Title: Implement a dictionary for some real world application. Use C/C++ or python.

Objective: To implement a dictionary for real world application using python.

Expected Outcome of Experiment:

CO	Outcome
3	Describe concepts of advanced data structures like set, map & dictionary.

Books/ Journals/ Websites referred:
1. *Fundamentals Of Data Structures In C* – Ellis Horowitz, Satraj Sahni, Susan Anderson-Fred
2. *An Introduction to data structures with applications* – Jean Paul Tremblay, Paul G. Sorenson
3. *Data Structures A Pseudo Approach with C* – Richard F. Gilberg & Behrouz A. Forouzan
4. https://www.geeksforgeeks.org/binary-tree-data-structure/
5. https://www.thecrazyprogrammer.com/2015/03/c-program-for-binary-search-tree-insertion.html

Program:

```python
rainfall_data = {
    str(year): f"{100 + year % 50}"
    for year in range(2000, 2025)
}

while True:
    print("\n--- Rainfall Data Management ---")
    print("1. Add or Update Rainfall Data")
    print("2. Delete Year Data")
    print("3. Display All Data")
    print("4. Search Rainfall by Year")
    print("5. Exit")
    choice = int(input("Enter your choice: "))

    if choice == 1:
        year = input("Enter year (2000-2024): ")
        if year.isdigit() and 2000 <= int(year) <= 2024:
            rainfall = input("Enter rainfall amount (in mm): ")
            rainfall_data[year] = rainfall
            print(f"Data {'updated' if year in rainfall_data else 'added'} for year {year}")
        else:
            print("Invalid year. Please enter a year between 2000 and 2024.")

    elif choice == 2:
```

```
        year = input("Enter year to delete data (2000-2024): ")

        if year in rainfall_data:

            del rainfall_data[year]

            print("Data for year", year, "deleted.")

        else:

            print("Year not found.")


    elif choice == 3:

        print("Year-wise Rainfall Data (2000-2024):")

        for year, rainfall in sorted(rainfall_data.items()):

            print(f"Year: {year}, Rainfall: {rainfall} mm")


    elif choice == 4:

        year = input("Enter year to search rainfall data (2000-2024): ")

        if year in rainfall_data:

            print(f"Year: {year}, Rainfall: {rainfall_data[year]} mm")

        else:

            print("Year not found.")


    elif choice == 5:

        print("Exiting program.")

        break


    else:

        print("Invalid choice. Please enter a number from 1 to 5.")
```

Output:

```
--- Rainfall Data Management ---
1. Add or Update Rainfall Data
2. Delete Year Data
3. Display All Data
4. Search Rainfall by Year
5. Exit
Enter your choice: 3
Year-wise Rainfall Data (2000-2024):
Year: 2000, Rainfall: 100 mm
Year: 2001, Rainfall: 101 mm
Year: 2002, Rainfall: 102 mm
Year: 2003, Rainfall: 103 mm
Year: 2004, Rainfall: 104 mm
Year: 2005, Rainfall: 105 mm
Year: 2006, Rainfall: 106 mm
Year: 2007, Rainfall: 107 mm
Year: 2008, Rainfall: 108 mm
Year: 2009, Rainfall: 109 mm
Year: 2010, Rainfall: 110 mm
Year: 2011, Rainfall: 111 mm
Year: 2012, Rainfall: 112 mm
Year: 2013, Rainfall: 113 mm
Year: 2014, Rainfall: 114 mm
Year: 2015, Rainfall: 115 mm
Year: 2016, Rainfall: 116 mm
Year: 2017, Rainfall: 117 mm
Year: 2018, Rainfall: 118 mm
Year: 2019, Rainfall: 119 mm
Year: 2020, Rainfall: 120 mm
Year: 2021, Rainfall: 121 mm
Year: 2022, Rainfall: 122 mm
Year: 2023, Rainfall: 123 mm
Year: 2024, Rainfall: 124 mm

--- Rainfall Data Management ---
1. Add or Update Rainfall Data
2. Delete Year Data
```

```
4. Search Rainfall by Year
5. Exit
Enter your choice: 2
Enter year to delete data (2000-2024): 2024
Data for year 2024 deleted.

--- Rainfall Data Management ---
1. Add or Update Rainfall Data
2. Delete Year Data
3. Display All Data
4. Search Rainfall by Year
5. Exit
Enter your choice: 3
Year-wise Rainfall Data (2000-2024):
Year: 2000, Rainfall: 100 mm
Year: 2001, Rainfall: 101 mm
Year: 2002, Rainfall: 102 mm
Year: 2003, Rainfall: 103 mm
Year: 2004, Rainfall: 104 mm
Year: 2005, Rainfall: 105 mm
Year: 2006, Rainfall: 106 mm
Year: 2007, Rainfall: 107 mm
Year: 2008, Rainfall: 108 mm
Year: 2009, Rainfall: 109 mm
Year: 2010, Rainfall: 110 mm
Year: 2011, Rainfall: 111 mm
Year: 2012, Rainfall: 112 mm
Year: 2013, Rainfall: 113 mm
Year: 2014, Rainfall: 114 mm
Year: 2015, Rainfall: 115 mm
Year: 2016, Rainfall: 116 mm
Year: 2017, Rainfall: 117 mm
Year: 2018, Rainfall: 118 mm
Year: 2019, Rainfall: 119 mm
Year: 2020, Rainfall: 120 mm
Year: 2021, Rainfall: 121 mm
Year: 2022, Rainfall: 122 mm
Year: 2023, Rainfall: 123 mm
```

```
2. Delete Year Data
3. Display All Data
4. Search Rainfall by Year
5. Exit
Enter your choice: 1
Enter year (2000-2024): 2024
Enter rainfall amount (in mm): 150
Data updated for year 2024

--- Rainfall Data Management ---
1. Add or Update Rainfall Data
2. Delete Year Data
3. Display All Data
4. Search Rainfall by Year
5. Exit
Enter your choice: 3
Year-wise Rainfall Data (2000-2024):
Year: 2000, Rainfall: 100 mm
Year: 2001, Rainfall: 101 mm
Year: 2002, Rainfall: 102 mm
Year: 2003, Rainfall: 103 mm
Year: 2004, Rainfall: 104 mm
Year: 2005, Rainfall: 105 mm
Year: 2006, Rainfall: 106 mm
Year: 2007, Rainfall: 107 mm
Year: 2008, Rainfall: 108 mm
Year: 2009, Rainfall: 109 mm
Year: 2010, Rainfall: 110 mm
Year: 2011, Rainfall: 111 mm
Year: 2012, Rainfall: 112 mm
Year: 2013, Rainfall: 113 mm
Year: 2014, Rainfall: 114 mm
Year: 2015, Rainfall: 115 mm
Year: 2016, Rainfall: 116 mm
Year: 2017, Rainfall: 117 mm
Year: 2018, Rainfall: 118 mm
Year: 2019, Rainfall: 119 mm
Year: 2020, Rainfall: 120 mm
Year: 2021, Rainfall: 121 mm
Year: 2022, Rainfall: 122 mm
Year: 2023, Rainfall: 123 mm
Year: 2024, Rainfall: 150 mm
```

```
--- Rainfall Data Management ---
1. Add or Update Rainfall Data
2. Delete Year Data
3. Display All Data
4. Search Rainfall by Year
5. Exit
Enter your choice: 4
Enter year to search rainfall data (2000-2024): 2010
Year: 2010, Rainfall: 110 mm

--- Rainfall Data Management ---
1. Add or Update Rainfall Data
2. Delete Year Data
3. Display All Data
4. Search Rainfall by Year
5. Exit
Enter your choice: 5
Exiting program.
```

Conclusion:-

We implemented Dictionary for the rainfall data for the past 24 years .

PostLab Questions:

1) **List the main functions or methods you implemented in your dictionary. What is the purpose of each?**

   Add or Update Rainfall Data: Adds new rainfall data for a given year or updates existing data.

   Delete Year Data: Removes rainfall data for a specified year.

   Display All Data: Shows all stored rainfall data, sorted by year.

   Search Rainfall by Year: Finds and displays rainfall data for a specified year.

   Exit: Exits the program.