Student Name - DISHI JAIN
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FIT9132
Assignment 2

NORMALISATIONS

VEHICLE ENTITY

UNF :
VEHICLE(VIN, vehicle_type, model_name, vehicle_manf_year , vehicle_color, (reg_date , reg_number, dereg_date))

1NF:
VEHICLE(VIN, vehicle_type , model_name, vehicle_manf_year, vehicle_color)
REGISTRATION(*VIN*, reg_date, reg_number, dereg_date)

Dependency Diagram-
NO PARTIAL DEPENDENCY
NO TRANSITIVE DEPENDENCY

2NF:
Same as 1NF as no Partial Dependency exist-

VEHICLE(VIN, vehicle_type , model_name, vehicle_manf_year, vehicle_color)
REGISTRATION(*VIN*, reg_date, reg_number, dereg_date)

3NF:
Same as 2NF as no Transitive Dependency exist-

VEHICLE(VIN, vehicle_type , model_name, vehicle_manf_year, vehicle_color)
REGISTRATION(*VIN*, reg_date, reg_number, dereg_date)

MODEL ENTITY

UNF:
MODEL(model_name, model_transmission_type, (engine_type) , model_engine_size, model_laden_clearance, model_unladen_clearance, manf_code, manf_name, manf_country_isocode, manf_country_name)

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1NF:
MODEL(model_name, model_transmission_type, model_engine_size, model_laden_clearance, model_unladen_clearance, manf_code, manf_name, manf_country_isocode, manf_country_name)
ENGINE(*model_name* , engine_type)

Dependency Diagram -
NO PARTIAL DEPENDENCY

manf_code → manf_name TRANSITIVE DEPENDENCY
manf_country_isocode → manf_country_name TRANSITIVE DEPENDENCY

2NF:
Same as 1NF as no Partial Dependency exist-

MODEL(model_name, model_transmission_type, model_engine_size, model_laden_clearance, model_unladen_clearance, manf_code, manf_name, manf_country_isocode, manf_country_name)
ENGINE(*model_name* , engine_type)

3NF:
MODEL(model_name, model_transmission_type, model_engine_size, model_laden_clearance, model_unladen_clearance, manf_code, manf_country_isocode)
ENGINE(*model_name* , engine_type
MANUFACTURER(manf_code, manf_name)
MANF_COUNTRY(manf_country_isocode, manf_country_name)

DRIVER ENTITY:

UNF:
DRIVER(driver_licence_no, driver_licence_status, driver_fname, driver_lname, driver_street, driver_town, driver_postcode, driver_dob, driver_licence_expiry_date, (licence_type) , (suspension_startdate, suspension_enddate) , (cancel_date, cancel_duration, cancel_reason))

1NF:

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DRIVER(driver_licence_no, driver_licence_status, driver_fname, driver_lname, driver_street, driver_town, driver_postcode, driver_dob, driver_licence_expiry_date)
LICENCE_TYPE(*driver_licence_no*, licence_type)
SUSPENSION(*driver_licence_no* , suspension_startdate, suspension_enddate)
CANCEL(*driver_licence_no* , cancel_date, cancel_duration, cancel_reason)
Dependency Diagram -
suspension_startdate --> suspension_enddate PARTIAL DEPENDENCY
cancel_reason → cancel_duration TRANSITIVE DEPENDENCY

2NF:
DRIVER(driver_licence_no, driver_licence_status, driver_fname, driver_lname, driver_street, driver_town, driver_postcode, driver_dob, driver_licence_expiry_date)
LICENCE_TYPE(*driver_licence_no*, licence_type)
SUSPENSION(*driver_licence_no* , *suspension_startdate*)
SUSPENSION_DATES(suspension_startdate, suspension_enddate)
CANCEL(driver_licence_no , cancel_date, cancel_duration, cancel_reason)

3NF:
DRIVER(driver_licence_no, driver_licence_status, driver_fname, driver_lname, driver_street, driver_town, driver_postcode, driver_dob, driver_licence_expiry_date)
LICENCE_TYPE(driver_licence_no, licence_type)
SUSPENSION(driver_licence_no , suspension_startdate)
SUSPENSION_DATES(suspension_startdate, suspension_enddate)
CANCEL(driver_licence_no , cancel_date, *cancel_reason*)
CANCEL_DURATION(cancel_reason,cancel_duration)

As Driver's record should also contain the total demerit points accumulated by him, hence adding another attribute called demerit_point inside the DRIVER Entity after carrying out the normalisation.

After adding, the final results are-

DRIVER(driver_licence_no, driver_licence_status, driver_fname, driver_lname, driver_street, driver_town,driver_postcode, driver_dob, driver_licence_expiry_date,driver_demerit_point)
LICENCE_TYPE(driver_licence_no, licence_type)
SUSPENSION(driver_licence_no , suspension_startdate)

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SUSPENSION_DATES(suspension_startdate, suspension_enddate)
CANCEL(driver_licence_no , cancel_date, *cancel_reason*)
CANCEL_DURATION(cancel_reason,cancel_duration)

CANCEL REPORT ENTITY

UNF:
CANCEL_REPORT(driver_licence_no, fname, lname, (cancel_date, cancel_reason, cancel_court_date, cancel_licence_renew_date))

1NF:
CANCEL_REPORT(driver_licence_no, fname, lname)
COURT_HEARING(driver_licence_no, cancel_date, cancel_reason, cancel_court_date, cancel_licence_renew_date)

Dependency Diagram-
NO PARTIAL DEPENDENCY
NO TRANSITIVE DEPENDENCY

2NF:
Same as 1NF as no Partial Dependency exist-

CANCEL_REPORT(driver_licence_no, fname, lname)
COURT_HEARING(driver_licence_no, cancel_date, cancel_reason, cancel_court_date, cancel_licence_renew_date)

3NF:
Same as 2NF as no Transitive Dependency exist-

CANCEL_REPORT(driver_licence_no, fname, lname)
COURT_HEARING(driver_licence_no, cancel_date, cancel_reason, cancel_court_date, cancel_licence_renew_date)

DEMERIT ENTITY

As well as recording the demerit_code, demerit_desc, demerit_point for each demerit, now we need to store whether the demerit causes immediate licence

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cancellation. If it does then we need to record the number of months for which the licence will get cancelled.

The new DEMERIT entity will hence look like-

DEMERIT(demerit_code, demerit_desc , demerit_point, demerit_causing_cancellation, demerit_cancellation_duration)

REMAINING ENTITY-

OFFENCE

OFFENCE(offence_no, offence_location, offence_date, offence_time)

POLICE OFFICER

POLICE_OFFICER(officer_id, officer_fname, officer_lname, rank)

POLICE_STATION

POLICE_STATION(station_no, station_address, station_phone_no, station_availability)

POLICE_ALLOCATION

POLICE_ALLOCATION(allocation_start_date, *officer_id*, *station_no*)

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ENTITIES AFTER 3NF-

VEHICLE(VIN, vehicle_type , *model_name*, vehicle_manf_year, vehicle_color)
REGISTRATION(*VIN*, reg_date, reg_number, dereg_date)

MODEL(model_name, model_transmission_type, model_engine_size, model_laden_clearance, model_unladen_clearance, *manf_code*, *manf_country_isocode*)
ENGINE(*model_name*, engine_type)

MANUFACTURER(manf_code, manf_name)
MANF_COUNTRY(manf_country_isocode, manf_country_name)

DRIVER(driver_licence_no, driver_licence_status, driver_fname, driver_lname, driver_street, driver_town,driver_postcode, driver_dob, driver_licence_expiry_date,driver_demerit_point)
LICENCE_TYPE(driver_licence_no, licence_type)
SUSPENSION(driver_licence_no , suspension_startdate)
SUSPENSION_DATES(suspension_startdate, suspension_enddate)
CANCEL(driver_licence_no , cancel_date, *cancel_reason*)
CANCEL_DURATION(cancel_reason,cancel_duration)

CANCEL_REPORT(driver_licence_no, driver_fname, driver_lname)
COURT_HEARING(driver_licence_no, cancel_date, cancel_reason, cancel_court_date, cancel_licence_renew_date)

DEMERIT(demerit_code, demerit_desc , demerit_point, demerit_causing_cancellation, demerit_cancellation_duration)

OFFENCE(offence_no, offence_location, offence_date, offence_time)

POLICE_OFFICER(officer_id, officer_fname, officer_lname, rank)
POLICE_STATION(station_no, station_address, station_phone_no, station_availability)
POLICE_ALLOCATION(allocation_start_date, *officer_id*, *station_no*)

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CHANGES MADE -

1. Between MODEL and ENGINE entities there is a Many to Many relationship.
1 Model can accommodate many engines and 1 engine can be accommodated in many models.
Hence adding the bridging entity of ACCOMMODATE between MODEL and ENGINE.
This ACCOMMODATE contains the model_name and the engine_type

2. For the below entity-
LICENCE_TYPE(driver_licence_no, licence_type)
To make the design simpler, I have added another Entity called VEHICLE_TYPE which will store the Vehicle type code and the Vehicle type name. This will get connected to the VEHICLE entity to display its vehicle_type_code and will also get connected to the LICENCE_TYPE entity to display the licence type along with the driver licence no.
So the resulting will be-
VEHICLE_TYPE(vehicle_type_code, vehicle_type_name)
VEHICLE(VIN, *vehicle_type_code*, *model_name*, vehicle_manf_year, vehicle_color)
LICENCE_TYPE(driver_licence_no, *vehicle_type_code*)

3. For the entity-
CANCEL_REPORT(driver_licence_no, driver_fname, driver_lname)
The information can be derived from the entity DRIVER hence we do not have to display it again

4. For the entities-
CANCEL(driver_licence_no , cancel_date, *cancel_reason*)
And
COURT_HEARING(driver_licence_no, cancel_date, cancel_reason, cancel_court_date, cancel_licence_renew_date)
We can merge the both into one entity, hence the resulting entity will be-
CANCELLATION(driver_licence_no, cancel_date, cancel_court_date, cancel_licence_renew_date , *cancel_reason*)

FINAL ENTITIES-

1. VEHICLE(VIN, *vehicle_type_code*, *model_name*, vehicle_manf_year, vehicle_color)
2. REGISTRATION(*VIN*, reg_date, reg_number, dereg_date)
3. MODEL(model_name, model_transmission_type, model_engine_size, model_laden_clearance, model_unladen_clearance, *manf_code*, *manf_country_isocode*)
4. ENGINE(engine_type)
5. ACCOMMODATE(*model_name*,*engine_type*)
6. MANUFACTURER(manf_code, manf_name)
7. MANF_COUNTRY(manf_country_isocode, manf_country_name)
8. DRIVER(driver_licence_no, driver_licence_status, driver_fname, driver_lname, driver_street, driver_town,driver_postcode, driver_dob, driver_licence_expiry_date,driver_demerit_point)
9. LICENCE_TYPE(*driver_licence_no*, *vehicle_type_code*)
10. VEHICLE_TYPE(vehicle_type_code, vehicle_type_name)
11. SUSPENSION(*driver_licence_no* , *suspension_startdate*)
12. SUSPENSION_DATE(suspension_startdate, suspension_enddate)
13. CANCEL_DURATION(cancel_reason,cancel_duration)
14. CANCELLATION(*driver_licence_no*, cancel_date, cancel_court_date, cancel_licence_renew_date , *cancel_reason*)
15. DEMERIT(demerit_code, demerit_desc , demerit_point, demerit_causing_cancellation, demerit_cancellation_duration)
16. OFFENCE(offence_no, offence_location, offence_date, offence_time)
17. POLICE_OFFICER(officer_id, officer_fname, officer_lname, rank)
18. POLICE_STATION(station_no, station_address, station_phone_no, station_availability)
19. POLICE_ALLOCATION(allocation_start_date, *officer_id*, *station_no*)