# Comp 4522 Assignment 1 Documentation

## Shawn Tian and Austin Bec

## Data structure for Logging & Rollback Sub-system

For this application, we decided that a dictionary is the best data structure to use. This is because we wanted a simple but efficient way to interact with the .csv and database files. The dictionary allows us to store key-value pairs to adequately describe the value being stored and displayed to the user. The dictionary also allows us to easily access the key and associated value so that if values need to be changed, it can be done with ease. The dictionary can also allow scalability. If more parameters are ever required, they can be added easily.

## Design Decisions

We had to modify the original file path passed into the read\_file function because when we cloned the repo from git, the program would look in the folder above so we had to specify the file path as “CodeAndData/Employees\_DB\_ADV.csv” This is also the same path format for the log files.

The recovery script is designed in a simple but efficient way. When an error occurs, the recovery script is called, and the transaction ID in which the error occurred is displayed. It then goes through the database and matches the transaction that occurred in the error. It will then roll back the data it originally was going to commit and writes each transaction to a row in the rollback.csv file.

The transaction processing function will iterate over each entry in the database and compare the unique ID with the ID of the incoming transaction. If the ID matches, it will then check which attribute is being changed. Once the attribute is found, the entry will be changed based on the data in the transaction. It will then update the database log with the transaction data.

In the main section of the program, the transaction processing function is called in the first loop after the database is loaded into its list. After the transaction has been completed, there is a decision on whether an error will occur. If an error occurs, the recovery script function is called to rollback the transaction. If there is no error, the transaction will be logged to commit\_log.csv, and the loop will continue until there are no more entries in the database.

## Sample of output ran for three cycles.

1. The data entries BEFORE updates are presented below:

['Unique\_ID', 'First\_name', 'Last\_name', 'Salary', 'Department', 'Civil\_status']

['1', 'John', 'Lennon', '230000', 'Projects', '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', 'Married']

['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']

There are 16 records in the database, including one header.

Processing transaction No. 1.

ID found, proceed with locating the attribute.

Old value for Department: Projects

Transaction ID=1 processed successfully.

['1', 'John', 'Lennon', '230000', 'Music', 'Married']

UPDATES have not been committed yet...

Transaction No. 1 has been commited! Changes are permanent.

Processing transaction No. 2.

ID found, proceed with locating the attribute.

Old value for Civil\_status: Married

Transaction ID=5 processed successfully.

['5', 'Rachel', 'Sturgeon', '197000', 'Engineering', 'Divorced']

UPDATES have not been committed yet...

There was a failure whilst processing transaction No. 2.

Calling your recovery script with DB\_Log as an argument.

Recovery in process ...

5

Civil\_status Married

Rollback log saved to CodeAndData/rollback.csv

Logging & Rollback System contents:

{'transaction\_id': '1', 'timestamp': '2024-02-12 19:24:36', 'attribute': 'Department', 'old\_value': 'Projects', 'new\_value': 'Music', 'status': 'executed'}

{'transaction\_id': '5', 'timestamp': '2024-02-12 19:24:36', 'attribute': 'Civil\_status', 'old\_value': 'Married', 'new\_value': 'Divorced', 'status': 'rolled-back'}

The data entries AFTER updates -and RECOVERY, if necessary- are presented below:

['Unique\_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', 'Married']

['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']

2. The data entries BEFORE updates are presented below:

['Unique\_ID', 'First\_name', 'Last\_name', 'Salary', 'Department', 'Civil\_status']

['1', 'John', 'Lennon', '230000', 'Projects', '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', 'Married']

['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']

There are 16 records in the database, including one header.

Processing transaction No. 1.

ID found, proceed with locating the attribute.

Old value for Department: Projects

Transaction ID=1 processed successfully.

['1', 'John', 'Lennon', '230000', 'Music', 'Married']

UPDATES have not been committed yet...

There was a failure whilst processing transaction No. 1.

Calling your recovery script with DB\_Log as an argument.

Recovery in process ...

1

Department Projects

Rollback log saved to CodeAndData/rollback.csv

Logging & Rollback System contents:

{'transaction\_id': '1', 'timestamp': '2024-02-12 19:33:42', 'attribute': 'Department', 'old\_value': 'Projects', 'new\_value': 'Music', 'status': 'rolled-back'}

The data entries AFTER updates -and RECOVERY, if necessary- are presented below:

['Unique\_ID', 'First\_name', 'Last\_name', 'Salary', 'Department', 'Civil\_status']

['1', 'John', 'Lennon', '230000', 'Projects', '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', 'Married']

['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']

3. The data entries BEFORE updates are presented below:

['Unique\_ID', 'First\_name', 'Last\_name', 'Salary', 'Department', 'Civil\_status']

['1', 'John', 'Lennon', '230000', 'Projects', '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', 'Married']

['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']

There are 16 records in the database, including one header.

Processing transaction No. 1.

ID found, proceed with locating the attribute.

Old value for Department: Projects

Transaction ID=1 processed successfully.

['1', 'John', 'Lennon', '230000', 'Music', 'Married']

UPDATES have not been committed yet...

Transaction No. 1 has been commited! Changes are permanent.

Processing transaction No. 2.

ID found, proceed with locating the attribute.

Old value for Civil\_status: Married

Transaction ID=5 processed successfully.

['5', 'Rachel', 'Sturgeon', '197000', 'Engineering', 'Divorced']

UPDATES have not been committed yet...

Transaction No. 2 has been commited! Changes are permanent.

Processing transaction No. 3.

ID found, proceed with locating the attribute.

Old value for Salary: 321000

Transaction ID=15 processed successfully.

['15', 'Ryuichi', 'Sakamoto', '200000', 'Processing Facilities', 'Single']

UPDATES have not been committed yet...

There was a failure whilst processing transaction No. 3.

Calling your recovery script with DB\_Log as an argument.

Recovery in process ...

15

Salary 321000

Rollback log saved to CodeAndData/rollback.csv

Logging & Rollback System contents:

{'transaction\_id': '1', 'timestamp': '2024-02-12 19:35:09', 'attribute': 'Department', 'old\_value': 'Projects', 'new\_value': 'Music', 'status': 'executed'}

{'transaction\_id': '5', 'timestamp': '2024-02-12 19:35:09', 'attribute': 'Civil\_status', 'old\_value': 'Married', 'new\_value': 'Divorced', 'status': 'executed'}

{'transaction\_id': '15', 'timestamp': '2024-02-12 19:35:09', 'attribute': 'Salary', 'old\_value': '321000', 'new\_value': '200000', 'status': 'rolled-back'}

The data entries AFTER updates -and RECOVERY, if necessary- are presented below:

['Unique\_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', '321000', 'Processing Facilities', 'Single']