

Python: Input/output

These exercises assume that the “Python: Designing classes” exercises have been completed.

1. Use the `Customer` and `Purchase` classes that were constructed for the “Python: Designing classes” exercises. Write a program to read the contents of the `customers.csv` and `purchases.csv` CSV file. The program should use a `csv.DictReader` to read the CSV files. The program should create `Customer` objects by reading the `customers.csv` file. The `Customer` objects should be stored in a dictionary, where the key is the customer id and the value is the `Customer` object. The dictionary should be used to associate the purchases that are read from the `purchases.csv` file with each customer.
2. The `air_quality.json` file contains a series of data values from air quality monitoring.
 - Create a function to read the JSON file into a list, using the `json` module.
 - Create three classes to hold the data values that are given in the `air_quality.json` file. These classes should be defined as:
 - A `Species` class that contains a code and air quality index.
 - A `Site` class that contains a name, latitude, longitude and a list of `Species` objects.
 - A `LocalAuthority` class that contains a name and a list of `Site` objects.
 - Write `__repr__` functions for the three classes. These functions should return a text string that contains the data member names and their values, for each of the classes.
 - Add a `load_from_json` function to the `LocalAuthority` class. This function should contain the code that is given in Listing 1.

Listing 1: A function to load values from JSON

```
1     def load_from_json(self, json_data):
2         self.name = json_data["name"]
3         del self.sites[:]
4         for json_site in json_data["sites"]:
5             site = Site()
6             site.load_from_json(json_site)
7             self.sites.append(site)
```

- Write a `load_from_json` function for the `Site` and `Species` class. This function should be similar to Listing 1, where the `Species` version does not include a `for` loop.
- Add function to the `Site` class to return the average air quality index of a site. The function should calculate the average using the air quality index from each species object.