**Approach and Logic Used for Calculating Uptime of Stations**

**Step 1: Parsing the Input Data**

* **Read Input File**: The program starts by reading an input file containing the station IDs, charger IDs, and their availability reports.
* **Content Cleaning**: The content is cleaned by removing extra spaces and empty lines, making it easier to process.
* **Parse Station IDs**: A dictionary is created where each station ID maps to a list of charger IDs that belong to that station.
* **Parse Charger Availability Reports**: The availability data for each charger is extracted, including the start time, end time, and the status (whether the charger was "up" or "down").

**Step 2: Calculating Uptime for Each Station**

* **Initialize Uptime Report**: A dictionary is created to store the total uptime for each station.
* **Iterate Through Chargers**: For each station, we loop through all its chargers and gather availability data from the charger availability reports.
  + If a charger is "up", the time period (start to end) is added to the total uptime for that charger.
  + If a charger is "down", no time is added.
* **Track Time for Each Charger**: For each charger, the start and end times of its availability are recorded to determine the total operational time later.

**Step 3: Calculate Total Operational Time for Each Station**

* **Total Time for Each Station**: For each station, the total operational time is calculated by aggregating the operational times (start to end) of its chargers.
* **Handling Non-contiguous Data**: Gaps in the data (when a charger is "down") are correctly handled, as downtime is automatically calculated when chargers are not "up".

**Step 4: Calculate Uptime Percentage for Each Station**

* **Uptime Calculation**: The uptime percentage for each station is calculated as:
  + Uptime Percentage = (Total Uptime / Total Operational Time) \* 100
* **Avoiding Division by Zero**: If a station has no operational time (i.e., all chargers are "down"), it’s assigned an uptime of 0%.

**Step 5: Generate the Final Uptime Report**

* **Final Report**: A report is generated that lists the uptime percentage for each station.
  + The report is structured as <Station ID> <Uptime Percentage>.
* **Sorting**: The stations are listed in ascending order based on their station IDs.

**Step 6: Writing the Report to Output**

* **Write to Output File**: The final uptime report is written to an output file, with the filename determined by the input filename.
  + If the input file is input\_1.txt, the output will be written to input\_1\_my\_output.txt.
  + Similarly, for input\_2.txt, the output will go to input\_2\_my\_output.txt.

**How to run the code?**

**Overview**

The challenge has been completed. To run the code follow the below steps:

**Step - 1:**

Clone the repo in your machine with the below code in command line:

***git clone*** [***https://github.com/nilayjain12/coding-challenge-charger-uptime-main.git***](https://github.com/nilayjain12/coding-challenge-charger-uptime-main.git)

Then head to the folder, where you cloned the repo.

**Step - 2:**

Open VS-code or any IDE

**Step - 3:**

In the terminal type the code below to create a virtual environment:

***python -m venv <name\_of\_environment>***

Then activate the virtual environment by following the code, in the terminal:

***\<name\_of\_environment>\Scripts\activate***

**Step - 4:**

Run the below command in the terminal to run the program:

***python write\_text.py***