Further discussions with Clean Up Inc (CUI) have revealed the points listed below:

i. Local Authorities are classified into the following fixed types:

- Borough
- City
- District Council
- Shire
- Town

ii. Road surfaces are classified into the following fixed types:

- Asphalt
- Concrete
- Unsealed

iii. Bins supplied to properties will be replaced if needed, the fixed reasons noted are:

- Damaged by owner
- Bin Failure (fair use eg. old age)
- Damaged during pickup of waste
- Stolen

iv. The types of waste collected by CUI currently include green waste, landfill, standard recycle and glass. The company would like to be able to easily add new types of waste for collection which suit particular local authorities needs.

v. Waste collections are made at one of the following fixed intervals:

- Weekly
- Fortnightly
- Monthly

vi. The RFID codes used to identify bins are recorded as a 16 character hexadecimal number. For recording purposes it is important to be able identify what the actual charge was made for the supply of a bin to a property. This bin charge is determined by what contract the bin was supplied under. Note that this is not necessarily the bin charge under the current contract, it may be that the bin located at the property was supplied under a previous contract.

vii. Each truck driver employed by CUI is assigned a unique driver number. Drivers are approved by the company to drive individual trucks in the fleet. A given truck may be driven by many approved drivers. Each truck is identified by its Vehicle Identification Number (VIN). When a driver is approved to drive a particular truck the date of that approval is recorded. Note that there is no dependency between truck make and model (such details are not necessarily unique to a particular make/model).

viii. When a truck is making a pickup of a bin from a property on a particular date, if the bin is detected by the truck's on board scales as being too heavy, the waste is not collected, and this bin collection is flagged as being overweight (Y). If the bin is not

overweight, it is flagged as not overweight (N) and collected.

ix. A particular type of waste can only be collected once on any given date from a particular property. However a property may have different types of waste collected on the same date.

x. CUI have indicated that they wish all phone numbers in the system to be recorded as simple attributes.

Clean Up Inc have supplied the following two forms as samples of those which are used within their business. *You should note that the data shown is incomplete and only representative of the type of data for each item*.

(i) Driver Details:

Clean Up Inc Driver report

Driver Number:	12
Licence Number:	123456789
Name	Mary Xiue
Date of Birth	11 Apr 1993
Taxfile Number	987645132

AUTHORISED TRUCKS

VIN	Rego Number	Make	Model	Year
1HSJRSCR9EJ419702	TRK123456	Hino	300 816 Auto	2020
YV5F4B3D8WD563753	TRK278901	Iveco	Acco	2022

... partial and representative data shown ...

(ii) **Collection Report**

Clean Up Inc Collection Report

Contract Number: 123
Waste Type ID: GW
Waste Type Description: Green Waste
Collection Frequency: Fortnightly

Date of collection: 15th March 2023
Driver No: 12
Driver Contact Number: 0426123456
Collection Truck VIN: 1HSJRSCR9EJ419702
Collections Made:

Bin RFID	Collected Kgs	Overweight
B724E7D504B19A9B		Y
294CEEFD3435F15D	56	N
56EB9899AA5EE944	45	N
B5E79C8D3DD0394E	60	N
C19D7652AB78E157	54	N
3DA18BA44CC14795	67	N
4DBAE5111FA74C42	32	N

... partial and representative data shown ...

Date of collection: 29th March 2023
Driver No: 8
Driver Contact Number: 0123456789
Collection Truck VIN: YV5F4B3D8WD563753
Collections Made:

Bin RFID	Collected Kgs	Overweight
B724E7D504B19A9B	65	N
56EB9899AA5EE944		Y
B5E79C8D3DD0394E	69	N
C19D7652AB78E157	45	N
3DA18BA44CC14795	42	N
4DBAE5111FA74C42	56	N

... partial and representative data shown ...

Tasks to complete

1. Perform **normalisation to 3NF** for the data depicted in the two supplied sample documents.

   The approach **you are required to use** is the same approach as shown in the normalisation applied class solution. *The normalisation must be carried out form by form (i.e.* ***one form at a time****), beginning by representing the document you are working on as a* ***single*** *UNF relation* and then moving through 1NF, 2NF and 3NF. **No marks will be awarded if you use a different approach**.

   During normalisation, you must:

   - **Not** add surrogate keys.
   - Include all attributes (you must **not remove** any attribute as derivable)
   - Clearly show UNF, 1NF, 2NF and 3NF.
   - Clearly identify the Primary Key in all relations by underlining the PK attribute/s.
   - Clearly identify **all dependencies** at the various normalisation stages (Partial at 1NF, Transitive at 2NF and Full at 3NF). You should use the same notation as depicted in the normalisation sample solutions, for example:

     attr1 -> attr2, attr3

     If none exist you must note this by stating:

     No partial dependencies present and/or

     No transitive dependencies present
   - Carry out attribute synthesis.

   The relation and attribute names used throughout your normalisation and those on your subsequent logical model **must be the same**.

   Your normalisation must be carried out in an MS Word document in your group's private MS Teams channel so that a full development history is available. It does not need to be pushed to GitLab other than as listed in Submission Requirements.

2. Based on your group's assignment 1A conceptual model, your markers feedback, your reading of this case study and the normalisations you carried out in step 1 above, **prepare a logical level design** for the Clean Up Inc database.

   - The logical model must be drawn using the Oracle Data Modeler. The information engineering or Crow's foot notation must be used in drawing the model. Your logical model must **not** show data types.
   - All relations depicted must be in 3NF
   - You are required to **add at least one surrogate key to your design** (you are free to select the most appropriate relation to make this change in). You may add surrogate keys to multiple relations if you wish
   - All **attributes must be commented *in the database*** (i.e. the comments must be part of the table structure, not simply comments in the schema file).
   - Check clauses/look up tables must be applied to attributes where appropriate.
   - You **MUST** include the legend as part of your model. Please edit the legend panel to show your group name
   - Note that your GIT repository must clearly indicate your development history with multiple commits/pushes as you work on your model.

3. **Generate the schema for the database** in Oracle Data Modeler and use the schema to create the database in your Oracle account (this should be tested in your individual Oracle accounts - a group Oracle account is not available).

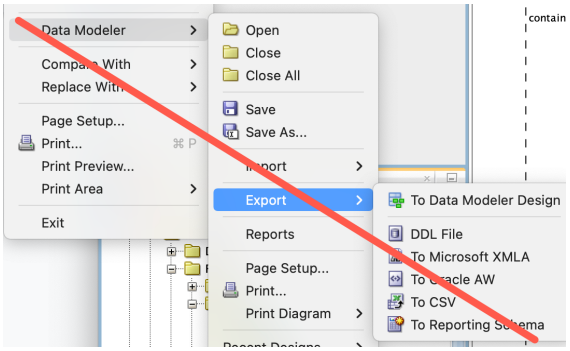
   The ***only*** edit you are permitted to carry out to the generated schema file is to add header comment/s containing your details (group/members names) and the commands to spool/echo your run of the script. In generating your schema file ensure you:

   - Capture the output of the run of your schema statements using the spool command.
   - Ensure your script includes drop table statements at the start of the script.
   - Name the schema file as **cui_schema.sql.**

4. Maintain a Group Diary which records when the group met to discuss/work on the task, including the date, who was present and a brief statement of what occurred. This Group Diary must be maintained in Microsoft Teams as a shared document in your private group channel. It does not need to be pushed to GitLab other than as listed in Submission Requirements.

As part of submission of your assignment each group member will be required to provide confidential feedback on the group members performance/interactions.

Please note when working with your model **ensure that you NEVER select any export options from the Data Modeller menu**:



such actions can fill your Oracle account space and render it unusable.