CHAPTER 1

INTRODUCTION

1.1 Introduction to Industry

AllSoft Infotech& Multimedia Pvt.Itd, Ujjain. Is a premier institute which provides IT and software skills training in scientific & Engineering field with best quality at lower costs. We are the fastest growing software solution, technical consultancy and knowledge outsourcing company situated in india with offices Ujjain and indore.

Mission:-

Our mission is to complete our social responsibility towards youth and professional and make come true the dream of incredible India with the help of all our efforts and knowledge and make a dynamic youth force to work with our Indian companies. Our company Running these youth development program in many phases it is our first phase to invite MALVA region technically talented youth to come with us and make a big foot step towards the professional world and create a achievement by developing their own skills .We are sure that everyone with us will contribute with full efforts to make our dreams come true as India on top economic democracies!!!

Vision:-

Our vision to run these youth development program is that we want to improve level of knowledge of local youth up to that level that they can able to built their own business or get good jobs and help our nation and society to make a bright future of India .

Introduction to Python

Python is a widely used high-level, general-purpose, interpreted, dynamic programming language. Its design philosophy emphasizes code readability, and its syntax allows programmers to express concepts in fewer lines of code than would be possible in languages such as C++ or Java. The language provides constructs intended to enable clear programs on both a small and large scale. Python supports multiple programming paradigms, including object-oriented, imperative and functional programming or procedural styles. It features a dynamic type system and automatic memory management and has a large and comprehensive standard library. Python interpreters are available for installation on many operating systems, allowing Python code execution on a wide variety of systems.

- **Python is Object-Oriented:** Python supports Object-Oriented style or technique of programming that encapsulates code within objects.

- **Python is a Beginner's Language:** Python is a great language for the beginner-level programmers and supports the development of a wide range of applications from simple text processing to WWW browsers to games.

- **Python is Interpreted:** Python is processed at runtime by the interpreter, you do not need to compile your program before executing it. This is similar to PERL and PHP.

History of Python

- Python was developed by Guido van Rossum in the late eighties and early nineties at the National Research Institute for Mathematics and Computer Science in the Netherlands.

- Python is derived from many other languages, including ABC, Modula-3, C, C++, Algol-68, SmallTalk, and UNIX shell and other scripting languages.

- Python is copyrighted. Like Perl, Python source code is now available under the GNU General Public License (GPL).

- Python is now maintained by a core development team at the institute, although Guido van Rossum still holds a vital role in directing its progress.

Python Features Python's features include:

- **Easy-to-learn:** Python has few keywords, simple structure, and a clearly defined syntax. This allows the student to pick up the language quickly.

- **Easy-to-read:** Python code is more clearly defined and visible to the eyes.

- .**Easy-to-maintain:** Python's source code is fairly easy-to-maintain.

- **A broad standard library:** Python's bulk of the library is very portable and crossplatform compatible on UNIX, Windows, and Macintosh.

- **Interactive Mode:** Python has support for an interactive mode which allows interactive testing and debugging of snippets of code.

- **Portable:** Python can run on a wide variety of hardware platforms and has the same interface on all platforms.

- **Extendable:** You can add low-level modules to the Python interpreter. These modules enable programmers to add to or customize their tools to be more efficient.

- **Databases**: Python provides interfaces to all major commercial databases.

- **GUI Programming**: Python supports GUI applications that can be created and ported to many system calls, libraries and windows systems, such as Windows MFC, Macintosh, and the X Window system of Unix.

- **Scalable:** Python provides a better structure and support for large programs than shell scripting.

1.2 Objective

The purpose of Industrial Training is to expose students to real work of environment experience and at the same time, to gain the knowledge through hands on observation and job execution. From the industrial training, the students will also develop skills in work ethics, communication, management and others. Moreover, this practical training program allows students to relate theoretical knowledge with its application in the manufacturing industry. The objectives of industrial training are:

- To provides students the opportunity to test their interest in a particular career before permanent commitments are made..
- To develop skills in the application of theory to practical work situations.
- To develop skills and techniques directly applicable to their careers.
- Internships will increase a student's sense of responsibility and good work habits.
- To expose students to real work environment experience gain knowledge in writing report in technical works/projects.

- Internship students will have higher levels of academic performance.
- Internship programs will increase student earning potential upon graduation.
- To build the strength, teamwork spirit and self-confidence in students life.
- To enhance the ability to improve students creativity skills and sharing ideas.
- To build a good communication skill with group of workers and learn to learn proper behavior of corporate life in industrial sector.
- The student will be able instilled with good moral values such as responsibility , commitment and trustworthy during their training.

The course is designed to provide Basic knowledge of Python. Python programming is intended for software engineers, system analysts, program managers and user support personnel who wish to learn the Python programming language.Python is the fastest growing programming language globally, mainly due to its simplicity, large community, and wealth of application; including data science and quant finance. Though VBA is more immediately applicable for Excel users, and therefore still very relevant, Python is more globally scalable in terms of its possibilities. Python is faster at complex calculations, can handle huge datasets (big data), has more packages (libraries), and can be used to build standalone or web-based applications, as well as interact with Excel if required. Python is also much friendlier and easier to leam than C++, thus is viewed as a language suitable for beginners and advanced programmers alike.

The objective of this course is to get comfortable with the main elements of Python programming. Day one is about acquiring a suite of Python language skills via small exercises concerning stock ticker lists, client databases, basic statistics and other fun topics such as email address, usernames and passwords. Day two further applies python and python packages to the world of finance. On this day, we conduct some data science projects.

The learning objectives of this internship are:

- Master the fundamentals of writing Python scripts
- Learn core Python scripting elements such as variables and flow control structures
- Discover how to work with lists and sequence data
- Write Python functions to facilitate code reuse
- Use Python to read and write files
- Make their code robust by handling errors and exceptions properly
- Work with the Python standard library
- Explore Python's object-oriented features
- Search text using regular expressions

1.3 Tools and Technology used

There are various tools and technologies used in internship to accomplish successful knowledge. These tools and technologies are given below:

NumPy

NumPy is a Python library.NumPy is used for working with arrays.NumPy is short for "Numerical Python".NumPy's main object is the homogeneous multidimensional array.

- It is a table of elements (usually numbers), all of the same type, indexed by a tuple of positive integers.
- In NumPy dimensions are called *axes*. The number of axes is *rank*.
- NumPy's array class is called **ndarray**. It is also known by the alias **array**.

Pandas

Pandas is a Python library used for working with data sets.It has functions for analyzing, cleaning, exploring, and manipulating data. The name "Pandas" has a reference to both "Panel Data", and "Python Data Analysis" and was created by Wes McKinney in 2008.

Why Use Pandas?

- Pandas allows us to analyze big data and make conclusions based on statistical theories.
- Pandas can clean messy data sets, and make them readable and relevant.
- Relevant data is very important in data science.

SciPy

SciPy is a scientific computation library that uses NumPy underneath. SciPy stands for Scientific Python. It provides more utility functions for optimization, stats and signal processing.Like NumPy, SciPy is open source so we can use it freely.SciPy was created by NumPy's creator Travis Olliphant.

Why Use SciPy?

- If SciPy uses NumPy underneath, why can we not just use NumPy?
- SciPy has optimized and added functions that are frequently used in NumPy and Data Science.

Matplotlib

Matplotlib is a low level graph plotting library in python that serves as a visualization utility.Matplotlib was created by John D. Hunter.Matplotlib is open source and we can use it freely.Matplotlib is mostly written in python, a few segments are written in C, Objective-C and Javascript for Platform compatibility.

CHAPTER 2

TRAINING WORK UNDERTAKEN

2.1 Python

Python is a computer programming language often used to build websites and software, automate tasks, and conduct data analysis. Python is a general purpose language, meaning it can be used to create a variety of different programs and isn't specialized for any specific problems. This versatility, along with its beginner-friendliness, has made it one of the most-used programming languages today. A survey conducted by industry analyst firm RedMonk found that it was the most popular programming language among developers in 2021.

It is used for:

- **Web development (server-side)**
  Python is often used to develop the back end of a website or application—the parts that a user doesn't see. Python's role in web development can include sending data to and from servers, processing data and communicating with databases, URL routing, and ensuring security. Python offers several frameworks for web development. Commonly used ones include Django and Flask.

- **Software testing and prototyping**
  In software development, Python can aid in tasks like build control, bug tracking, and testing. With Python, software developers can automate testing for new products or features. Some Python tools used for software testing include Green and Requestium.

- **System Scripting**
  If you find yourself performing a task over and over again, you could work more efficiently by automating it with Python. Writing code used to build these automated processes is called scripting. In the coding world, automation can be used to check for errors across multiple files, convert files, execute simple math, and remove duplicates in data.

Built-in Data Types

In programming, data type is an important concept.Variables can store data of different types, and different types can do different things.Python has the following data types built-in by default, in these categories:

Name	Type	Description
Integers	int	Whole numbers, such as: 3 300 200
Floating point	float	Numbers with a decimal point: 2.3 4.6 100.0
Strings	str	Ordered sequence of characters: "hello" 'Sammy' "2000" "楽しい"
Lists	list	Ordered sequence of objects: [10,"hello",200.3]
Dictionaries	dict	Unordered Key:Value pairs: {"mykey" : "value" , "name" : "Frankie"}
Tuples	tup	Ordered immutable sequence of objects: (10,"hello",200.3)
Sets	set	Unordered collection of unique objects: {"a","b"}
Booleans	bool	Logical value indicating **True** or **False**

Table 2.1 Data types in python

In this Training we learn:

1. Introduction to Python Programming
    - Why do we need Python?
    - Program structure in Python

2. Execution steps
    - Interactive Shell
    - Executable or script files.
    - User Interface or IDE # Memory management and Garbage collections
    - Object creation and deletion
    - Object properties

3. Data Types and Operations
    - Numbers
    - Strings • List
    - Tuple
    - Dictionary
    - Other Core Types

4. Statements and Syntax in Python
    - Assignments, Expressions and prints
    - If tests and Syntax Rules

- While and For Loops
- Iterations and Comprehensions

5. File Operations
    - Opening a file
    - Using Files
    - Other File tools

6. Functions in Python
    - Function definition and call
    - Function Scope
    - Arguments
    - Function Objects
    - Anonymous Functions

7. Modules and Packages
    - Module Creations and Usage
    - Module Search Path
    - Module Vs. Script
    - Package Creation and Importing PYTHON internship Training Program

8. Classes in Python
    - Classes and instances
    - Classes method calls
    - Inheritance and Compositions
    - Static and Class Methods
    - Bound and Unbound Methods
    - Operator Overloading
    - Polymorphism

9. Exception Handling in Python Programming
    - Default Exception Handler
    - Catching Exceptions

2.1.1 Python Libraries

Numpy

NumPy is the fundamental package for scientific computing in Python. It is a Python library that provides a multidimensional array object, various derived objects (such as masked arrays and matrices), and an assortment of routines for fast operations on arrays, including mathematical, logical, shape manipulation, sorting, selecting, I/O, discrete Fourier transforms, basic linear algebra, basic statistical operations, random simulation and much more

- NumPy arrays have a fixed size at creation, unlike Python lists (which can grow dynamically). Changing the size of an ndarray will create a new array and delete the original.
- The elements in a NumPy array are all required to be of the same data type, and thus will be the same size in memory. The exception: one can have arrays of (Python, including NumPy) objects, thereby allowing for arrays of different sized elements.
- NumPy arrays facilitate advanced mathematical and other types of operations on large numbers of data. Typically, such operations are executed more efficiently and with less code than is possible using Python's built-in sequences.
- A growing plethora of scientific and mathematical Python-based packages are using NumPy arrays; though these typically support Python-sequence input, they convert such input to NumPy arrays prior to processing, and they often output NumPy arrays. In other words, in order to efficiently use much (perhaps even most) of today's scientific/mathematical Python-based software, just knowing how to use Python's built-in sequence types is insufficient - one also needs to know how to use NumPy arrays.

Matplotlib

Matplotlib is a plotting library available for the Python programming language as a component of NumPy, a big data numerical handling resource. Matplotlib uses an object oriented API to embed plots in Python applications Since Python is widely used in machine learning, resources like NumPy and matplotlib are often useful in modeling machine learning technologies. The idea is that programmers access these libraries for key tasks inside of a broader Python environment, and integrate the results with all of the other elements and features of a machine learning program, a neural network or some other advanced machine. The utility of NumPyand matplotlib have to do with numbers — the utility of matplotlib specifically has to do with visual plotting tools. So in asense, these resources aremoreanalytical than generative. However, all of this infrastructure works together to allow the machine learning programs to produce results that are useful to human handlers.

- Create publication quality plots.
- Make interactive figures that can zoom, pan, update.
- Customize visual styleand layout.
- Export to many file formats.
- Embed inJupyterLab and Graphical User Interfaces.

- Use a rich array oftjird-party packages built on Matplotlib.

Linestyle

We can use the keyword argument linestyle, or shorter ls, to change the style of the plotted line:

```
import matplotlib.pyplot as plt
import numpy as np
ypoints = np.array([3, 8, 1, 10])
plt.plot(ypoints, linestyle = 'dotted')
plt.show()
```

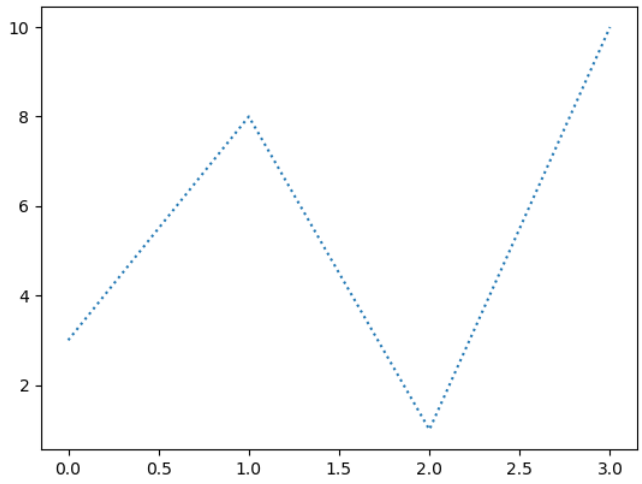


Figure 2.1 Linestyle plotting using matplot lib

2.1.2 Visual Studio Code

Visual Studio is an Integrated Development Environment (IDE) developed by Microsoft to develop GUI (Graphical User Interface), console, Web applications, web apps, mobile apps, cloud, and web services, etc. With the help of this IDE, you can create managed code as well as native code. It uses the various platforms of Microsoft software development software like Windows store, Microsoft Silverlight, and Windows API, etc. It is not a language-specific IDE as you can use this to write code in C#, C++, VB(Visual Basic), Python, JavaScript, and many more languages.

Some of its key features it offers are:

- Visual Studio Code has a powerful command line interface that let us control how we launch the editor. We can open different files, install extensions, and even change the display language at the startup.
- VS Code is equally accessible from the keyboard. The most important key combination to know is Ctrl+Shift+P, which brings up the Command Palette. From here, you would have access to all of the functionality of VS Code, including keyboard shortcuts for the most common operations.
- Visual Studio Code comes with Git integration that allows you to commit, pull, and push your code changes to a remote Git repository.
- If we want to persist the new language mode for that file type, we can use the Configure File Association for command to associate the current file extension with an installed language.

CHAPTER 3

RESULTS AND DISCUSSION

3.1 Results

The industrial training completed in 'python' and after it final project motivate in 'Weather Forecasting'. The main purpose of this project is to provide weather information in visualize form. Having visualization give the better way to understand data. This project also encompasses the usage of Streamlit, a low code front end for Data Scientists.

We look at weather data and the future predicted the weather to plan our days accordingly. Having visualizations helps us understand that data better. Developing this project using the Streamlit library we can create a responsive front-end which gives us more time to work on the actual back-end and the services we aim to provide. This project is a good start for beginners in python and it gives a basic understanding of how to use APIs and related python frameworks.

3.1.1 Project Stages

Figure 3.1 Project stages

High Level Approach

- Setting up the Project environment
- Making the Streamlit front end
- Fetching the data from API calls
- Making the Data visualizations
- Adding other weather updates

Task 1

Creating basic Streamlit layout

Requirements

Import relevant libraries as shown below:

```
import os
import pytz
import pyowm
import streamlit as st
from matplotlib import dates
from datetime import datetime
from matplotlib import pyplot as plt
```

Get the api key from the OpenWeatherMap website and use it as follows

```
owm=pyowm.OWM('your-api-key')
mgr=owm.weather_manager()
```

For the streamlit frontend we will need a title and a placeholder text:

```
st.title("5 Day Weather Forecast")
st.write("### Write the name of a City and select the Temperature Unit and
Graph Type from the sidebar")
```

Now we will input the city name and using store it in a variable called the place

```
place=st.text_input("NAME OF THE CITY :", "")

if place == None:
   st.write("Input a CITY!")
```

```
unit=st.selectbox("Select Temperature Unit",("Celsius","Fahrenheit"))

g_type=st.selectbox("Select Graph Type",("Line Graph","Bar Graph"))
```

To run the code:

```
streamlit run <filename>
```

Task 2

Fetching the API data

Now that our front-end is done we need to fetch the data using the PyOWM API so that we can visualize it.

Task 3

Plot the Temperature

Now that we have a function to retrieve the weather, we're ready for the fun part, plotting the temperature!

Task 4

Adding the additional weather updates

Now that we have a function to plot the weather data, we can now include details like the impending weather changes, cloud coverage, wind speed, and sunrise and sunset times.

Requirements

Python Open Weather Map provides methods to check for certain weather conditions in a forecast. The following methods are available:

```
will_have_rain()
will_have_clear()
will_have_fog()
will_have_clouds()
will_have_snow()
will_have_storm()
will_have_tornado()
will_have_hurricane()
```

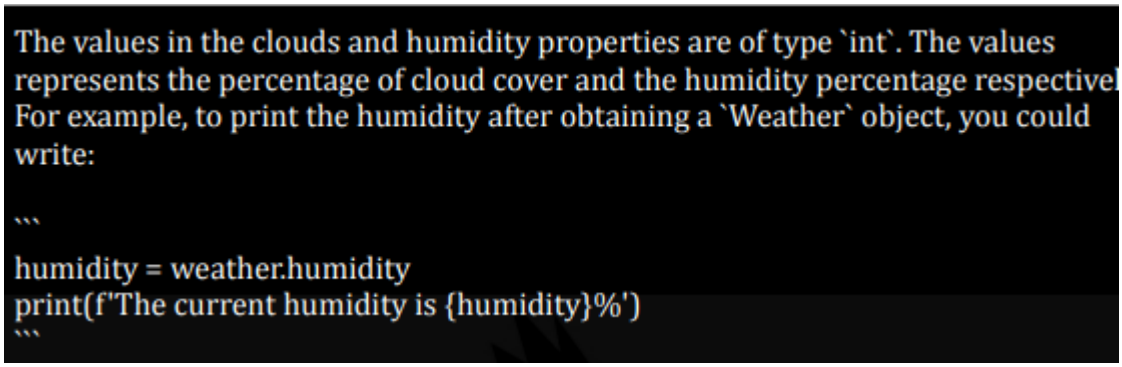
For example, the following snippet checks if there is rain in this week's forecast for LA:

```
forecaster = mgr.forecast_at_place('Los Angeles, US', '3h')
print(forecaster.will_have_rain())
```

Knowing what time the sun rises and sets is great information to have when planning your day! Let's see how we can get these times using PyOWM. sunrise_time(): Returns the GMT time of sunrise sunset_time(): Returns the GMT time of sunset For example :

```
print(weather.sunrise_time())
```

PyOWM gives you access to other weather information in addition to the temperature. Some of the information you can get about is: ○ wind ○ clouds ○ humidity



All we have to do is to integrate all these functions into the main file.

3.1.2 Discussion

These training enhanced understanding of my academic knowledge and skills. It indeed polished my knowledge and experience. Classroom studies are confined only to books and theoretical learning majorly. Application of these theories and lectures delivered in classrooms differ a little from the specifically set format.Through this internship, I not only got the opportunity to experience but I also leamt the applications of these programming in actual the application. I got to observe the whole python working. I was able to understand the basic concepts of python django and database connectivity much better than before. It also improved my general knowledge about python commonly used in our industries.Not only technical students,non technical students also easily work on python programming language

The constructs of this language make it easier for a non-technical person to grab it and is definitely one of the easiest programming languages to learn. Even the learners from a non-technical background are taking a liking to the language.If we are a non-programmer, python could be our starting point as it is on the top of the top programming languages of the 2020 list and is also the easiest to learn. If you know any other programming languages, learning Python will be a breeze for us.

CHAPTER 4

CONCLUSION AND FUTURE SCOPE

4.1 CONCLUSION

This internship has been a very useful experience for us. We can safely say that our understanding of the job environment has increased greatly.We believe that time spent in research and discovering was well worth it. Two main things that we have learned are proper time management and self motivation. All we can say is that, this internship has brought a new flavor of study and has developed more interest in learning the web concepts and trying to implement it in real life. It also enables us to create python project from our own. This, our second internship, will be more memorable because of our trainer. Effortful job was done by the trainer and the way he trained is appreciable. We would like to thanks everyone who has made this internship a superb experience.

In a nutshell, this internship has been an excellent and rewarding experience. We can conclude that their have been a lot we have learn from this internship. We learnt a lot of concepts in a very short period. during the whole internship mainly we learn three things that is practical knowledge , self motivation and time-management. We have gained lots of experience and knowledge needed to be successful in great engineering challenges; we achieved several of our learning goals and had got insight into professional practice. We are thanking full to Allsoft infotech for presenting us a chances of achieving practical knowledge about python.

4.2 FUTURE SCOPE

This internship has brought a new flavor of study and has developed more interest in learning the web concepts and trying to implement it in real life. It also enables us to create python project from our own.Python growth is promising in future. Top companies stuck with java, python trending technologies now and also in future. As a result of fact, python has become a core language, using python for research, production, development. Small, big, start-up organizations choose python to meet their customer requirements. Python has been voted as a favorite language rather than c, c ++, machine learning course, learn r programming.To write scripts, testing mobile devices it is the most demandable language in IT industry. Python just the great tool at large scale. Companies in India, us expecting highly skilled python developers for their companies. Statistics show that continuous rise in salaries for python developers. Python offers excellent management memory.

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Appendix A

Screenshots

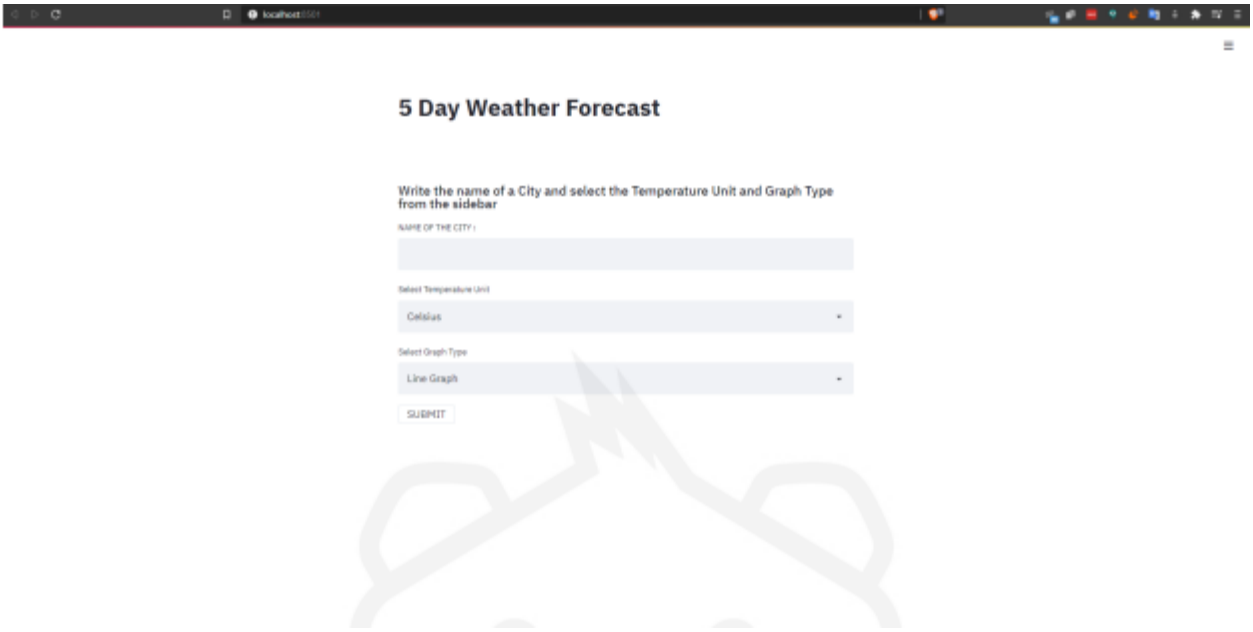

Figure A.1: Home Page

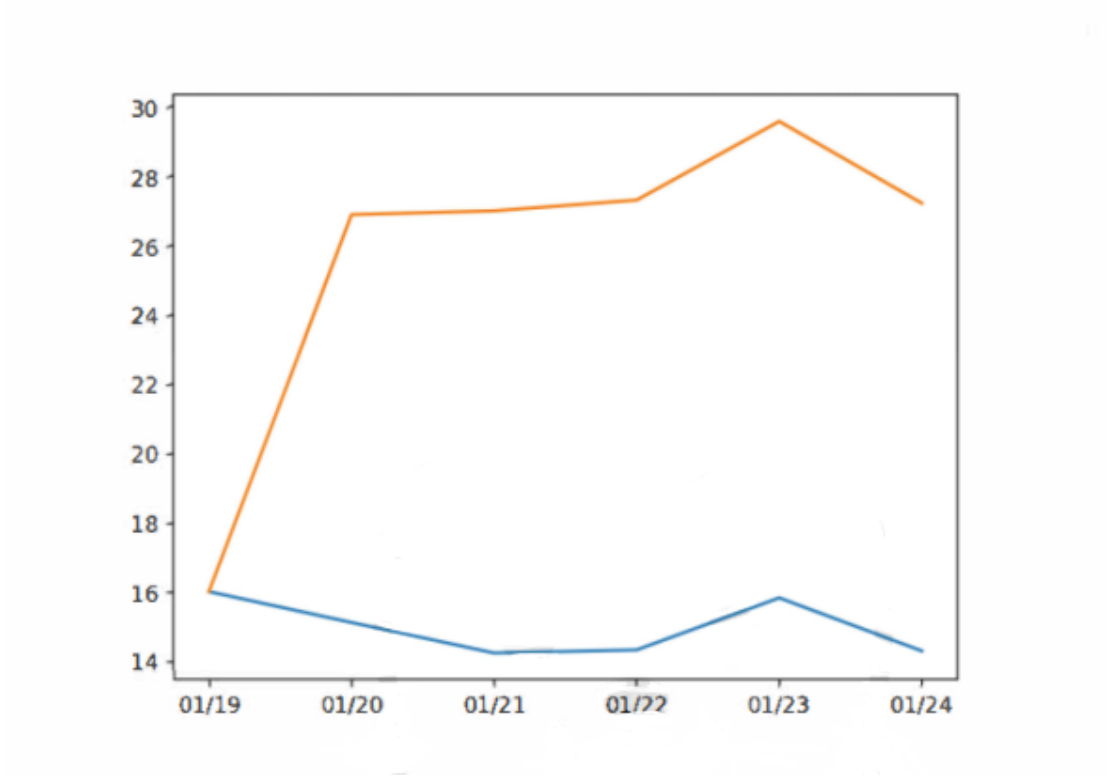

Figure A.2: Line graph

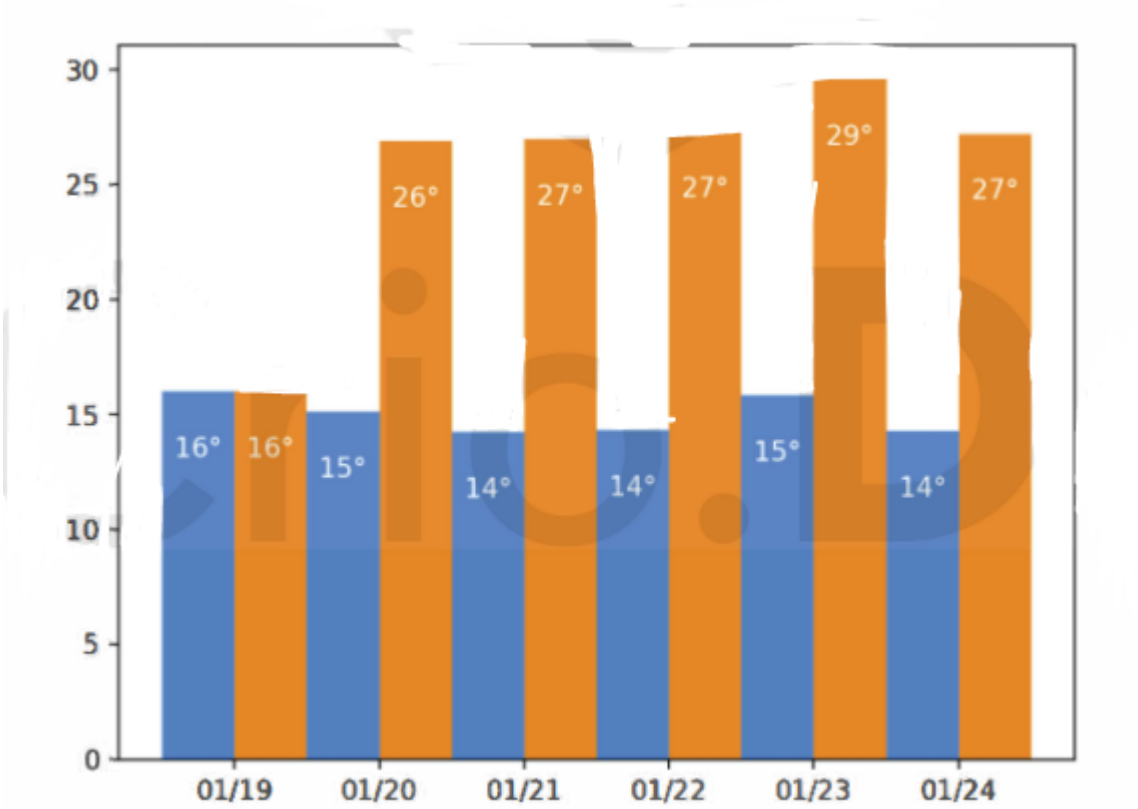

Figure A.3: Graph Plot between Date and temperature

Impending Temperature Changes :

Clear Weather!

Cloud coverage and wind speed

The current cloud coverage for Indore is 0 %

The current wind speed for Indore is 2.06 mph

Sunrise and Sunset Times :

Sunrise time in Indore is 2021-01-20 01:38:53+00

Sunset time in Indore is 2021-01-20 12:36:03+00

Figure A.4: Output