COMP 4522 Assignment 1 - Data Structure Choice

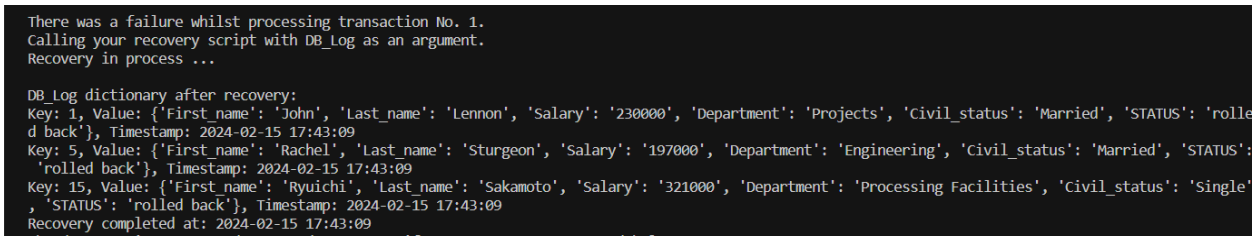
MAIN MEMORY:

We used a Dictionary data structure to store our database for '**main memory**'. The reason why we have used a Dictionary database over other data structures is due to its key-value storage. Dictionaries can mirror how databases are often structured, which is by having a set key which resembles a database's primary key. With each key, there is a new line of data that corresponds to it. Using dictionaries allows for quick and efficient data retrieval, updating, and management of the overall data. With keys, it is easy to access, modify or remove data entries directly. This is highly effective when organizing and handling data that is structured, which replicates how a real database manages its data.

DATABASE LOG:

For our **database log**, the reason that we chose an ordered dictionary is primarily due to the fact that it preserves the order of keys as they were inserted. This is important because it helps to further understand the sequence of transactions when having to roll back or replay transactions. This upholds accuracy within a database, as every event is recorded sequentially, which makes it easier to understand when certain transactions happened. Some databases are heavily reliant on the chronological ordering of transactions because of the need to rollback or to process recovery.

If there's a transaction failure:



With the following file being written:

deAndData > transactionsUnsuccesful.csv

```
ID,First_name,Last_name,Salary,Department,Civil_status,STATUS
1,John,Lennon,230000,Projects,Married,rolled back
2,Joan,Doe,100000,Human Resources,Single,
3,Mary,Carpenter,250000,Projects,Separated,
4,John,Ingham,125000,Projects,Separated,
5,Rachel,Sturgeon,197000,Engineering,Married,rolled back
6,Hanifa,Salima,50000,Engineering,Married,
7,Femi,Okeke,425000,Industries,Married,
8,Moe,Khalifa,325000,Industries,Married,
9,Katy,Jones,475000,Management,Single,
10,Lin,Wang,435000,Engineering,Married,
11,Art,Blanket,137000,Projects,Single,
12,Vivek,Singh,231000,Industries,Married,
13,Amal,Khan,230000,Projects,Single,
14,Richard,Carpenter,123000,Human Resources,Single,
15,Ryuichi,Sakamoto,321000,Processing Facilities,Single,rolled back
```

If transactions are successful:

```
There are 15 records in the database, including the header.

All transactions ended up well.
Updates to the database were committed!

The data entries AFTER updates -and RECOVERY, if necessary- are presented below:
Key: 1, Value: {'First_name': 'John', 'Last_name': 'Lennon', 'Salary': '230000', 'Department': 'Music', 'Civil_status': 'Married'}
Key: 2, Value: {'First_name': 'Joan', 'Last_name': 'Doe', 'Salary': '100000', 'Department': 'Human Resources', 'Civil_status': 'Single'}
Key: 3, Value: {'First_name': 'Mary', 'Last_name': 'Carpenter', 'Salary': '250000', 'Department': 'Projects', 'Civil_status': 'Separated'}
Key: 4, Value: {'First_name': 'John', 'Last_name': 'Ingham', 'Salary': '125000', 'Department': 'Projects', 'Civil_status': 'Separated'}
Key: 5, Value: {'First_name': 'Rachel', 'Last_name': 'Sturgeon', 'Salary': '197000', 'Department': 'Engineering', 'Civil_status': 'Divorced'}
Key: 6, Value: {'First_name': 'Hanifa', 'Last_name': 'Salima', 'Salary': '50000', 'Department': 'Engineering', 'Civil_status': 'Married'}
Key: 7, Value: {'First_name': 'Femi', 'Last_name': 'Okeke', 'Salary': '425000', 'Department': 'Industries', 'Civil_status': 'Married'}
Key: 8, Value: {'First_name': 'Moe', 'Last_name': 'Khalifa', 'Salary': '325000', 'Department': 'Industries', 'Civil_status': 'Married'}
Key: 9, Value: {'First_name': 'Katy', 'Last_name': 'Jones', 'Salary': '475000', 'Department': 'Management', 'Civil_status': 'Single'}
Key: 10, Value: {'First_name': 'Lin', 'Last_name': 'Wang', 'Salary': '435000', 'Department': 'Engineering', 'Civil_status': 'Married'}
Key: 11, Value: {'First_name': 'Art', 'Last_name': 'Blanket', 'Salary': '137000', 'Department': 'Projects', 'Civil_status': 'Single'}
Key: 12, Value: {'First_name': 'Vivek', 'Last_name': 'Singh', 'Salary': '231000', 'Department': 'Industries', 'Civil_status': 'Married'}
Key: 13, Value: {'First_name': 'Amal', 'Last_name': 'Khan', 'Salary': '230000', 'Department': 'Projects', 'Civil_status': 'Single'}
Key: 14, Value: {'First_name': 'Richard', 'Last_name': 'Carpenter', 'Salary': '123000', 'Department': 'Human Resources', 'Civil_status': 'Single'}
Key: 15, Value: {'First_name': 'Ryuichi', 'Last_name': 'Sakamoto', 'Salary': '200000', 'Department': 'Processing Facilities', 'Civil_status': 'Singl
e'}
PS C:\Users\vbolg\Domain\Mount Royal University\Database2\Assignment 1 db2\COMP4522-Assignment1>
```

With the following file being written:

```csv
ID,First_name,Last_name,Salary,Department,Civil_status
1,John,Lennon,230000,Music,Married
2,Joan,Doe,100000,Human Resources,Single
3,Mary,Carpenter,250000,Projects,Separated
4,John,Ingham,125000,Projects,Separated
5,Rachel,Sturgeon,197000,Engineering,Divorced
6,Hanifa,Salima,50000,Engineering,Married
7,Femi,Okeke,425000,Industries,Married
8,Moe,Khalifa,325000,Industries,Married
9,Katy,Jones,475000,Management,Single
10,Lin,Wang,435000,Engineering,Married
11,Art,Blanket,137000,Projects,Single
12,Vivek,Singh,231000,Industries,Married
13,Amal,Khan,230000,Projects,Single
14,Richard,Carpenter,123000,Human Resources,Single
15,Ryuichi,Sakamoto,200000,Processing Facilities,Single
```