

The **SIN (Sistema Interligado Nacional)** is a coordination and control system that integrates electricity production and transmission companies from all regions of Brazil, except for a portion of the North region. The Brazilian Government provides monthly CO2 emissions factors for electricity consumption in the SIN since January 2006. The **Sistema Interligado do Amazonas** serves the North region and had emissions factors provided from 2011 to 2015 when it became connected to the SIN.

With the consumption data, we can calculate the total CO2 emissions using the factors provided in the attached .xlsx file.

An **emission source** will consist of the following information: a unique ID, a string called sourceName, the consumption amount, the year and month of the consumption, the state, and the total CO2 emissions.

Your objective is to create an application that enables users to save new emission sources, access saved sources, and view the total CO2 emissions. Users should be able to register new sources by either manually entering the consumption data or extracting it in real time from a PDF bill issued by the company CELESC. Examples of public bills can be found in the attachments. For simplicity, you only need to extract the "Consumo Total Faturado" (Total Billed Consumption) and the "Vencimento" (Due Date) from the PDF. In the case of the PDF input, always assume the state as "Santa Catarina".



Conta de Energia Elétrica	
01-20217471125924-14	REF.: 07/2021
VENCIMENTO 07/08/2021	
CONSUMO TOTAL FATURADO 659 kWh	





If the user chooses to write the data manually, ask for the state. If the state is in the North region, compute the emissions using the annual average of the Sistema Interligado do Amazonas according to the given year.

You can choose to implement one of the following user interfaces:

```
C:\Users\REMA ACER 01\OneDrive\Área de Trabalho>python Electricity.py
Type 1 to register a new emissions source
Type 2 to show a source and its emission for a specific id
Type 3 to show all sources and its emissions
Type 4 to show the emissions factor of the SIN
```

Option 1: A simplified terminal-based user interface using Python or C++.

+ NOVO REGISTRO

	Source	Date	State	Consumption	CO2 Emissions	
	Source1	January 2020	Pará	100	67.08	 
	Source2	December 2018	Santa Catarina	500	285.56	 

Option 2: A web page user interface using HTML, CSS, and JavaScript/Typescript (or any preferred framework). Choosing Option 2 can earn you a maximum score of 120 in this test, compared to a maximum score of 100 for Option 1.

Evaluation criteria:

- 1. Write a script in any programming language to convert the data from the .xlsx file to a .json file. Use the Pandas library if using Python. You can export the .xlsx file to a .csv if it helps. (10/100)
- 2. Write a script in any programming language to read the data from PDF inserted in real-time. (35/100)
- 3. Design choices (15/100)
- 4. File I/O handling for data storage. The data should be persisted, either in a .dat file or a database. (15/100)
- 5. Input validation and data handling (15/100)
- 6. Documentation in English and clean code. Include documentation for any interface or base classes. A new developer should be able to understand your scripts for items 1 and 2. (10/100)

The following aspects will not be evaluated:

- UI presentation (fancy command line menus or excessive CSS). Keep it simple and don't spend too much time on it.