1)

a) First Normal Form (1NF): Requires that all columns contain atomic (indivisible) values, and there are no repeating groups or arrays.

Second Normal Form (2NF): Meets all the requirements of 1NF and ensures that all non-key attributes are fully functionally dependent on the primary key. This means that there is no partial dependency of any column on the primary key.

Third Normal Form (3NF): Meets all the requirements of 2NF and ensures that all the attributes are functionally dependent only on the primary key.

So the table satisfies 1NF as all columns contain atomic values and there are no repeating groups or arrays and It cannot be 2NF because there are partial dependencies between the columns.

b) Now I start from the 2NF since the table is already in 1NF: I must look for any partial dependencies between the attributes and create tables with non-key attributes that are functionally dependent on the key attribute.

2NF:

Staff Table (staff id [PK], given names, family name)

Permit Table (permit reservation id [PK], permit from date, permit to date, permit for number plate)

Card Table (staff card id [PK], card issue date)

EntryAttempt Table (entry attempt id [PK], parking area id, entry datetime, exit datetime)

3NF:

The tables from 2NF already satisfy the conditions of 3NF for the given dataset, as there are no transitive dependencies in the 2NF tables.

BCNF:

For this form I must make sure every non-trivial functional dependency is a super key, this means that the super key of the table should be able to identify a specific row in the database:

Staff Table (staff id [PK], given names, family name, staff card id [FK to Card Table])

Permit Table (permit reservation id [PK], permit from date, permit to date, permit for number plate, staff id [FK to Staff Table])

Card Table (staff card id [PK], card issue date)

EntryAttempt Table (entry attempt id [PK], parking area id, entry datetime, exit datetime, staff id [FK to Staff Table], permit reservation id [FK to Permit Table])

Screen Shots of queries

a)

staff_number	number_of_records
873686	1
571651	1
711876	1

b)

name_on_card	staff_number
Barry Holden	873686
John Sally	711876
Pomona Ford	571651

c)

attempt_id	card_id	area_id	date_and_time_of_entry
2	61688	2	2023-09-20 06:37:18
4	61688	2	2023-09-21 05:11:17
5	61688	2	2023-09-21 05:11:19
NULL	NULL	NULL	NULL

d)

carpark_id	description	total_spots
1	Near Main Entrance	1
2	Near Building B	1
3	Beside Gym	1

e)

card_id	num_of_cars
57165	2
61688	1
84826	1

f)

carpark_id	description	unallocated_spots
1	Near Main Entrance	1
2	Near Building B	1
3	Beside Gym	1

g)

staff_number	total_amount
571651	105.00
711876	125.00
873686	100.00

h)

carpark_id	year	total_revenue
1	2023	105.00
2	2023	125.00
3	2023	100.00