University of Strathclyde Glasgow

Python: Classes

1. Create a class to represent an electric car.
    - The class should include data members for the speed, map coordinates (x and y), electric charge and maximum charge.
    - Write a function to return the percentage electric charge, using the electric charge and the maximum electric charge.
2. A house has a solar panel array on it that is controlled by a small computer system that is part of the solar array installation.
    - Define a `SolarPanel` class that includes a public data member to hold a serial number as a text string and a public data member to hold the power produced as a floating point value.
    - Define a `SolarArray` class that contains a public data member that is a list of solar panel objects, and map coordinates (x and y) for the solar array. The constructor should have three input parameters:

      ```
      def __init__(self, x, y, solar_panels=[]):
      ```

      The constructor should use a shallow copy to copy the input `solar_panels` to a data member.
    - Add a member function to the `SolarArray` class that returns the total power of the solar array, by looping over the `SolarPanel` objects and summing their power values.
3. Create two classes named `Customer` and `Purchase`.
    - The classes should be designed to contain the contents of Table 1 and 2. The `Customer` class should include a list data member to hold `Purchase` objects.

Table 1: Customers

id	first_name	surname
1	Amiee	Greene
2	Maia	Morley
3	Charleigh	Cano
4	Franklin	Torres
5	Mitchell	Page
6	Momina	Thornton
7	Cheryl	Devlin
8	Isobel	Orozco
9	Nicolas	Adams
10	Devante	Rodriguez

Table 2: Purchases, where the foreign key `customer_id` relates to the `id` value in the Customers table.

customer_id	item_id	amount_paid
3	1	100
2	3	123
6	5	40
1	2	23
3	1	100
5	5	40
7	15	46
2	7	3.02
1	10	22
8	12	45.95
4	17	33
4	17	33
2	5	40

- Add a member function to the `Customer` class to return a table of `item_id` and `amount_paid`. The return value should be a formatted string that includes the values and description of what they are. The string should use a tab (`\t`) character to separate the two columns.
- Add a member function to the `Customer` class to return a total `amount_paid` by a specific customer. The function should loop over all `Purchase` objects and return a floating point number.