task_1

June 1, 2022

1 A Jupyter notebook for first task with Jupyter

Load the libraries and define first functions

[26]:
```
import matplotlib.pyplot as plt
import numpy as np
import pandas as pd
```

[27]:
```
def get_df(year):
    return pd.read_csv('00_sources/Environmental_Data_Deep_Moor_{}.csv'.
 ↪format(year))
```

[30]:
```
def monthly_avg_calc(month, column):
    return df[df['date'].str.contains('201[2345]_[0]?' + str(month))][column].
 ↪mean()
```

[32]:
```
def yearly_avg(category):
    return list(map(lambda m: monthly_avg_calc(m, category), range(1,13)))
```

Start creating first charts

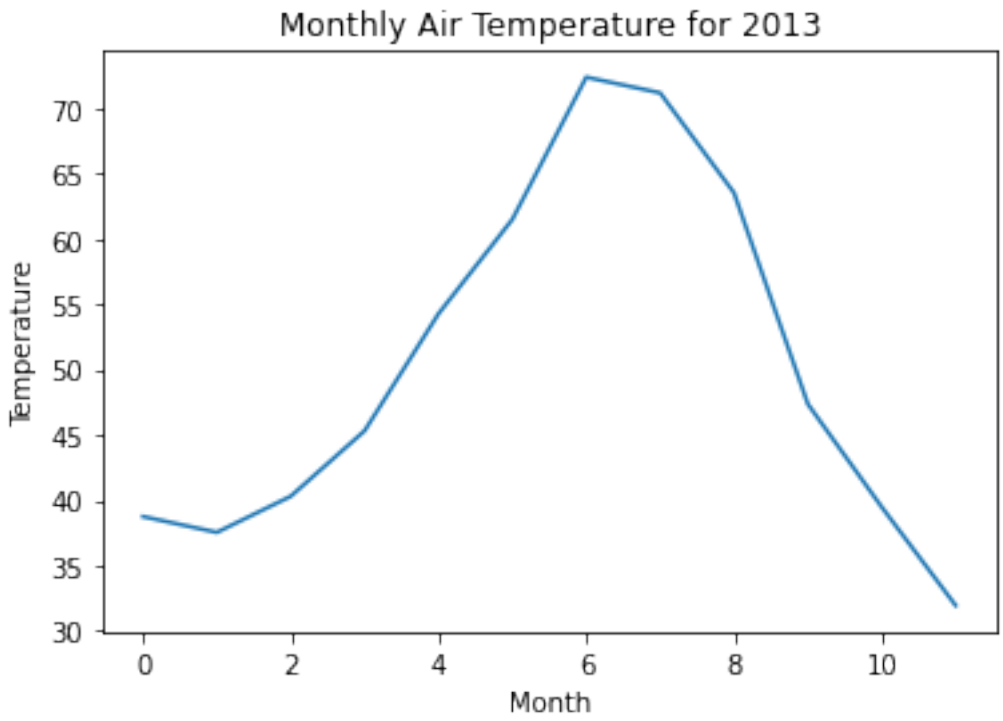
1.1 Monthly air temperature for Year 2013

read the data .csv file for Year 2013

[41]:
```
df = get_df('2013')
```

generate plot based on 2013 data

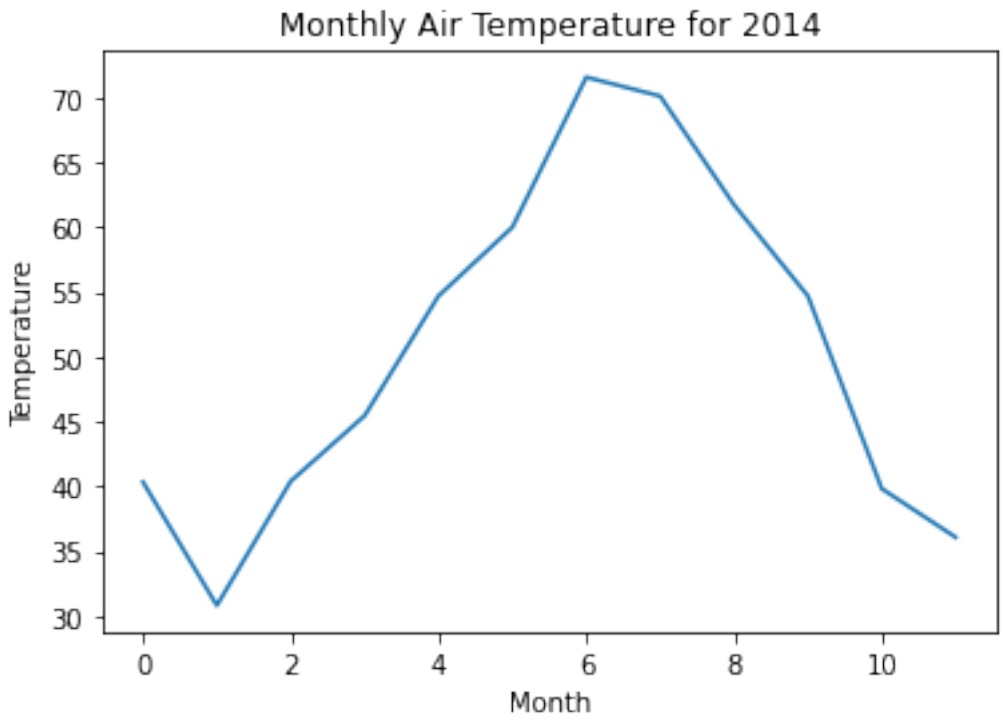
[40]:
```
plt.plot(yearly_avg('Air_Temp'))
plt.title('Monthly Air Temperature for 2013')
plt.xlabel('Month')
plt.ylabel('Temperature')
plt.show()
```



1.2 Monthly air temperature for Year 2014

[44]:
```
df = get_df('2014')
```

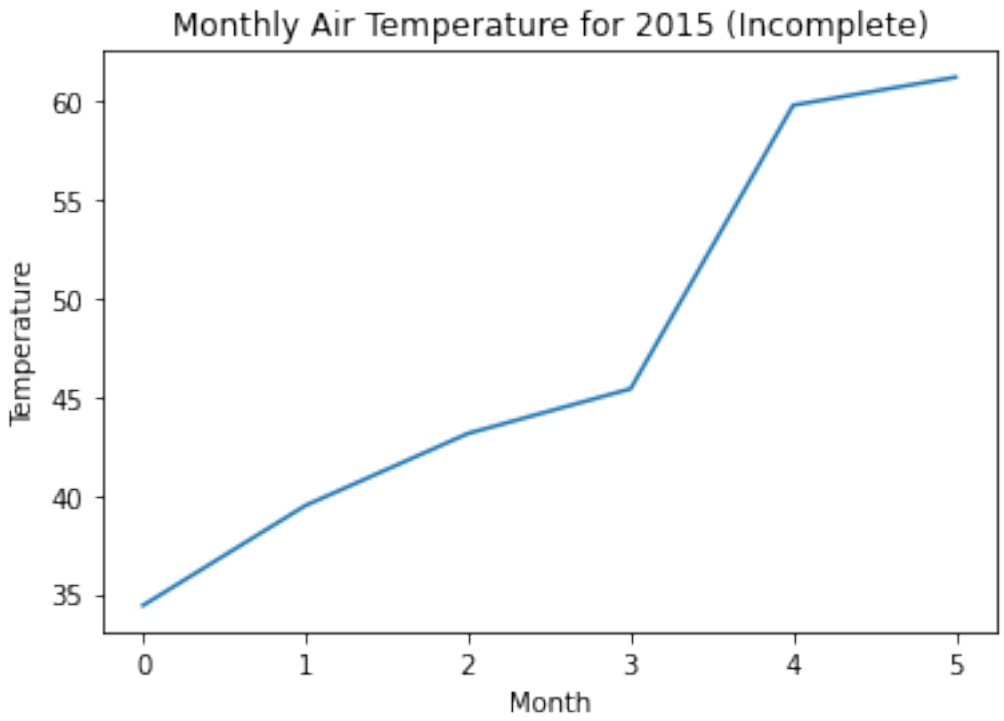
[45]:
```
plt.plot(yearly_avg('Air_Temp'))
plt.title('Monthly Air Temperature for 2014')
plt.xlabel('Month')
plt.ylabel('Temperature')
plt.show()
```



1.3 Monthly air temperature for Year 2015

[46]:
```
df = get_df('2015')
```

[48]:
```
plt.plot(yearly_avg('Air_Temp'))
plt.title('Monthly Air Temperature for 2015 (Incomplete)')
plt.xlabel('Month')
plt.ylabel('Temperature')
plt.show()
```



*The data is not full for year 2015 hence the lower average

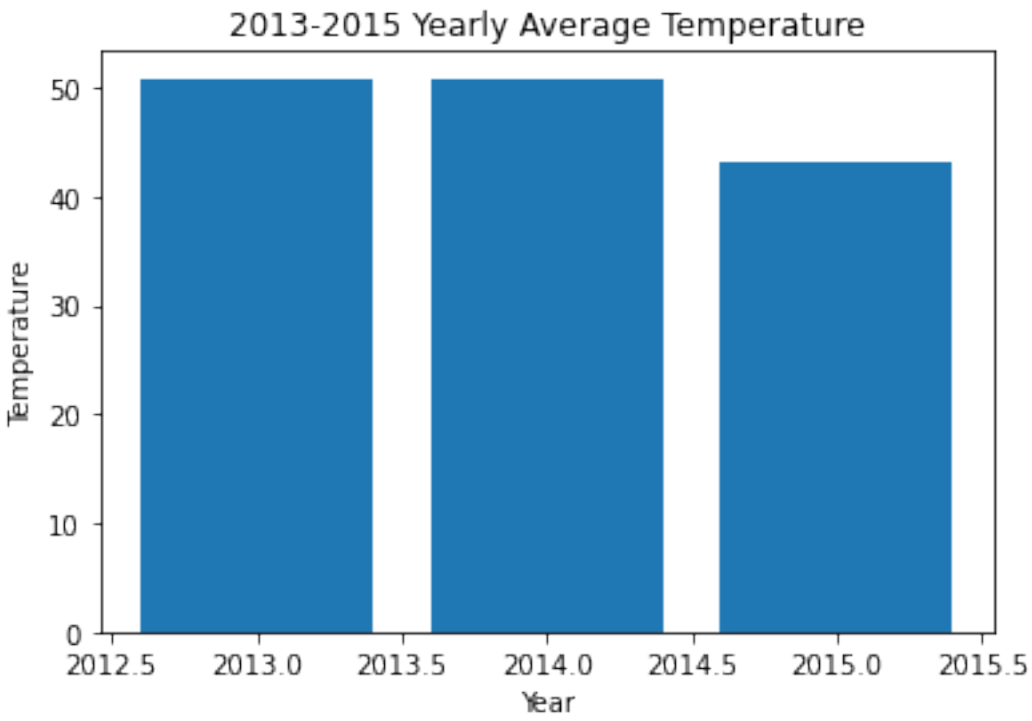
1.4 2013-2015 Yearly Average Temperature Bar Chart

[94]:
```
def get_years(years):
    full_period=[];
    for i in years:
        df = get_df(i)
        full_period.append(df)
    return full_period

years = [2013, 2014, 2015]


heights = [year['Air_Temp'].mean() for year in full_period]

plt.bar(years, heights)
plt.title('2013-2015 Yearly Average Temperature')
plt.xlabel('Year')
plt.ylabel('Temperature')
plt.show()
```



*The data is not full for year 2015 hence the lower average

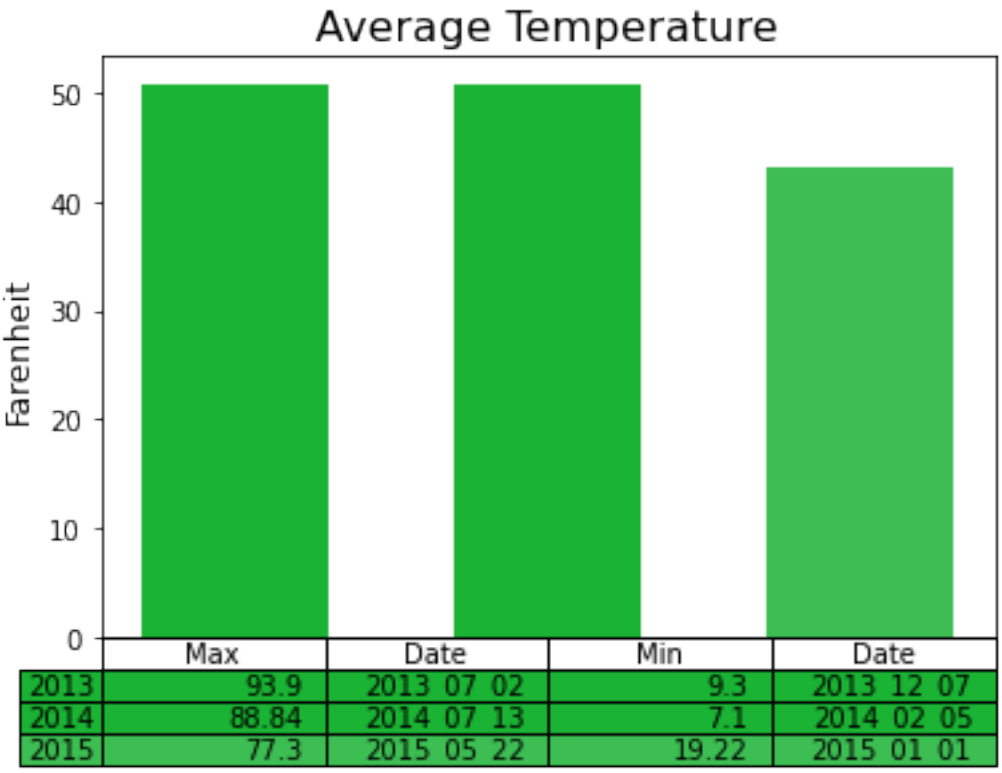
[95]:
```
def max_temp(s):
    return s[s['Air_Temp']==s['Air_Temp'].max()]
def min_temp(s):
    return s[s['Air_Temp']==s['Air_Temp'].min()]
```

[96]:
```
def min_man_temps(arr):
    return [(max_temp(s)['Air_Temp'].values[0],
             max_temp(s)['date'].values[0],
             min_temp(s)['Air_Temp'].values[0],
             min_temp(s)['date'].values[0]
        ) for s in get_years(arr)]
```

[97]:
```
alphas = [height/max(heights) for height in heights]
colors = [(.1,.7,.2,a) for a in alphas]
plt.bar(years, heights, .6, color=colors)
plt.ylabel('Farenheit', fontsize=12)
plt.title('Average Temperature', fontsize=16)
plt.xticks(np.arange(2013,2016,1), rotation=60, fontsize=12)
columns = ['Max', 'Date', 'Min', 'Date']
plt.table(cellText=min_man_temps(years),
          rowLabels=years,
          colLabels=columns,
```

```
          rowColours=colors,
          cellColours=[[c]*4 for c in colors])
plt.xticks([])

plt.show()
```



Code creates a bar chart and a table with max/min temperatures for each year and the dates when they happened