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Course Title: M.Sc. Cyber Security

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Module/Subject Title: Advanced Programming Techniques

Assignment Title: CA_ONE_(30%)

No of Words: 645

https://github.com/Sarizonn/AdvancedProgramming-ca1

Introduction

This report shows the design and implementation of four programming tasks. Part I shows Object-Oriented Programming using C# for console applications, while Part II applies Python for network programming and web data extraction.

Part I: Programming in C#

Question 1: Contact Book Application

For this task, I created a menu-driven console application that functions as a digital phonebook. The system allows users to store contacts, view details, update information, and delete records when necessary.

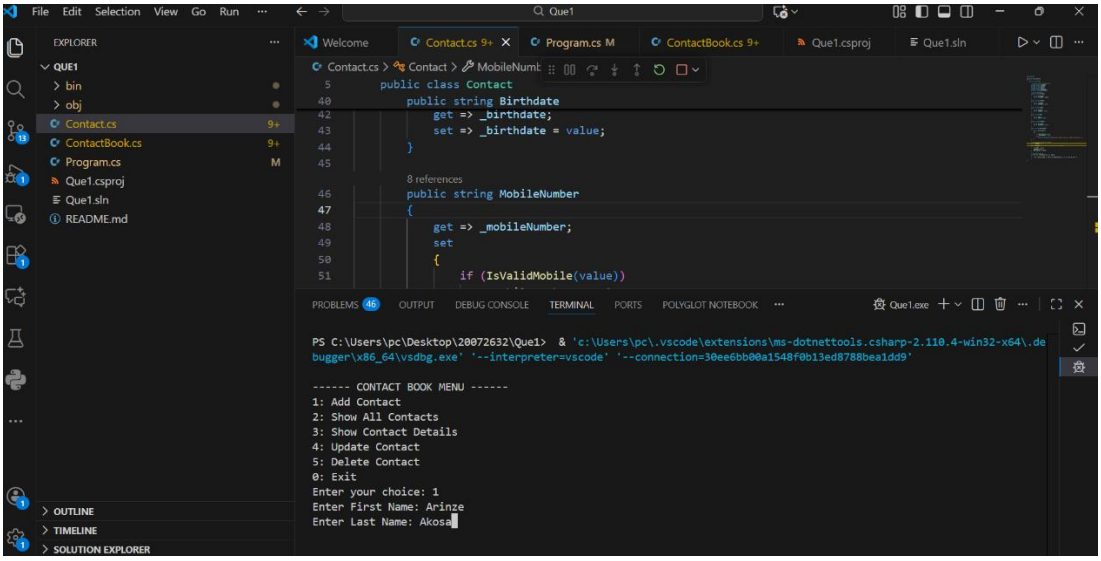
Implementation Details

- **OOP Principles:** I designed a class named Contact to represent a person. I used Encapsulation by keeping fields like _firstName and _mobileNumber private and exposing them through public properties. This allowed me to add logic to the MobileNumber property to ensure it only accepts valid 9-digit numbers.
- **Data Structure:** To store the contacts, I used a List<Contact> within the ContactBook class. Lists were the perfect choice here because they are dynamic—we can add or remove contacts without worrying about fixed sizes like arrays.
- **Functionality:**

I included a SeedContacts() method that automatically generates 20 sample contacts (e.g., "Person1", "Person2") when the program starts, meeting the minimum requirement.

The AddContact() method uses try-catch blocks to prevent the program from crashing if the user enters invalid data.

Screenshots:




```
------ CONTACT BOOK 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: John
Enter Last Name: Oke
Enter Company: DBS
Enter Mobile Number (9 digits): 083456789
Enter Email: jn@gmail.com
Enter Birthdate: 11 feb 1999
Contact added successfully!

------ CONTACT BOOK MENU ------
1: Add Contact
2: Show All Contacts
3: Show Contact Details
4: Update Contact
5: Delete Contact
```

```
PROBLEMS 46   OUTPUT   DEBUG CONSOLE   TERMINAL   PORTS   POLYGLOT NOTEBOOK   ...

Enter Last Name: Akosa
Enter Company: DBS
Enter Mobile Number (9 digits): 892596354
Enter Email: Ako@gmail.com
Enter Birthdate: 11 jan 1999
Contact added successfully!

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

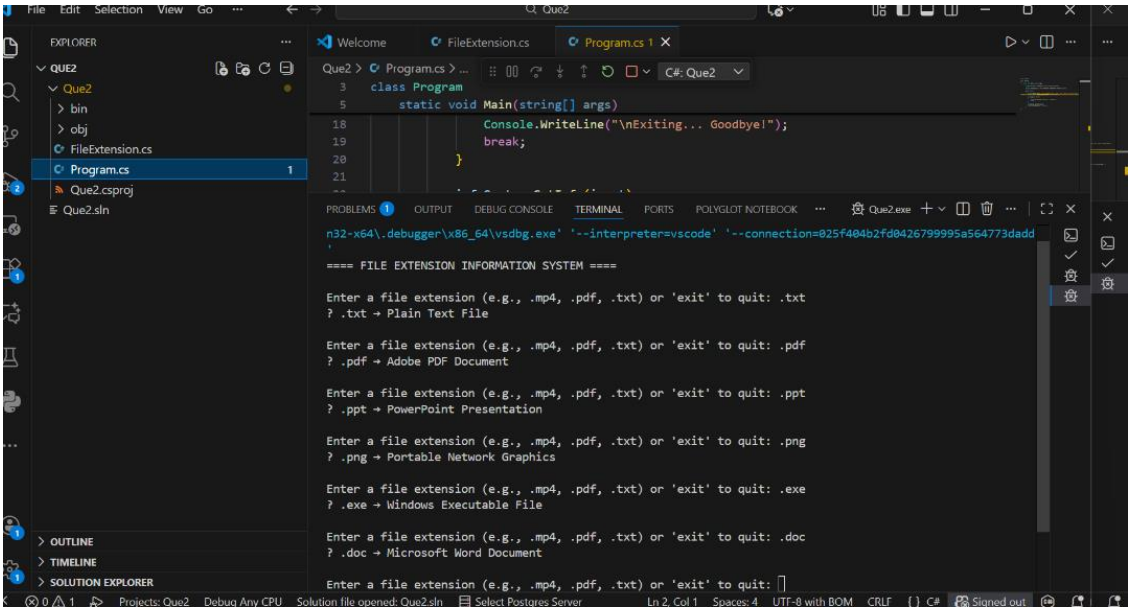
Question 2: File Extension Assistant

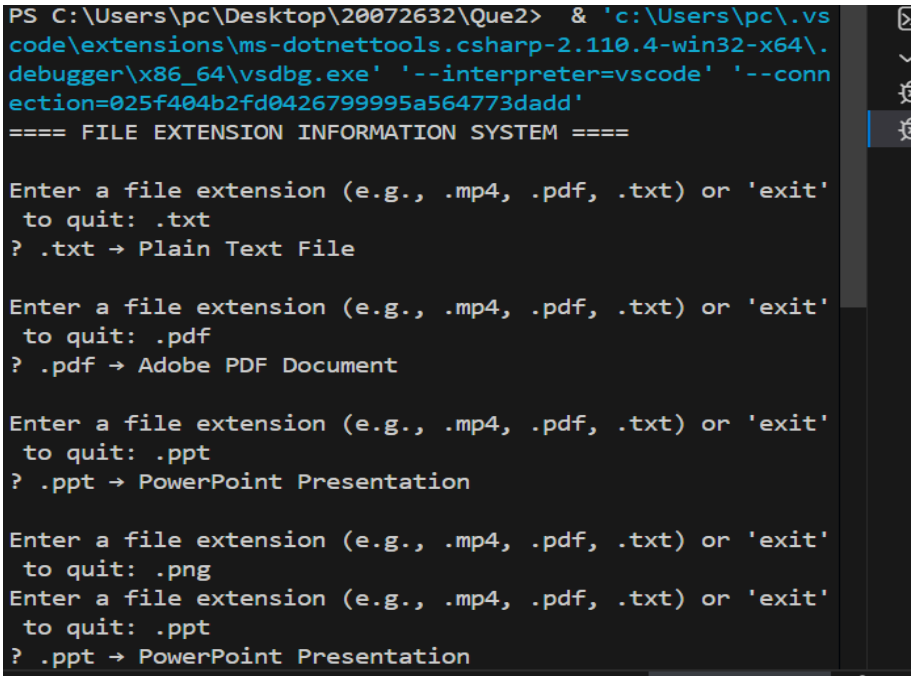
This program helps users identify file types based on their extensions. For example, if a user enters .ppt, the system tells them it is a "PowerPoint Presentation."

Implementation Details

- **Data Structure:** I used a Dictionary<string, string> to store the data. This is much faster than a list because it pairs a "Key" (the extension) directly with a "Value" (the description), allowing for instant lookups.
- **Logic:** The GetInfo method checks if the user's input exists in the dictionary.
    - If it exists (e.g., .pdf), it prints the description.
    - If the input is missing a dot (e.g., pdf) or is unknown, the program handles it gracefully by printing a friendly warning message instead of crashing.

Screenshots:





Part II: Programming in Python

Question 3: Client-Server Admission System

This task shows a college admission system using a Client-Server architecture. The Client collects student data, and the Server saves it and issues a registration number.

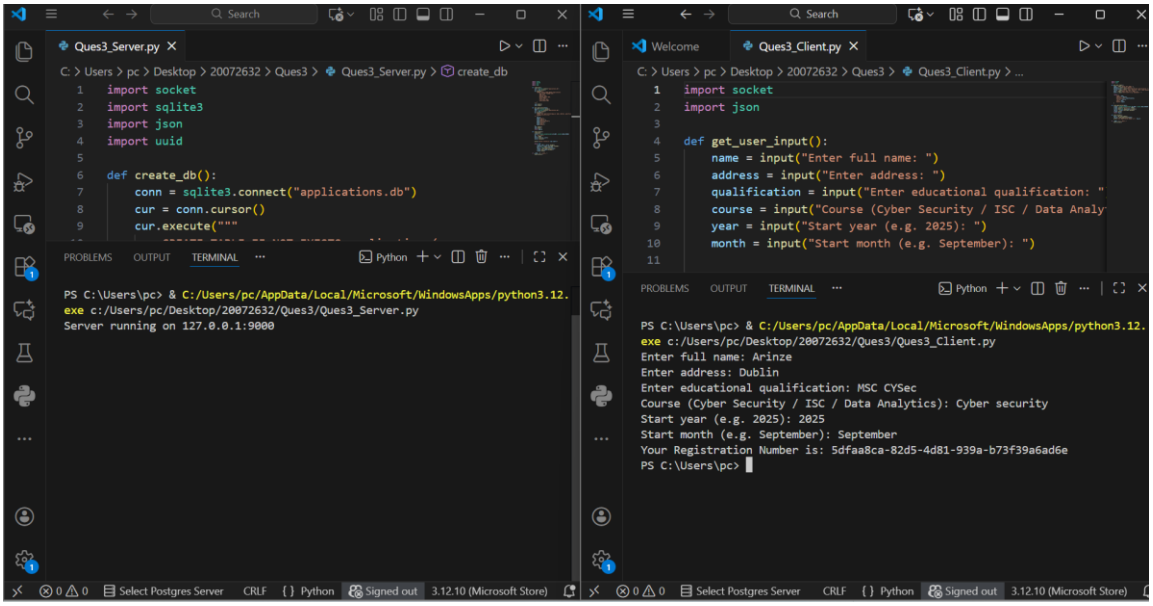
Implementation Details

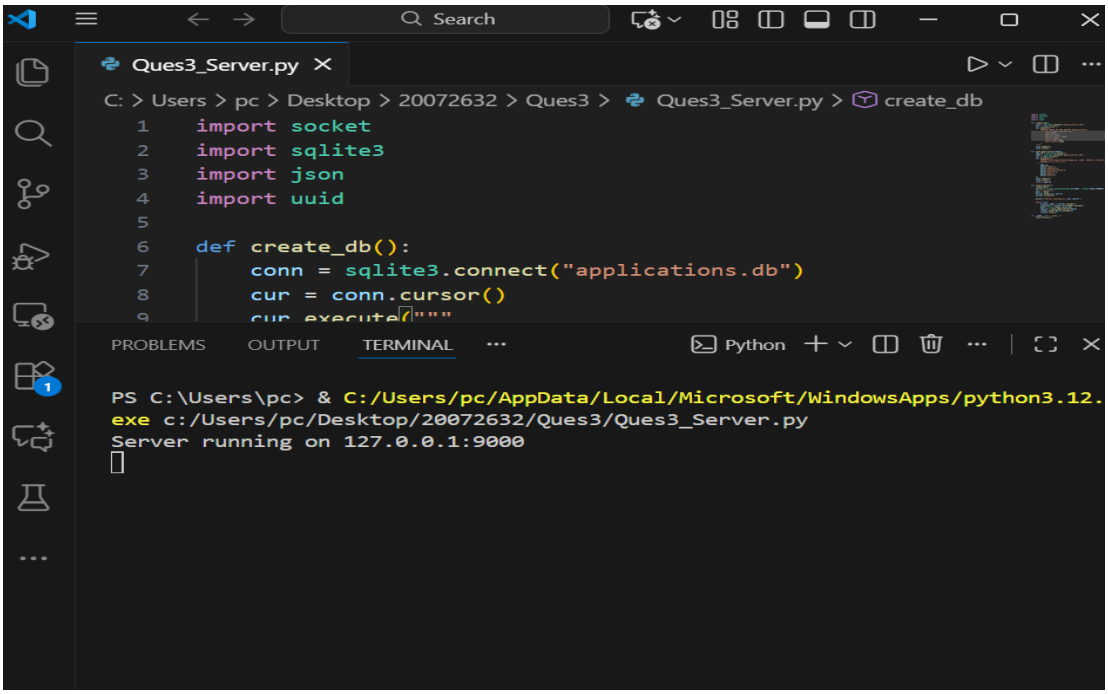
- **Networking:** I used the Python socket library to implement the TCP protocol. I chose TCP because it is connection-oriented, ensuring that the student's personal data is delivered reliably without errors.
- **Database:** On the server side (Que3_Server.py), I used SQLite. The code creates a database file named applications.db. This ensures the data is persistent—meaning if I restart the server, the student records are still there.
- **Data Handling:**

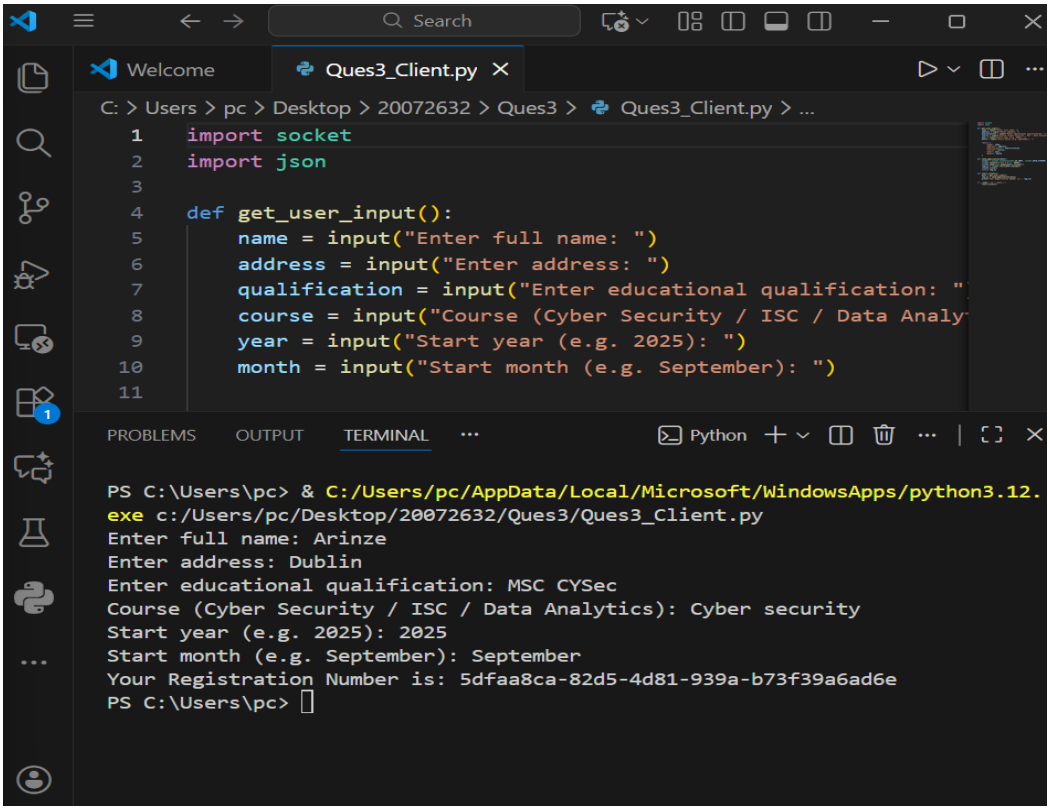
The Client collects inputs (Name, Course, Address) and bundles them into a JSON format before sending.

The Server receives the JSON, assigns a unique ID using the uuid library, saves the record to the database, and sends the unique ID back to the Client as confirmation.

Screenshots:







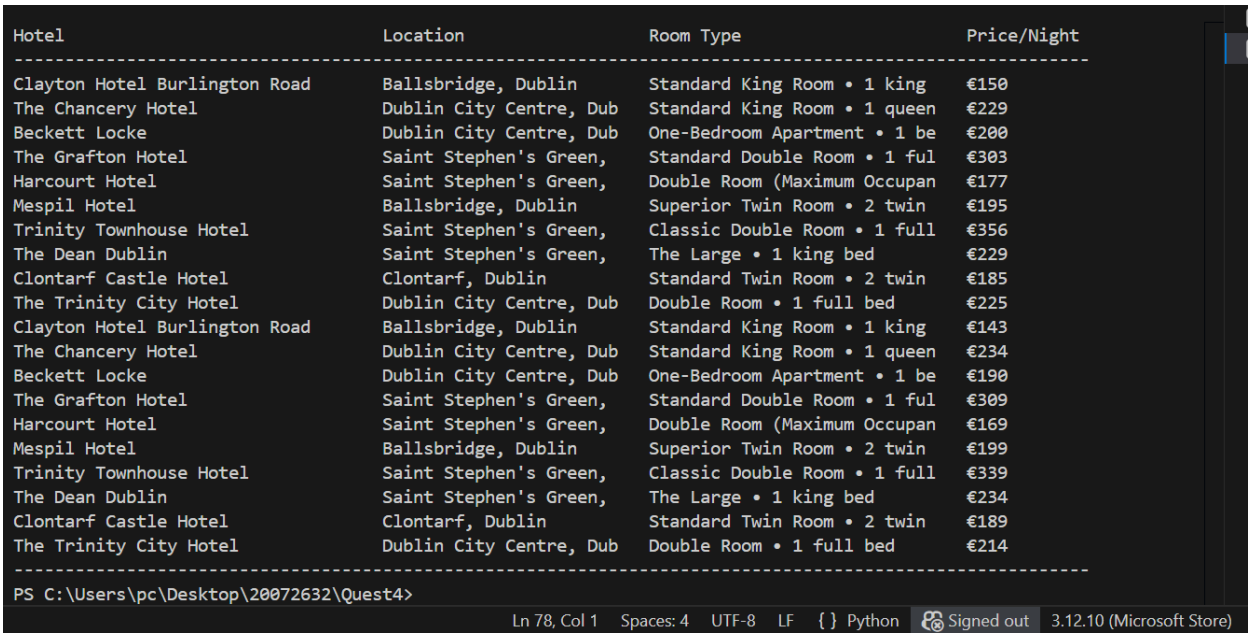
Question 4: Hotel Price Scraper

The final task involved extracting room price data for a holiday period. I built a scraper that gathers data from two specific hotel listing sites: "DublinStays" and "Luxe Haven."

Implementation Details

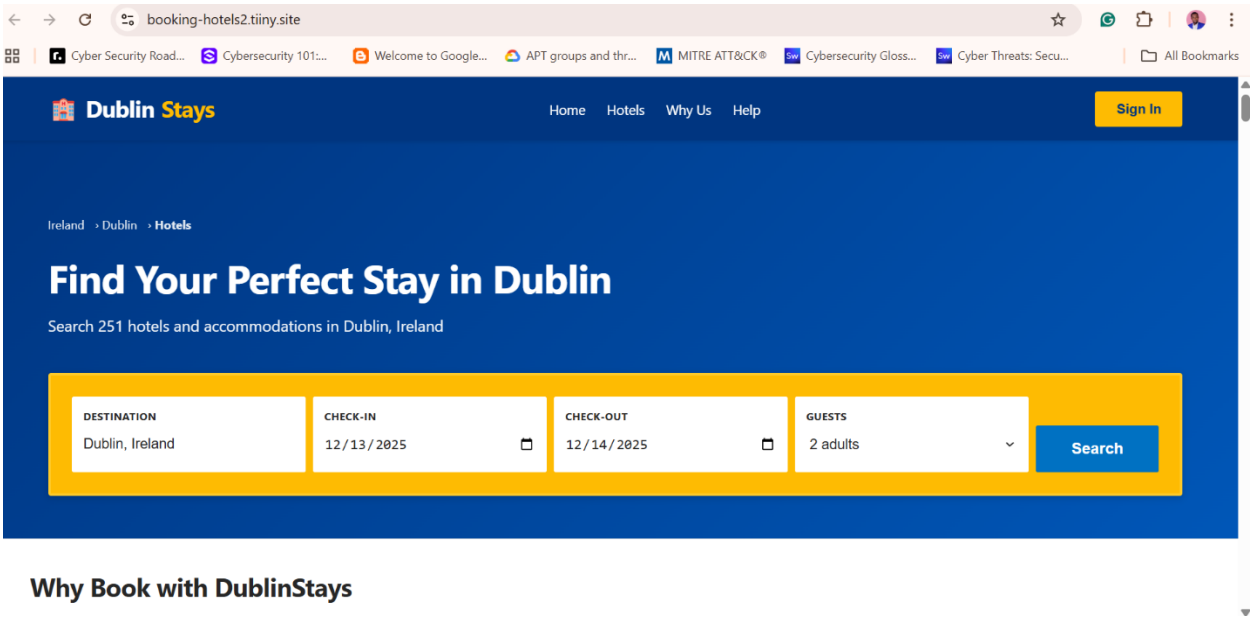
- **Web Scraping:** I used the requests library to fetch the HTML and BeautifulSoup to search through it. The script looks for specific HTML tags (like hotel-card and current-price) to find the relevant information.
- **Data Cleaning:** Prices on websites often include text or symbols. I used Python's **Regular Expressions (re)** module to strip away currency symbols and extract just the numeric price for calculation.

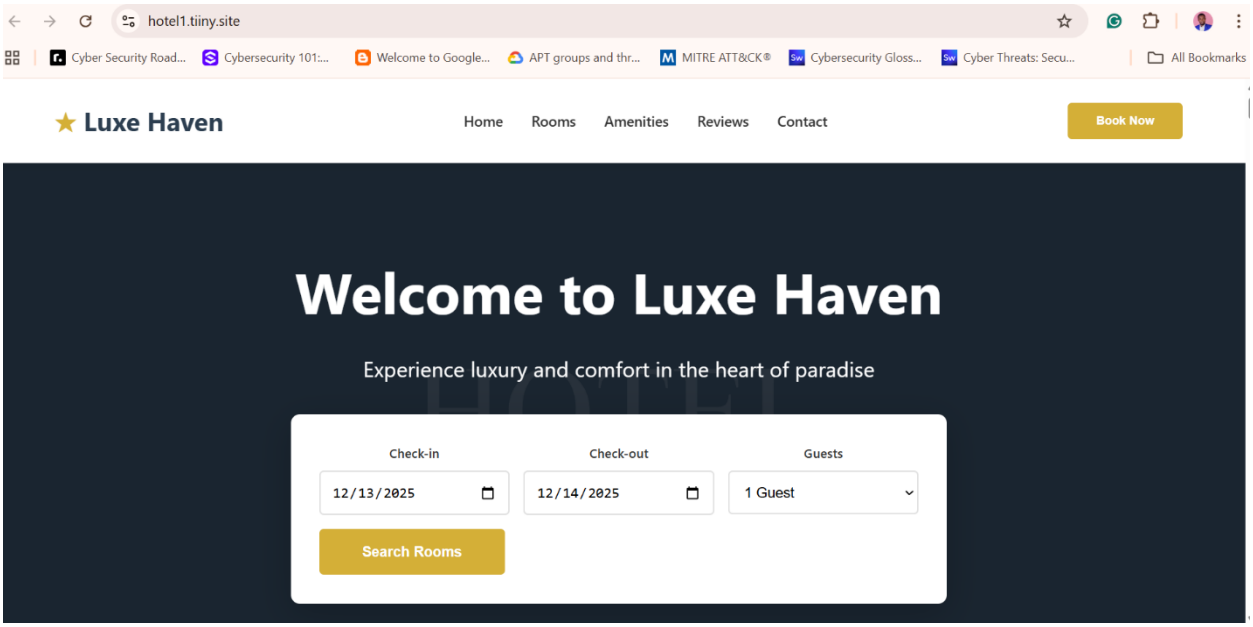
- **Storage & Display:** The data is first written to a file named hotel_prices.csv. At the end of the script, the program reads this CSV file back and prints a neatly formatted table to the terminal so the user can compare prices easily.



```
Hotel                          Location                Room Type                        Price/Night
-------------------------------------------------------------------------------------------------------
Clayton Hotel Burlington Road  Ballsbridge, Dublin     Standard King Room • 1 king      €150
The Chancery Hotel             Dublin City Centre, Dub Standard King Room • 1 queen     €229
Beckett Locke                  Dublin City Centre, Dub One-Bedroom Apartment • 1 be     €200
The Grafton Hotel              Saint Stephen's Green,  Standard Double Room • 1 ful     €303
Harcourt Hotel                 Saint Stephen's Green,  Double Room (Maximum Occupan     €177
Mespil Hotel                   Ballsbridge, Dublin     Superior Twin Room • 2 twin      €195
Trinity Townhouse Hotel        Saint Stephen's Green,  Classic Double Room • 1 full     €356
The Dean Dublin                Saint Stephen's Green,  The Large • 1 king bed           €229
Clontarf Castle Hotel          Clontarf, Dublin        Standard Twin Room • 2 twin      €185
The Trinity City Hotel         Dublin City Centre, Dub Double Room • 1 full bed         €225
Clayton Hotel Burlington Road  Ballsbridge, Dublin     Standard King Room • 1 king      €143
The Chancery Hotel             Dublin City Centre, Dub Standard King Room • 1 queen     €234
Beckett Locke                  Dublin City Centre, Dub One-Bedroom Apartment • 1 be     €190
The Grafton Hotel              Saint Stephen's Green,  Standard Double Room • 1 ful     €309
Harcourt Hotel                 Saint Stephen's Green,  Double Room (Maximum Occupan     €169
Mespil Hotel                   Ballsbridge, Dublin     Superior Twin Room • 2 twin      €199
Trinity Townhouse Hotel        Saint Stephen's Green,  Classic Double Room • 1 full     €339
The Dean Dublin                Saint Stephen's Green,  The Large • 1 king bed           €234
Clontarf Castle Hotel          Clontarf, Dublin        Standard Twin Room • 2 twin      €189
The Trinity City Hotel         Dublin City Centre, Dub Double Room • 1 full bed         €214
-------------------------------------------------------------------------------------------------------
PS C:\Users\pc\Desktop\20072632\Quest4>
```

Ln 78, Col 1 Spaces: 4 UTF-8 LF { } Python Signed out 3.12.10 (Microsoft Store)




hotel1.tiiny.site
Cyber Security Road...
Cybersecurity 101:...
Welcome to Google...
APT groups and thr...
MITRE ATT&CK®
Cybersecurity Gloss...
Cyber Threats: Secu...
All Bookmarks
Luxe Haven
Home
Rooms
Amenities
Reviews
Contact
Book Now
Welcome to Luxe Haven
Experience luxury and comfort in the heart of paradise
Check-in
12/13/2025
Check-out
12/14/2025
Guests
1 Guest
Search Rooms