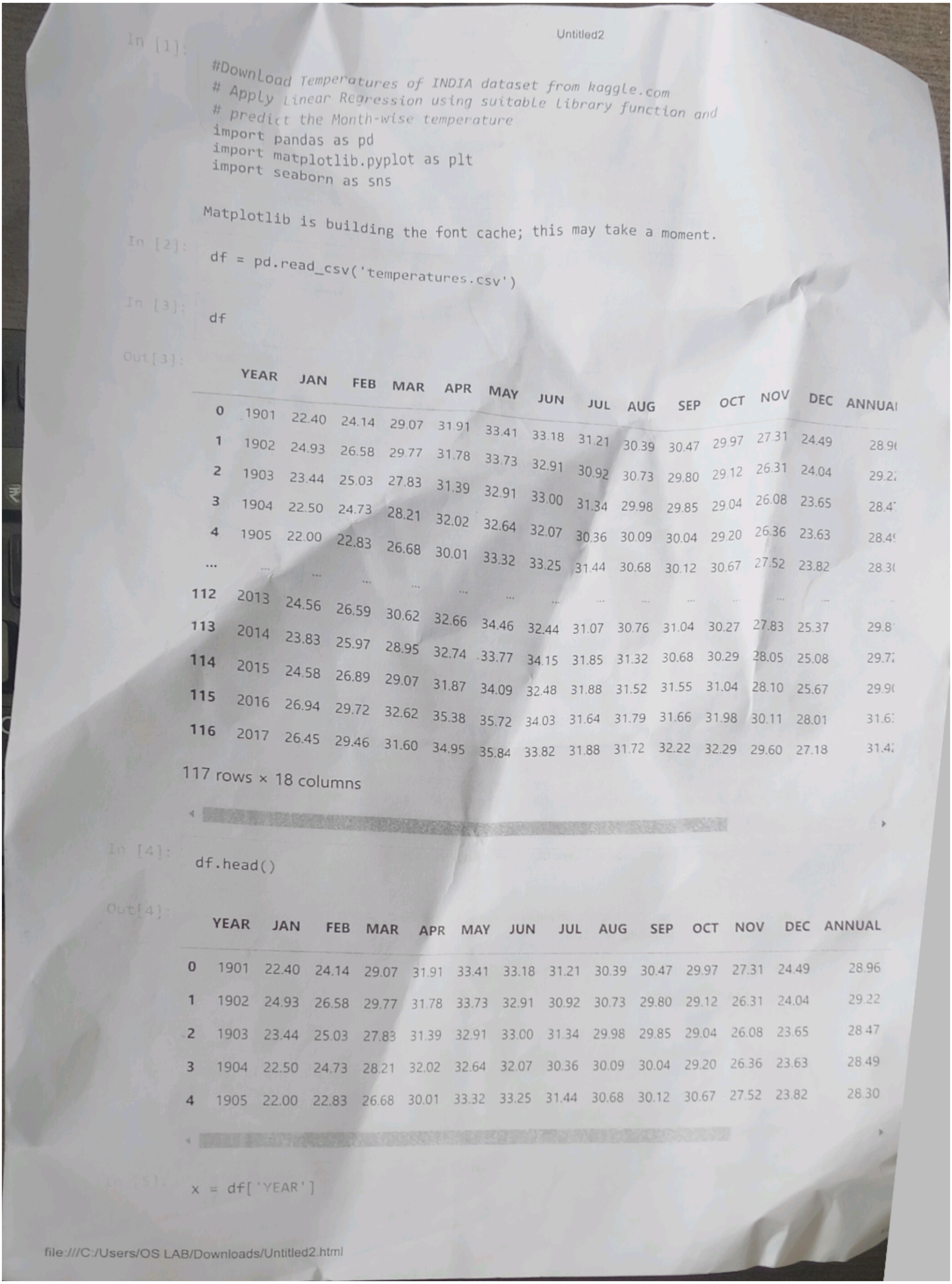


In [1]:

```
#Download Temperatures of INDIA dataset from kaggle.com
# Apply Linear Regression using suitable library function and
# predict the Month-wise temperature
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
```

```
Matplotlib is building the font cache; this may take a moment.
```

In [2]:

```
df = pd.read_csv('temperatures.csv')
```

In [3]:

```
df
```

Out[3]:

	YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUA
0	1901	22.40	24.14	29.07	31.91	33.41	33.18	31.21	30.39	30.47	29.97	27.31	24.49	28.9
1	1902	24.93	26.58	29.77	31.78	33.73	32.91	30.92	30.73	29.80	29.12	26.31	24.04	29.2
2	1903	23.44	25.03	27.83	31.39	32.91	33.00	31.34	29.98	29.85	29.04	26.08	23.65	28.4
3	1904	22.50	24.73	28.21	32.02	32.64	32.07	30.36	30.09	30.04	29.20	26.36	23.63	28.4
4	1905	22.00	22.83	26.68	30.01	33.32	33.25	31.44	30.68	30.12	30.67	27.52	23.82	28.3
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
112	2013	24.56	26.59	30.62	32.66	34.46	32.44	31.07	30.76	31.04	30.27	27.83	25.37	29.8
113	2014	23.83	25.97	28.95	32.74	33.77	34.15	31.85	31.32	30.68	30.29	28.05	25.08	29.7
114	2015	24.58	26.89	29.07	31.87	34.09	32.48	31.88	31.52	31.55	31.04	28.10	25.67	29.9
115	2016	26.94	29.72	32.62	35.38	35.72	34.03	31.64	31.79	31.66	31.98	30.11	28.01	31.6
116	2017	26.45	29.46	31.60	34.95	35.84	33.82	31.88	31.72	32.22	32.29	29.60	27.18	31.4

117 rows × 18 columns

In [4]:

```
df.head()
```

Out[4]:

	YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
0	1901	22.40	24.14	29.07	31.91	33.41	33.18	31.21	30.39	30.47	29.97	27.31	24.49	28.96
1	1902	24.93	26.58	29.77	31.78	33.73	32.91	30.92	30.73	29.80	29.12	26.31	24.04	29.22
2	1903	23.44	25.03	27.83	31.39	32.91	33.00	31.34	29.98	29.85	29.04	26.08	23.65	28.47
3	1904	22.50	24.73	28.21	32.02	32.64	32.07	30.36	30.09	30.04	29.20	26.36	23.63	28.49
4	1905	22.00	22.83	26.68	30.01	33.32	33.25	31.44	30.68	30.12	30.67	27.52	23.82	28.30

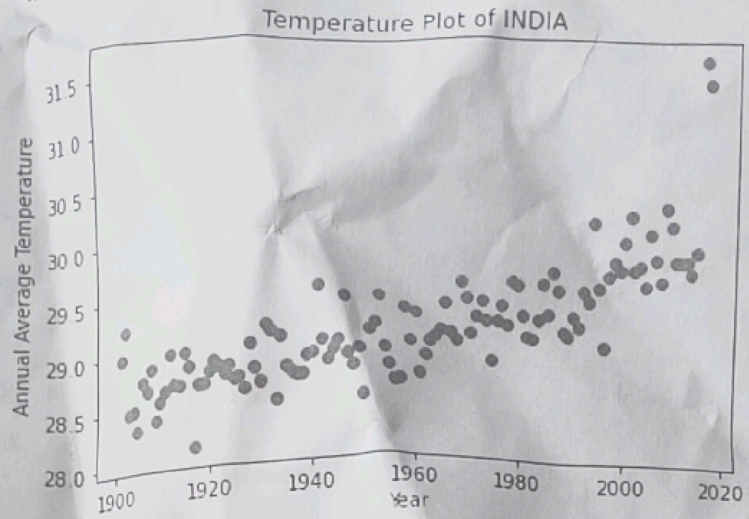
In [5]:

```
x = df['YEAR']
```

```
In [6]:  y = df['ANNUAL']
```

```
In [8]:  #plt.figure(figsize=(16,9))
         plt.title('Temperature Plot of INDIA')
         plt.xlabel('Year')
         plt.ylabel('Annual Average Temperature')
         plt.scatter(x,y)
```

```
Out[8]:  <matplotlib.collections.PathCollection at 0x14c7bb7fdc0>
```



```
In [10]:  x = x.values
```

```
In [11]:  x = x.reshape(117,1)
```

```
In [12]:  x.shape
```

```
Out[12]:  (117, 1)
```

```
In [17]:  from sklearn.linear_model import LinearRegression
```

```
In [18]:  #Now we are going to train regression model of M/c Learning
          regressor = LinearRegression()
```

```
In [19]:  regressor.fit(x,y)
          #Model done
```

```
Out[19]:  LinearRegression()
```

```
In [20]:  #Now we will find 'm' value from y = mx + c
          regressor.coef_
```

```
Out[20]:  array([0.01312158])
```

```
In [21]:  #Now we will find 'c' value from y = mx + c
          regressor.intercept_

Out[21]:  3.4761897126187016

In [25]:  regressor.predict([[2120]])

Out[25]:  array([31.29394211])

In [30]:  # Assess the performance of regression models using MSE, MAE and R-Square metrics
          predicted = regressor.predict(x)

In [27]:  predicted

Out[27]:  array([28.4203158 , 28.43343739, 28.44655897, 28.45968055, 28.47280213,
                 28.48592371, 28.49904529, 28.51216687, 28.52528846, 28.53841004,
                 28.55153162, 28.5646532 , 28.57777478, 28.59089636, 28.60401794,
                 28.61713952, 28.63026111, 28.64338269, 28.65650427, 28.66962585,
                 28.68274743, 28.69586901, 28.70899059, 28.72211218, 28.73523376,
                 28.74835534, 28.76147692, 28.7745985 , 28.78772008, 28.80084166,
                 28.81396324, 28.82708483, 28.84020641, 28.85332799, 28.86644957,
                 28.87957115, 28.89269273, 28.90581431, 28.91893589, 28.93205748,
                 28.94517906, 28.95830064, 28.97142222, 28.9845438 , 28.99766538,
                 29.01078696, 29.02390855, 29.03703013, 29.05015171, 29.06327329,
                 29.07639487, 29.08951645, 29.10263803, 29.11575961, 29.1288812 ,
                 29.14200278, 29.15512436, 29.16824594, 29.18136752, 29.1944891 ,
                 29.20761068, 29.22073227, 29.23385385, 29.24697543, 29.26009701,
                 29.27321859, 29.28634017, 29.29946175, 29.31258333, 29.32570492,
                 29.3388265 , 29.35194808, 29.36506966, 29.37819124, 29.39131282,
                 29.4044344 , 29.41755599, 29.43067757, 29.44379915, 29.45692073,
                 29.47004231, 29.48316389, 29.49628547, 29.50940705, 29.52252864,
                 29.53565022, 29.5487718 , 29.56189338, 29.57501496, 29.58813654,
                 29.60125812, 29.6143797 , 29.62750129, 29.64062287, 29.65374445,
                 29.66686603, 29.67998761, 29.69310919, 29.70623077, 29.71935236,
                 29.73247394, 29.74559552, 29.7587171 , 29.77183868, 29.78496026,
                 29.79808184, 29.81120342, 29.82432501, 29.83744659, 29.85056817,
                 29.86368975, 29.87681133, 29.88993291, 29.90305449, 29.91617608,
                 29.92929766, 29.94241924])

In [28]:  y

Out[28]:  0      28.96
          1      29.22
          2      28.47
          3      28.49
          4      28.30
                 ...
          112    29.81
          113    29.72
          114    29.90
          115    31.63
          116    31.42
          Name: ANNUAL, Length: 117, dtype: float64

In [32]:  # Mean Absolute Error
          import numpy as np
```

Guidelines for Laboratory Conduction

1. All the assignments should be implemented using python programming language
2. Implement any 4 assignments out of 6
3. Assignment number 4 is compulsory
4. The instructor is expected to frame the assignments by understanding the prerequisites, technological aspects, utility and recent trends related to the topic.
5. The instructor may frame multiple sets of assignments and distribute them among batches of students.
6. All the assignments should be conducted on multicore hardware and 64-bit open-sourcesoftware

Guidelines for Practical Examination

1. Both internal and external examiners should jointly set problem statements for practical examination. During practical assessment, the expert evaluator should give the maximum weightage to the satisfactory implementation of the problem statement.
2. The supplementary and relevant questions may be asked at the time of evaluation to judge the student 's understanding of the fundamentals, effective and efficient implementation.
3. The evaluation should be done by both external and internal examiners.

List of Laboratory Assignments

Group A

1. **Assignment on Regression technique**

   Download temperature data from below link. https://www.kaggle.com/venky73/temperatures-of-india?select=temperatures.csv

   This data consists of temperatures of INDIA averaging the temperatures of all places month wise. Temperatures values are recorded in CELSIUS

   A. Apply Linear Regression using suitable library function and predict the Month-wise temperature.

   B. Assess the performance of regression models using MSE, MAE and R-Square metrics

   C. Visualize simple regression model.

2. **Assignment on Classification technique**

   Every year many students give the GRE exam to get admission in foreign Universities. The data set contains GRE Scores (out of 340), TOEFL Scores (out of 120), University Rating (out of 5), Statement of Purpose strength (out of 5), Letter of Recommendation strength (out of 5), Undergraduate GPA (out of 10), Research Experience (0=no, 1=yes), Admitted (0=no, 1=yes). Admitted is the target variable.

   Data Set Available on kaggle (The last column of the dataset needs to be changed to 0 or 1)Data Set : https://www.kaggle.com/mohansacharya/graduate-admissions

   The counselor of the firm is supposed check whether the student will get an admission or not based on his/her GRE score and Academic Score. So to help the counselor to take appropriate decisions build a machine learning model classifier using Decision tree to predict whether a student will get admission or not.

   Apply Data pre-processing (Label Encoding, Data Transformation….) techniques if necessary.

Perform data-preparation (Train-Test Split)