FINAL CODE

Team ID	PNT2022TMID38427
Project Name	Real-time river water quality monitoring and control system

CODE:

```python
# Import common libraries

import numpy as np

import pandas as pd

import matplotlib.pyplot as plt


# Import the PyGeohydro libaray tools

import pygeohydro as gh

from pygeohydro import NWIS, plot


# Use the national water info system (NWIS)

nwis = NWIS()
# Specify date range of interest

dates = ("2020-01-01", "2020-12-31")
```

```python
# Filter stations to have only those with proper dates
stations = info_box[(info_box.begin_date <= dates[0]) &
(info_box.end_date >= dates[1])].site_no.tolist()


# Remove duplicates by converting to a set
stations = set(stations)
# Specify characteristics of interest
select_attributes = ['CAT_BASIN_AREA', 'CAT_ELEV_MAX',
'CAT_STREAM_SLOPE']


# Initialize a storage matrix
nldi_data = np.zeros((len(flow_data.columns), len(select_attributes)))


# Loop through all gages, and request NLDI data near each gage
for i, st in enumerate(flow_data.columns):

    # Navigate up all flowlines from gage
    flowlines = NLDI().navigate_byid(fsource = 'nwissite',
                    fid = f'{st}',
                    navigation="upstreamTributaries",
                    source = 'flowlines',
                    distance = 10)
```

```python
# Get the nearest comid

station_comid = flowlines.nhdplus_comid.to_list()[0]


# Source NLDI local data

nldi_data[i,:] = NLDI().getcharacteristic_byid(station_comid, "local", char_ids = select_attributes)
```