

## Task 1 :

### 1. Entity 1 : Vehicle

- UNF :
  - VEHICLE(vin, v\_type, v\_year, v\_colour, (r\_date,r\_num,r\_re\_date))
- 1NF :
  - VEHICLE(vin, v\_type, v\_year, v\_colour)
  - REGISTRATION(vin, r\_date, r\_num, r\_re\_date)
  - Dependencies :
    - Partial : No partial dependencies present.
    - Transitive : No transitive dependencies present.
- 2NF : Since there are no partial dependencies, 2NF will be same as 1 NF.
  - VEHICLE(vin, v\_type, v\_year, v\_colour)
  - REGISTRATION(vin, r\_date, r\_num, r\_re\_date)
- 3NF :
  - VEHICLE(vin, v\_type, v\_year, v\_colour, m\_code)
  - REGISTRATION(vin, r\_date, r\_num, r\_re\_date)

### 2. Entity 2 : Model

- UNF :
  - MODEL(v\_model, v\_transmission\_mode, v\_laden, v\_unladen, engine\_size, m\_code, m\_name, m\_country\_code, m\_country\_name, (engine\_type))
- 1NF :
  - MODEL(v\_model, v\_transmission\_mode, v\_laden, v\_unladen, engine\_size, m\_code, m\_name, m\_country\_code, m\_country\_name)
  - ENGINE(v\_model, engine\_type)
  - Dependencies :
    - Partial : No partial dependencies present.
    - Transitive :
      - m\_code -> m\_name, m\_country\_code, m\_country\_name
      - m\_country\_code -> m\_country\_name
- 2NF : Since there are no partial dependencies, 2NF will be same as 1 NF.
  - MODEL(v\_model, v\_transmission\_mode, v\_laden, v\_unladen, engine\_size, m\_code, m\_name, m\_country\_code, m\_country\_name, vin)

- ENGINE(v\_model, engine\_type)
- 3NF : There are two transitive dependencies. Thus, we separate them out into two tables.
  - MODEL(v\_model, v\_transmission\_mode, v\_laden, v\_unladen, engine\_size, m\_code, vin)
  - ENGINE(v\_model, engine\_type)
  - MANUFACTURER(m\_code, m\_name, m\_country\_code)
  - COUNTRY(m\_country\_code, m\_country\_name)

### 3. Entity 3 : Driver Licence

- UNF :
  - DRIVER( l\_num, l\_status, f\_name, l\_name, dob, address\_street, address\_town, address\_postcode, l\_expiry\_date, (l\_type), (suspension\_start\_date, suspension\_end\_date ), (cancellation\_date, cancellation\_period, cancellation\_reason))
- 1NF :
  - DRIVER( l\_num, l\_status, f\_name, l\_name, dob, address\_street, address\_town, address\_postcode, l\_expiry\_date)
  - LICENSE( l\_num, l\_type)
  - SUSPENSION( l\_num, suspension\_start\_date, suspension\_end\_date)
  - CANCELLATION( l\_num, cancellation\_date, cancellation\_period, cancellation\_reason)
  - Dependencies :
    - Partial : None
    - Transitive : None
- 2NF : Since there are no partial dependencies, 2NF is same as 1NF.
  - DRIVER( l\_num, l\_status, f\_name, l\_name, dob, address\_street, address\_town, address\_postcode, l\_expiry\_date)
  - LICENSE( l\_num, l\_type)
  - SUSPENSION( l\_num, suspension\_start\_date, suspension\_end\_date)
  - CANCELLATION( l\_num, cancellation\_date, cancellation\_period, cancellation\_reason)
- 3NF :
  - DRIVER( l\_num, l\_status, f\_name, l\_name, dob, address\_street, address\_town, address\_postcode, l\_expiry\_date)
  - LICENSE( l\_num, l\_type)
  - SUSPENSION( l\_num, suspension\_start\_date, suspension\_end\_date)
  - CANCELLATION( l\_num, cancellation\_date, cancellation\_period, cancellation\_reason)

#### 4. Entity 4 : Driver License Cancellation Report

- UNF :
  - REPORT( I\_num, first\_name, last\_name, ( cancellation\_date, cancellation\_reason, court\_hearing\_date, reinstatement\_date))
- 1NF :
  - REPORT( I\_num, first\_name, last\_name)
  - CANCELLATION(I\_num, cancellation\_date, cancellation\_reason, court\_hearing\_date, reinstatement\_date)
  - Dependencies :
    - Partial : No partial dependencies present
    - Transitive : No transitive dependencies present
- 2NF :
  - REPORT( I\_num, first\_name, last\_name)
  - CANCELLATION(I\_num, cancellation\_date, cancellation\_reason, court\_hearing\_date, reinstatement\_date)
- 3NF :
  - REPORT( I\_num, first\_name, last\_name)
  - CANCELLATION(I\_num, cancellation\_date, cancellation\_reason, court\_hearing\_date, reinstatement\_date)

Finally, these are our final tables! -

1. VEHICLE(vin, v\_type, v\_model, v\_year, v\_colour, m\_code)
2. REGISTRATION(vin, r\_num, r\_date, r\_re\_date)
3. MODEL(v\_model, v\_transmission\_mode, v\_laden, v\_unladen, engine\_size, m\_code, vin)
4. ENGINE(v\_model, engine\_type)
5. MANUFACTURER(m\_code, m\_name, m\_country\_code)
6. COUNTRY(m\_country\_code, m\_country\_name)
7. DRIVER(I\_num, I\_status, f\_name, I\_name, dob, address\_street, address\_town, address\_postcode, I\_expiry\_date)
8. LICENSE(I\_num, I\_type)
9. SUSPENSION(I\_num, suspension\_start\_date, suspension\_end\_date)
10. CANCELLATION(I\_num, cancellation\_date, cancellation\_period, cancellation\_reason)
11. REPORT(I\_num, first\_name, last\_name)
12. CANCELLATION(I\_num, cancellation\_date, cancellation\_reason, court\_hearing\_date, reinstatement\_date)

After consolidation, we get - 10 tables! (Without adding surrogate key and lookup table)

- VEHICLE(vin, v\_type, v\_year, v\_colour)
- REGISTRATION(vin, r\_date, r\_num, r\_re\_date)
- MODEL(v\_model, v\_transmission\_mode, v\_laden, v\_unladen, engine\_size, m\_code, vin)
- ENGINE(v\_model, engine\_type)
- MANUFACTURER(m\_code, m\_name, m\_country\_code)
- COUNTRY(m\_country\_code, m\_country\_name)
- DRIVER(l\_num, l\_status, f\_name, l\_name, dob, address\_street, address\_town, address\_postcode, l\_expiry\_date)
- LICENSE(l\_num, l\_type)
- SUSPENSION(l\_num, suspension\_start\_date, suspension\_end\_date)
- CANCELLATION(l\_num, cancellation\_date, cancellation\_period, cancellation\_reason, cancellation\_reason, court\_hearing\_date, reinstatement\_date)

Improved version - after adding a surrogate key for LICENSE, we get our lookup table and have 11 tables overall!

- VEHICLE(vin, v\_type, v\_year, v\_colour)
- REGISTRATION(vin, r\_date, r\_num, r\_re\_date)
- MODEL(v\_model, v\_transmission\_mode, v\_laden, v\_unladen, engine\_size, m\_code)
- ENGINE(v\_model, engine\_type)
- MANUFACTURER(m\_code, m\_name, m\_country\_code)
- COUNTRY(m\_country\_code, m\_country\_name)
- DRIVER(l\_num, l\_status, f\_name, l\_name, dob, address\_street, address\_town, address\_postcode, l\_expiry\_date)
- LICENSE(l\_num, l\_code)
- LICENSE\_TYPE(l\_code, l\_type)
- SUSPENSION(l\_num, suspension\_start\_date, suspension\_end\_date)
- CANCELLATION(l\_num, cancellation\_date, cancellation\_period, cancellation\_reason, cancellation\_reason, court\_hearing\_date, reinstatement\_date)

