.2

EXPLORER Program.cs • FileExtension.cs
QUE2
ConsoleApp1
bin
obj
ConsoleApp1.csproj
FileExtension.cs
Program.cs
ConsoleApp1.sln

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS POLYGLOT NOTEBOOK
PS C:\Users\Admin\Desktop\sakshi200793\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: 3
Enter Extension : .png
Enter Description : Image file
Entension added !

---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
.png - Image file

OUTLINE
TIMELINE
MYSQL
SOLUTION EXPLORER

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

The screenshot shows a dark-themed IDE interface with a sidebar containing icons for Explorer, GitHub, Search, Task List, Solution Explorer, and Properties. The main area displays a terminal window with the following output:

```
Program.cs • FileExtension.cs
ConsoleApp1 > 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: 4
Extension : .png
New Description : Picture
Extension Updated

---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 - 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

---File Extension ---
1.Show All Extensions
2.Show One Extensions
3.Add Extensions
4.Update Extensions
5.Delete Extensions
```

At the bottom, the status bar shows "Projects: ConsoleApp1 Debug Any CPU Solution file opened: ConsoleApp1.sln".

The screenshot shows a terminal window within a dark-themed IDE interface. The terminal output is as follows:

```
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: |
```

The terminal also displays the current working directory: PS C:\Users\Admin\Desktop\sakshi20079303\Que.2\ConsoleApp1>. The status bar at the bottom indicates: 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**.

The screenshot shows the Microsoft Visual Studio Code interface. The left sidebar displays the 'EXPLORER' view with a project folder named 'SAKSHI20079303'. Inside this folder are sub-folders 'Que.1', 'Que.2', 'ConsoleApp1', 'ConsoleApp1.sln', 'Que.3', and 'Admission.db'. Under 'Que.3', there are files 'Que3_client.py' and 'Que3_server.py'. The right side of the screen shows the 'TERMINAL' tab open, displaying the following terminal session:

```
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> cd C:\Users\Admin\Desktop\sakshi20079303\Que.3
PS C:\Users\Admin\Desktop\sakshi20079303\Que.3> python Que3_client.py
Enter Your Details :
Name: shinde
Address :Ireland
Qualification :Diploma
Course: Cyber security
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>
```

	Application ID	Name	Address	Qualification	Course	Year	Month
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 security	2021	aug
5	DBS1643	hardik	mumbai	bca	msc	2022	oct
6							

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 .

The screenshot shows a Microsoft Visual Studio Code interface. The left sidebar displays a file tree with a folder named 'SAKSHI20079303' containing subfolders 'Que.1', 'Que.2', 'Que.3' (with files 'Admission.db', 'Que3_client.py', 'Que3_server.py'), 'Que.4' (with files 'hotelA.html', 'hotelB.html', 'HotelRooms.csv'), and a selected file 'webScraping.py'. Other items in the tree include 'webScraping.py' (marked with a red error icon), a report file, a temporary file, another report file, and a solution file 'sakshi20079303.sln'. The main editor area shows the code for 'webScraping.py' which imports 'requests' and performs web scraping on two hotel websites to save data to 'HotelRooms.csv'. The terminal below shows the command line output of running the script, including directory changes and the resulting CSV file. The status bar at the bottom indicates the file is saved.

```
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>
```

The screenshot shows the Microsoft Visual Studio interface with the following details:

- Solution Explorer:** Displays a project structure under "SAKS...".
 - Que.1
 - Que.2
 - Que.3
 - Que.4
 - hotelA.html
 - hotelB.html
 - HotelRooms.csv** (selected)
 - webScraping.py
 - ~\$(CA1) Report(Saks...
 - ~WRL003.tmp
 - AP(CA1) Report(Saks...
 - sakshi20079303.sln
- Editor:** Shows the content of 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
```
- Task List:** Shows a list of tasks:
 - > OUTLINE
 - > TIMELINE
 - > MYSQL
 - > SOLUTION EXPLORER
- Bottom Status Bar:** Projects: 1, Debug Any CPU, Solution file opened: sakshi20079303.sln, 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>