

```
import csv
import sqlite3
```

```
class DatabaseConnector:
```

```
    """
```

```
    Manages a connection to a sqlite database.
```

```
    """
```

```
def __init__(self, database_file):
```

```
    self.connection = sqlite3.connect(database_file)
```

```
    self.cursor = self.connection.cursor()
```

```
def populate(self, spreadsheet_folder):
```

```
    """
```

```
    Populate the database with data imported from each spreadsheet.
```

```
    """
```

```
    # open the spreadsheets
```

```
    with open(f"{spreadsheet_folder}/shipping_data_0.csv", "r") as spreadsheet_file_0:
```

```
        with open(f"{spreadsheet_folder}/shipping_data_1.csv", "r") as spreadsheet_file_1:
```

```
            with open(f"{spreadsheet_folder}/shipping_data_2.csv", "r") as spreadsheet_file_2:
```

```
                # prepare the csv readers
```

```
                csv_reader_0 = csv.reader(spreadsheet_file_0)
```

```
                csv_reader_1 = csv.reader(spreadsheet_file_1)
```

```
                csv_reader_2 = csv.reader(spreadsheet_file_2)
```

```
                # populate first spreadsheet
```

```
                self.populate_first_shipping_data(csv_reader_0)
```

```
                self.populate_second_shipping_data(csv_reader_1, csv_reader_2)
```

```
def populate_first_shipping_data(self, csv_reader_0):
```

```
    """
```

```
    Populate the database with data imported from the first spreadsheet.
```

```
    """
```

```
    for row_index, row in enumerate(csv_reader_0):
```

```
        # ignore the header row
```

```
        if row_index > 0:
```

```
            # extract each required field
```

```
            product_name = row[2]
```

```
            product_quantity = row[4]
```

```
            origin = row[0]
```

```
            destination = row[1]
```

```
            # insert the data into the database
```

```
            self.insert_product_if_it_does_not_already_exist(product_name)
```

```
            self.insert_shipment(product_name, product_quantity, origin, destination)
```

```
            # give an indication of progress
```

```
            print(f"inserted product {row_index} from shipping_data_0")
```

```
def populate_second_shipping_data(self, csv_reader_1, csv_reader_2):
```

```
    """
```

```
    Populate the database with data imported from the second and third spreadsheets.
```

```
    """
```

```
    # collect shipment info
```

```

shipment_info = {}
for row_index, row in enumerate(csv_reader_2):
    # ignore the header row
    if row_index > 0:
        # extract each required field
        shipment_identifier = row[0]
        origin = row[1]
        destination = row[2]

        # store them for later use
        shipment_info[shipment_identifier] = {
            "origin": origin,
            "destination": destination,
            "products": {}
        }

# read in product information
for row_index, row in enumerate(csv_reader_1):
    # ignore the header row
    if row_index > 0:
        # extract each required field
        shipment_identifier = row[0]
        product_name = row[1]

        # populate intermediary data structure
        products = shipment_info[shipment_identifier]["products"]
        if products.get(product_name, None) is None:
            products[product_name] = 1
        else:
            products[product_name] += 1

# insert the data into the database
count = 0
for shipment_identifier, shipment in shipment_info.items():
    # collect origin and destination
    origin = shipment_info[shipment_identifier]["origin"]
    destination = shipment_info[shipment_identifier]["destination"]
    for product_name, product_quantity in shipment["products"].items():
        # iterate through products and insert into database
        self.insert_product_if_it_does_not_already_exist(product_name)
        self.insert_shipment(product_name, product_quantity, origin, destination)

    # give an indication of progress
    print(f'inserted product {count} from shipping_data_1")
    count += 1

def insert_product_if_it_does_not_already_exist(self, product_name):
    """
    Insert a new product into the database.
    If a product already exists in the database with the given name,
    ignore it.
    """
    query = """
        INSERT OR IGNORE INTO product (name)
        VALUES (?);
    """

```

```

        """
self.cursor.execute(query, (product_name,))
self.connection.commit()

def insert_shipment(self, product_name, product_quantity, origin, destination):
    """
    Insert a new shipment into the database.
    """
    # collect the product id
    query = """
        SELECT id
        FROM product
        WHERE product.name = ?;
    """
    self.cursor.execute(query, (product_name,))
    product_id = self.cursor.fetchone()[0]

    # insert the shipment
    query = """
    INSERT OR IGNORE INTO shipment (product_id, quantity, origin, destination)
    VALUES (?, ?, ?, ?);
    """
    self.cursor.execute(query, (product_id, product_quantity, origin, destination))
    self.connection.commit()

def close(self):
    self.connection.close()

if __name__ == '__main__':
    database_connector = DatabaseConnector("shipment_database.db")
    database_connector.populate("./data")
    database_connector.close()

```