Basic (both questions)

1. Given a list of dictionaries (in 'Participant Variables.py') representing sales transactions, write a Python function to calculate the total sales amount for each product. Sort the results in descending order of total sales (amount). Output should be a dictionary with total sales and then a list with the item codes in descending order of sales.

2. Write a recursive function to print the Fibonacci series until the nth number. Code will be checked with random values later. Eg. Output: 0 1 1 2 3 ……. nth term

Machine Learning (*Choose any one as per ability*):

1. **Lifecycle Analysis (LCA)**

- Design a Python program that performs a simplified LCA for a product, considering stages like raw material purity & lifetime of prior products. The data is given in a CSV (LCA_inputdata.csv). The final program should accurately predict lifetime of a new product for an entered purity level. Edit the text file (LCA_outputdata.txt) containing sample purity levels and give expected lifetime of each in same line.
- **Hint:** Utilize linear regression

2. **Carbon Footprint Calculation**

- Implement a Python script that estimates a simplified carbon footprint based on energy consumption. Data given in a CSV (CarbonFootprint_inputdata.csv) The final program should be able to produce a result of carbon footprint when a random energy consumed value is entered.
- **Hint:** Use polynomial regression

Sustainability (*Choose any one as per ability*):

1. **Energy Consumption Data:**

- You have a list of dictionaries of energy consumption records with the fields: city and energy usage (in 'Participant Variables.py'). Also given is a CSV file ('CountryAreas.csv') with the details on which countries the cities belong to. Write a function to aggregate the energy usage by country as a dictionary and sort the results to identify the locations with the highest and lowest energy consumption. (encoding = 'cp850')

  Eg output:

  {'countryname21': 1231, 'countryname13': 984……..}
  The top 10 countries are: [countryname1, countryname2…. countryname10]
  The last 10 countries are: [country(n-10),country(n-9)…..country(n)]

2. **Sustainability Report Generator:**

- Create a Python script that takes in CSV file (company_sustainability_scores.csv) containing data on various sustainability metrics (e.g., carbon footprint, energy usage, water consumption) and generates a sorted report of the top 10 most sustainable companies as a list using the function (x/1000)^(-2) + y^(5/7) – (z/10000)^2 = Sustainability Impact score. The same CSV file should also be sorted in decreasing order of sustainability score.