

Customer

CustomerID	Name	Surname	Title	Address
1	Mohammed	Abraham	Mr	2 Jean Drive
2	Abby	Smith	Ms	514 Mackenzie St
3	Reifoge	Molote	Mrs	6 Joker St
4	Corlize	van Heerden	Ms	12 Lotus Ave
5	Simone	Fourie	Dr	2 Duncan St
6	Samantha	Hanna	Mrs	34 Lynwood St
7	Rebecca	Duncan	Ms	111 Bondev Drive
8	Gary	Lou	Mr	5555 Rands St
9	Ronald	Wang	Prof	65 Quinton Ave
10	Fatima	Vallee	Ms	987 Sabie Road
11	Thando	Moloi	Dr	9 Lira St
12	Sphesihle	Mangena	Ms	3333 Warden St
13	Daniel	Alberts	Mrs	3 Peso St
14	Jason	Mackenzie	Mr	98 Theo St
15	Michael	Nouwens	Mr	18 De Villiers St

Returned\_Bike

CustID	BID	ReturnedDate
4	2	2020/12/14
9	4	2020/08/06
15	6	2021/02/14
14	7	2021/01/11

Returned\_Car

CustID	CID	ReturnedDate
4	2	2020/12/14
8	3	2020/02/16
9	4	2020/08/06
4	7	2020/12/14

Cars

CarID	Description	YearModel
1	Red Mercedes AMG	2020
2	White BMW X5	2017
3	Grey Mini Cooper JCW	2020
4	Silver Toyota Corolla	2015
5	Yellow Honda Jazz Sport	2021
6	Blue Nissan Amra	2018
7	Orange Toyota Hilux	2020

Customer\_Car

CustID	CID	RentedDate
1	1	2021/11/11
4	2	2020/11/09
8	3	2020/02/14
9	4	2020/06/06
14	5	2021/11/11
1	6	2021/01/01
4	7	2020/11/09

Motorbikes

BikeID	Type	YearModel
1	Ducati V4S	2021
2	BMW S1000RR	2020
3	Honda Fireblade SP	2018
4	Yamaha YZF-R1M	2015
5	Kawasaki Ninja H2	2017
6	Kawasaki ZX-10R SE	2019
7	Yamaha YZF-R1	2020

Customer\_Bike

CustID	BID	RentedDate
1	1	2021/11/11
4	2	2020/12/10
8	3	2020/08/14
9	4	2020/07/06
14	5	2021/11/11
15	6	2020/11/11
14	7	2020/11/11

Figure 2: Database state

- open cmd and navigate to the extracted **ra-2.2b** folder and type  
`java -jar ra.jar uXXXXXXX.CARRENTALS.properties`  
 You should be able to get RA running after successfully executing this command.
- type the command `\list;` in the prompt to see the tables you created.

### Task 5: Specifying and executing Queries .....(28 marks)

You are required to specify and execute the following queries in SQL using the CARRENTALS database schema.

1. List the names of all the customers who have rented more than one Car and display the number of Cars that they have rented.
2. Display the Type and Year Model of the Bike with the oldest Year Model.
3. List the names of all the customers who have rented at least one Bike but no Cars.
4. List the names of all the customers who have not rented any Cars.

You are also required to specify and execute the following queries both in SQL and in relational algebra using the RA interpreter on the CARRENTALS database schema.

5. List all the Cars released in 2020.
6. List the type of all the bikes released in 2020 that have been rented by the Mackenzie family.
7. List the names of all the customers who are renting a Bike on the same day that "Kawasaki ZX-10R SE" was rented and not yet returned.

**Note:** Please refer to the RA documentation at <https://users.cs.duke.edu/~junyang/radb/basic.html> and the notes to familiarise yourself with the relevant commands for interacting with your database most appropriately

### Task 6: Database dump .....(5 marks)

Dump your database structure and data into a text file or .sql file. Your queries should also be extracted and placed in a separate text file, one for your SQL queries and one for the RA queries. If you use the ra\_file