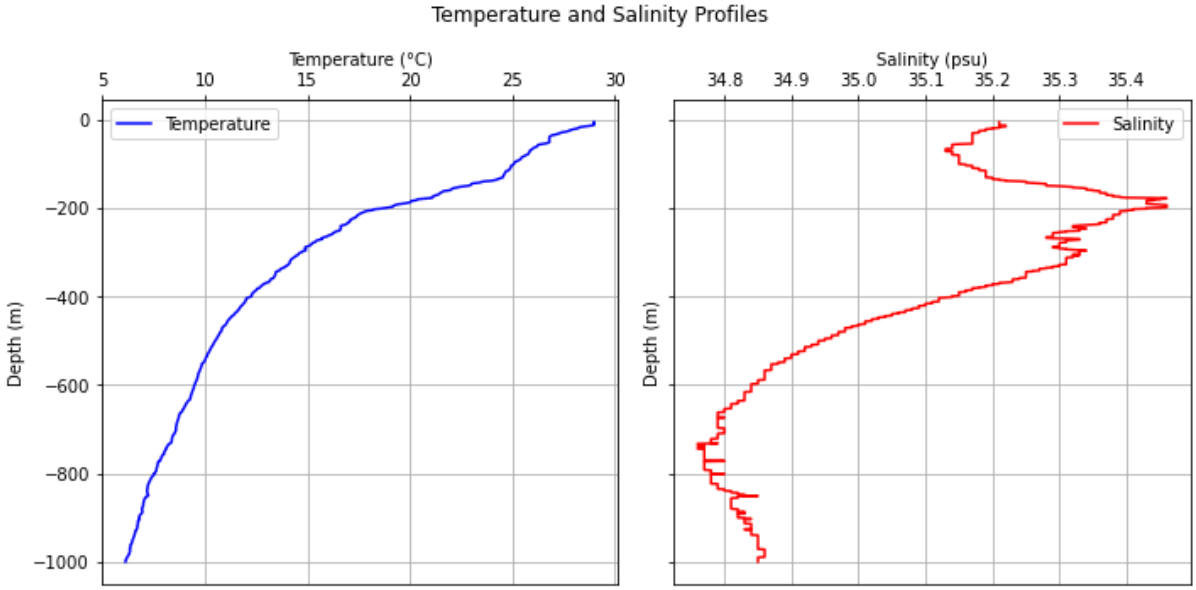
Ajani Mnyandu – Python script

Part 1 – Temperature and salinity profiles with figures

```
import matplotlib.pyplot as plt
import pandas as pd
import numpy as np



salinity_data = pd.read_csv('C:/Users/LENOVO/Documents/Python
Scripts/Salinity_Data.txt', delimiter='\t')


print(salinity_data.head())



depth = salinity_data.loc[:,'Time(h)'] * -1
tempC = salinity_data.loc[:,'z(m)']
salinity = salinity_data.loc[:,'T(C)']


salinity_data.columns



fig, axs = plt.subplots(1, 2, figsize=(10, 5), sharey=True)



axs[0].plot(tempC, depth, color='blue', label='Temperature')
axs[0].set_xlabel('Temperature (°C)')
axs[0].set_ylabel('Depth (m)')
axs[0].xaxis.set_label_position('top')  # Move the x-axis label to
the top
axs[0].xaxis.tick_top()  # Move the x-axis ticks to the top
axs[0].set_ylabel('Depth (m)')
axs[0].invert_yaxis()
axs[0].grid(True)
axs[0].legend()
```

```
axs[1].plot(salinity, depth, color='red', label='Salinity')
axs[1].set_xlabel('Salinity (psu)')
axs[1].xaxis.set_label_position('top')  # Move the x-axis label to the top
axs[1].xaxis.tick_top()  # Move the x-axis ticks to the top
axs[1].set_ylabel('Depth (m)')
axs[1].invert_yaxis()
axs[1].grid(True)
axs[1].legend()

plt.suptitle('Temperature and Salinity Profiles')
plt.tight_layout()
plt.show()
```

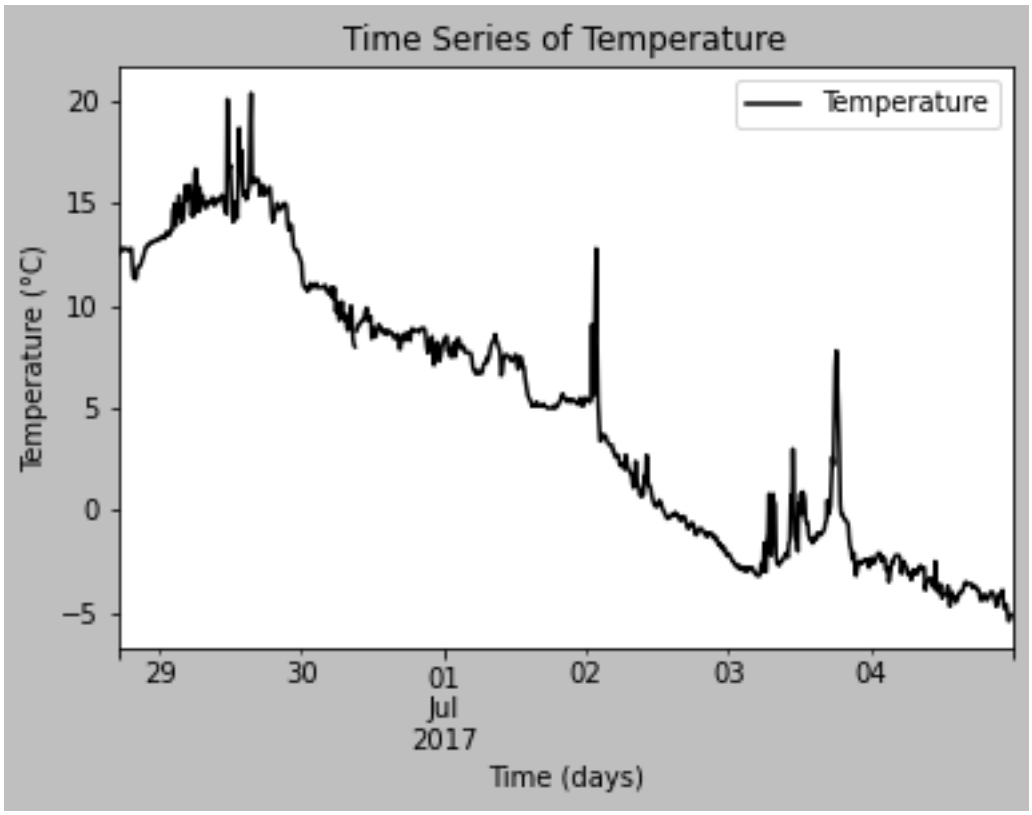


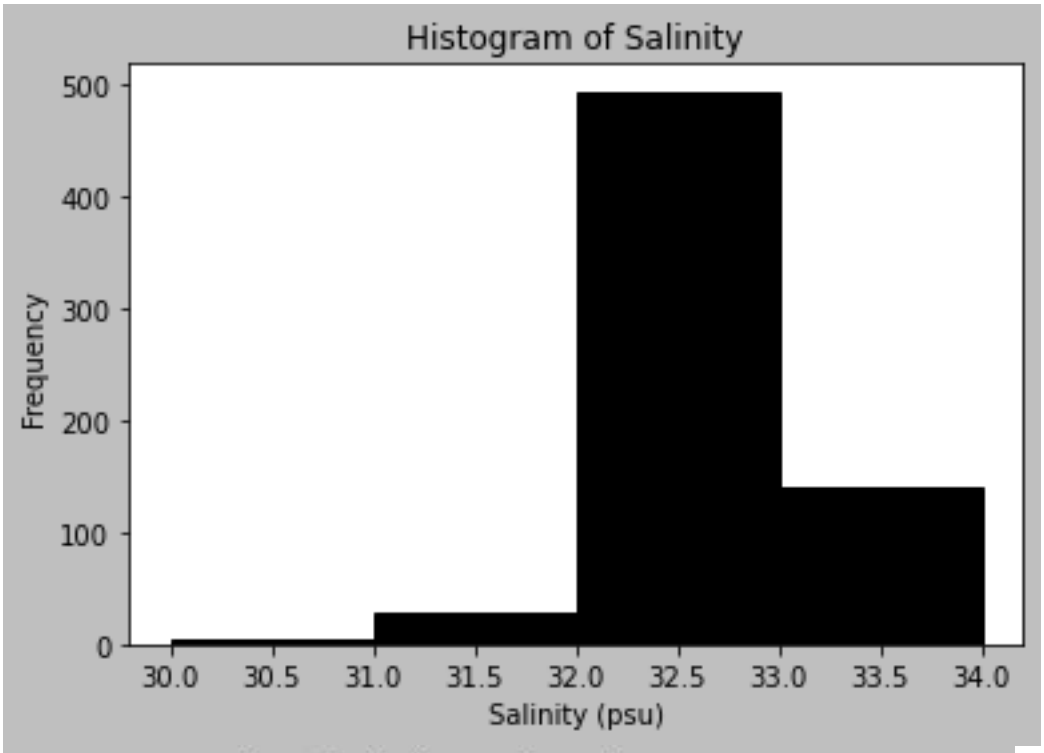
Part 2

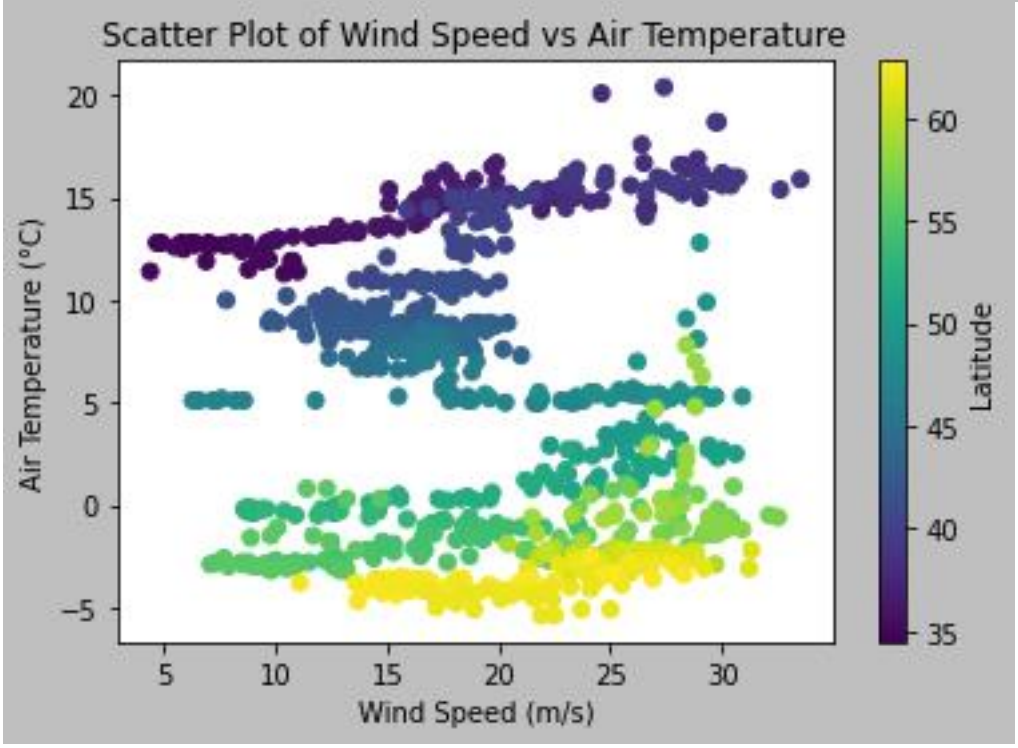
```
import pandas as pd
import matplotlib.pyplot as plt


data = pd.read_csv('C:/Users/LENOVO/Documents/Python Scripts/SAA2_WC_2017_metocean_10min_avg.csv')
```

```
# Check for missing values
print("Missing values before handling:\n", data.isnull().sum())



# Select data from departure to July 4th
departure_date = '2017/06/28 17:10 '  # Replace with actual departure date
july_4th_date = '2017/07/04 11:20'   # Replace with July 4th date
selected_data = data.loc[departure_date:july_4th_date]



# Plot time series of temperature
plt.figure()
selected_data['AIR_TEMPERATURE'].plot(label='Temperature')
plt.xlabel('TIME_SERVER')
plt.ylabel('Temperature (°C)')
plt.title('Time Series of Temperature')
plt.style.use('grayscale')
plt.legend()
plt.savefig('temperature_time_series.png', dpi=200)


# Plot histogram of salinity
plt.figure()
selected_data['TSG_SALINITY'].plot.hist(bins=range(30, 36), edgecolor='black')
plt.xlabel('Salinity (psu)')
plt.ylabel('Frequency')
plt.title('Histogram of Salinity')
plt.savefig('salinity_histogram.png', dpi=200)


# Create scatter plot of wind speed vs air temperature with latitude encoded in color
plt.figure()
plt.scatter(selected_data['WIND_SPEED_TRUE'], selected_data['AIR_TEMPERATURE'], c=selected_data['LATITUDE'], cmap='viridis')
plt.colorbar(label='Latitude')
plt.xlabel('Wind Speed (m/s)')
```

```
plt.ylabel('Air Temperature (°C)')
plt.title('Scatter Plot of Wind Speed vs Air Temperature')
plt.savefig('wind_speed_vs_air_temperature_scatter.png', dpi=200)

plt.show()
```




Histogram of Salinity
Frequency
Salinity (psu)
0
100
200
300
400
500
30.0
30.5
31.0
31.5
32.0
32.5
33.0
33.5
34.0


Scatter Plot of Wind Speed vs Air Temperature
Air Temperature (°C)
Wind Speed (m/s)
Latitude
−5
0
5
10
15
20
5
10
15
20
25
30
35
40
45
50
55
60