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**GitHub Repository Link:**

**[https://github.com/itsabdullah859/CA1\\_AdvanceProgramming.git](https://github.com/itsabdullah859/CA1_AdvanceProgramming.git)**

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# 1. Introduction

The following report describes the activities that were accomplished in the case of CA\_ONE. The assignment will be split into two sections Part I will cover C#, and Part II will cover Python. All these questions focus on programming abilities, such as object-oriented programming, file manipulations, networking, databases, and web scraping. The methods of designing each of the programs, why methods were chosen, and how the systems work are explained in this report. The outputs of the program have been also provided as screenshots to illustrate the results.

## 2. Question 1 – Phone Contact Book (C#)

The task contained the creation of a contact management system based on a console in C#. The program contains two classes: Contact and ContactBook. Contact class contains personal information like the name, company, mobile number, email, and date of birth whereas in ContactBook class, it consists of the functions of adding, viewing, updating, and deleting contacts. Contacts were managed with the help of a List. The validation of mobile numbers provides a positive and not a zero number of 9 digits. The technique of encapsulation was implemented with the help of private fields and public properties. The menu base interface enables the user to do all the necessary operations efficiently.

```
Build succeeded.
0 Warning(s)
0 Error(s)

Time Elapsed 00:00:01.01
PS C:\Users\ZEE\Desktop\20079754\Question1> dotnet run

--- MAIN MENU ---
1: Add Contact
2: Show All Contacts
3: Show Contact Details
4: Update Contact
5: Delete Contact
0: Exit
Enter your choice: |
```

Figure 1: Main Menu

```
--- MAIN MENU ---
1: Add Contact
2: Show All Contacts
3: Show Contact Details
4: Update Contact
5: Delete Contact
0: Exit
Enter your choice: 1
Enter First Name: Abdullah
Enter Last Name: Babar
Enter Company: DBS
Enter Mobile Number (9-digit, non-zero): 123456789
Enter Email: itsabdullah859@gmail.com
Enter Birthdate: 15-01-2003
Contact Added Successfully!
```

Figure 2: Adding Contacts

```
--- MAIN MENU ---
1: Add Contact
2: Show All Contacts
3: Show Contact Details
4: Update Contact
5: Delete Contact
0: Exit
Enter your choice: 3
Enter Mobile Number to search: 123456789
-----
Name      : Abdullah Babar
Company   : DBS
Mobile    : 123456789
Email     : itsabdullah859@gmail.com
Birthdate : 15-01-2003
-----
```

Figure 3: Viewing Contacts

### 3. Question 2 File Extension Information System (C#).

This C# application gives details of some of the widespread file extensions by use of a Dictionary with at least 20 extensions and definition. The dictionary makes quick extensions searches. Once a user has typed an extension, the program shows the meaning of the extension only when it is available; it does not just crash as the program would have done in earlier versions. This represents good utilization of data structures and elegant error management.

```
-----  
FILE EXTENSION INFORMATION SYSTEM  
-----  
  
Enter a file extension (e.g. .mp4, .pdf, .jpg)  
Type 'exit' to quit → .mp4  
Extension: .mp4  
Description: Video file (MPEG-4)  
  
Enter a file extension (e.g. .mp4, .pdf, .jpg)  
Type 'exit' to quit → .pdf  
Extension: .pdf  
Description: Portable Document Format file  
  
Enter a file extension (e.g. .mp4, .pdf, .jpg)  
Type 'exit' to quit → .jpg  
Extension: .jpg  
Description: JPEG image file  
  
Enter a file extension (e.g. .mp4, .pdf, .jpg)  
Type 'exit' to quit → .zip  
Extension: .zip  
Description: Compressed archive file  
  
Enter a file extension (e.g. .mp4, .pdf, .jpg)  
Type 'exit' to quit → .pptx  
Extension: .pptx  
Description: Microsoft PowerPoint presentation
```

Figure 4: File Extensions Information

## 4. Question 3 – TCP Client–Server Registration System (Python)

This assignment was done by creating a TCP-based client server system in Python. The client gathers the applicant information including the name, address, qualification, course of choice, and the date he intends to join and transmits the information to the server. The server puts the data in a SQLite database and comes up with a unique application number that is sent back to the client. SQLite was selected because it is lightweight technology, which does not need a dedicated server since it uses files to store data. TCP was selected since it is reliable, connection oriented and accurate transmission of data, which is a necessity in student application records.

```
DBS SERVER RUNNING... Waiting for connections...
```

Figure 5: Server is waiting for connection

```

===== DBS Admission Application =====
Enter Name: Abdullah Babar
Enter Address: Lucan
Enter Educational Qualification: BS Computer Science

Courses Offered:
1. MSc in Cyber Security
2. MSc Information Systems & Computing
3. MSc Data Analytics
Choose course (1/2/3): 1
Enter intended start year (e.g., 2025): 2025
Enter intended start month (e.g., January): September

Your application has been submitted!
Your Assigned Application Number is: DBS029803

```

*Figure 6: Client application has been saved*

```

DBS SERVER RUNNING... Waiting for connections...
Connected to: ('127.0.0.1', 55305)
Application Saved. ID Sent.

[]

```

*Figure 7: Server connected to client and application saved*

	<b>id</b>	<b>app_number</b>	name	address	qualification	course	<b>start_year</b>	<b>start_month</b>
	File...	Filter	Fileter	Filter	Filter	Filter	Fileter	Filter
1	4	DBS029803	Abdullah Babar	Lucan	BS Computer Science	MSc in Cyber Security	2025	September

*Figure 8: Showing Database Records*

## 5. Question 4 – Hotel Room Price Scraper (Python)

This task entailed in the extraction of hotel room prices in two authorized HTML files (hotel1.html and hotel2.html) to prevent the legal problems in the case of live scraping. Python BeautifulSoup library was used to scrape the data. The name of the room, price, description, and features were then processed with the CSV module of Python to extract all of them as a CSV file (hotel-prices.csv). After that, the CSV file was read and presented in the terminal to ensure that one could easily compare hotel room information at both hotels.

```
--- Available Hotel Rooms (from CSV) ---  
  
['Hotel', 'Room Name', 'Price', 'Description', 'Features']  
[{'Hotel': 'Simple Hotel', 'Room Name': 'Standard Single Room', 'Price': '$50/night', 'Description': "A cozy room perfect for solo travelers. Includes basic amenities for a comfortable stay.", 'Features': 'Free WiFi, TV, Air Conditioning, Single Bed'}, {'Hotel': 'Simple Hotel', 'Room Name': 'Deluxe Double Room', 'Price': '$80/night', 'Description': "Spacious room with modern decor, ideal for couples or small families.", 'Features': 'Free WiFi, TV, Air Conditioning, Double Bed, Mini Fridge'}, {"Hotel": "Simple Hotel", "Room Name": "Suite", "Price": "$150/night", "Description": "Luxurious suite with separate living area, perfect for extended stays or special occasions.", "Features": "Free WiFi, TV, Air Conditioning, King Bed, Mini Fridge, Balcony, Room Service"}, {"Hotel": "Simple Hotel", "Room Name": "Family Room", "Price": "$120/night", "Description": "Large room designed for families, with extra space and amenities for kids.", "Features": "Free WiFi, TV, Air Conditioning, Two Double Beds, Mini Fridge, Kids' Play Area"}, {"Hotel": "Simple Hotel", "Room Name": "Penthouse", "Price": "$300/night", "Description": "Exclusive top-floor penthouse with stunning views and premium services.", "Features": "Free WiFi, TV, Air Conditioning, King Bed, Mini Fridge, Balcony, Room Service, Jacuzzi, City View"}, {"Hotel": "Simple Hotel", "Room Name": "Budget Room", "Price": "$40/night", "Description": "Affordable option for budget-conscious travelers, with essential amenities.", "Features": "Free WiFi, TV, Air Conditioning, Single Bed"}, {"Hotel": "Simple Hotel", "Room Name": "Executive Room", "Price": "$100/night", "Description": "Business-friendly room with workspace and modern comforts for professionals.", "Features": "Free WiFi, TV, Air Conditioning, King Bed, Mini Fridge, Desk, Coffee Maker"}, {"Hotel": "Cozy Hotel", "Room Name": "Standard Single Room", "Price": "$50/night", "Description": "A cozy room perfect for solo travelers. Includes basic amenities for a comfortable stay.", "Features": "Free WiFi, TV, Air Conditioning, Single Bed"}, {"Hotel": "Cozy Hotel", "Room Name": "Deluxe Double Room", "Price": "$80/night", "Description": "Spacious room with modern decor, ideal for couples or small families.", "Features": "Free WiFi, TV, Air Conditioning, Double Bed, Mini Fridge"}, {"Hotel": "Cozy Hotel", "Room Name": "Suite", "Price": "$150/night", "Description": "Luxurious suite with separate living area, perfect for extended stays or special occasions.", "Features": "Free WiFi, TV, Air Conditioning, King Bed, Mini Fridge, Balcony, Room Service"}, {"Hotel": "Cozy Hotel", "Room Name": "Family Room", "Price": "$120/night", "Description": "Large room designed for families, with extra space and amenities for kids.", "Features": "Free WiFi, TV, Air Conditioning, Two Double Beds, Mini Fridge, Kids' Play Area"}, {"Hotel": "Cozy Hotel", "Room Name": "Penthouse", "Price": "$300/night", "Description": "Exclusive top-floor penthouse with stunning views and premium services.", "Features": "Free WiFi, TV, Air Conditioning, King Bed, Mini Fridge, Balcony, Room Service, Jacuzzi, City View"}, {"Hotel": "Cozy Hotel", "Room Name": "Budget Room", "Price": "$40/night", "Description": "Affordable option for budget-conscious travelers, with essential amenities."}]
```

Figure 9: Terminal Output of Scraped Data

A	B	C	D	E	F	G	H	I	J	K	L
1	Hotel	Room Name	Price	Description	Features						
2	Simple Hotel	Standard Single Room	\$50/night	A cozy room perfect for solo travelers. Includes basic amenities.	Free WiFi, TV, Air Conditioning, Single Bed						
3	Simple Hotel	Deluxe Double Room	\$80/night	Spacious room with modern decor, ideal for couples.	Free WiFi, TV, Air Conditioning, Double Bed, Mini Fridge						
4	Simple Hotel	Suite	\$150/night	Luxurious suite with separate living area, perfect for families.	Free WiFi, TV, Air Conditioning, King Bed, Mini Fridge, Balcony, Room Service						
5	Simple Hotel	Family Room	\$120/night	Large room designed for families, with extra space.	Free WiFi, TV, Air Conditioning, Two Double Beds, Mini Fridge, Kids' Play Area						
6	Simple Hotel	Penthouse	\$300/night	Exclusive top-floor penthouse with stunning views.	Free WiFi, TV, Air Conditioning, King Bed, Mini Fridge, Balcony, Room Service, Jacuzzi, City View						
7	Simple Hotel	Budget Room	\$40/night	Affordable option for budget-conscious travelers.	Free WiFi, TV, Air Conditioning, Single Bed						
8	Simple Hotel	Executive Room	\$100/night	Business-friendly room with workspace and modern amenities.	Free WiFi, TV, Air Conditioning, King Bed, Mini Fridge, Desk, Coffee Maker						
9	Cozy Hotel	Standard Single Room	\$50/night	A cozy room perfect for solo travelers. Includes basic amenities.	Free WiFi, TV, Air Conditioning, Single Bed						
10	Cozy Hotel	Deluxe Double Room	\$80/night	Spacious room with modern decor, ideal for couples.	Free WiFi, TV, Air Conditioning, Double Bed, Mini Fridge						
11	Cozy Hotel	Suite	\$150/night	Luxurious suite with separate living area, perfect for families.	Free WiFi, TV, Air Conditioning, King Bed, Mini Fridge, Balcony, Room Service						
12	Cozy Hotel	Family Room	\$120/night	Large room designed for families, with extra space.	Free WiFi, TV, Air Conditioning, Two Double Beds, Mini Fridge, Kids' Play Area						
13	Cozy Hotel	Penthouse	\$300/night	Exclusive top-floor penthouse with stunning views.	Free WiFi, TV, Air Conditioning, King Bed, Mini Fridge, Balcony, Room Service, Jacuzzi, City View						
14	Cozy Hotel	Budget Room	\$40/night	Affordable option for budget-conscious travelers.	Free WiFi, TV, Air Conditioning, Single Bed						
15	Cozy Hotel	Executive Room	\$100/night	Business-friendly room with workspace and modern amenities.	Free WiFi, TV, Air Conditioning, King Bed, Mini Fridge, Desk, Coffee Maker						

Figure 10: CSV File Preview

## 6. Challenges Faced

The assignment had several challenges. C# permitted input validation by ensuring that the mobile numbers were not empty or less than nine digits which was fixed by using a custom validation code. There were problems with TCP connection when the client was launched in advance of the server, which accentuates the need to start with the server. Also, variations in the HTML of the hotel pages meant that there was a need to have flexibility in the scraping logic that would search the pages based on certain tags and classes. CSV files and their reading and writing in Python were also not very simple to learn initially, though practice enabled them to comprehend the data processing as rows.

## 7. Conclusion

In general, this assignment enhanced my proficiency in C# object-oriented programming, Python networking, database, and web scraping. It was good experience in designing systems, data validation, long term storage of data, and data processing using HTML. The assignment requirements are fulfilled by the developed programs, and the acquired knowledge will be useful in the future programming activities.

## References:

- [https://developer.mozilla.org/en-US/docs/Learn\\_web\\_development/Core/Structuring\\_content/Basic\\_HTML\\_syntax](https://developer.mozilla.org/en-US/docs/Learn_web_development/Core/Structuring_content/Basic_HTML_syntax)
- <https://dotnettutorials.net/course/csharp-dot-net-tutorials/>
- <https://docs.python.org/3/tutorial/index.html>
- [https://coddyschool.com/upload/Flask\\_Web\\_Development\\_Developing.pdf](https://coddyschool.com/upload/Flask_Web_Development_Developing.pdf)