Problem statement 1 - Parking system

A parking lot is a dedicated area that is intended for parking vehicles. Parking lots are present in every city and suburban area. Shopping malls, stadiums, airports, train stations, and similar venues often feature a parking lot with a large capacity. A parking lot can spread across multiple buildings with multiple floors or can be in a large open area.

The parking lot will allow different types of vehicles to be parked:

- Motorcycles/Scooters
- Cars/SUVs
- Buses/Trucks

- Each vehicle will occupy a single spot and the spot size will be different for different vehicles.
- The number of spots per vehicle type will be different for different parking lots. For example,
  - Motorcycles/scooters: 100 spots
  - Cars/SUVs: 80 spots
  - Buses/Trucks: 40 spots
- When a vehicle is parked, a parking ticket should be generated with the spot number and the entry date-time.
- When a vehicle is unparked, a receipt should be generated with the entry date-time, exit date-time, and the applicable fees to be paid.

Fee Models

Different locations have different fee models. Below are a few possible models:

Mall

Per-hour flat fees

Vehicle	Fee
Motorcycle	10
Car/SUV	20
Bus/Truck	50

Stadium

Flat rate up to a few hours and then per-hour rate. The total fee is the sum of all the previous interval fees. No parking spots for buses/trucks at the stadium.

Vehicle	Interval	Fee
Motorcycle	[0, 4) hours	30
	[4, 12) hours	60
	[12, Infinity) hours	100 per hour
Car/SUV	[0, 4) hours	60
	[4, 12) hours	120
	[12, Infinity) hours	200 per hour

As stated by the notation, the start times are inclusive, and the end times are exclusive.

Airport

Flat rate up to one day. Then the per-day rate. There is no summing up of the previous interval fees. No parking spots for buses/trucks at the airport.

Vehicle	Interval	Fee
Motorcycle	[0, 1) hours	Free
	[1, 8) hours	40
	[8, 24) hours	60
	Each day	80
Car/SUV	[0, 12) hours	60
	[12, 24) hours	80
	Each day	100

Problem Statement

Given a parking lot with details about the vehicle types that can be parked, the number of spots, and the fee model for the parking lot; compute the fees to be paid for the parked vehicles when the vehicle is unparked.

Example 1: Small motorcycle/scooter parking lot

Spots:

- Motorcycles/scooters: 2 spots
- Cars/SUVs/Buses/Trucks: NA

Fee Model: Please refer to the **Mall fee model**, mentioned in the **‘Fee Models’** section
Scenarios:

Sr No	Action	Result
1	Park motorcycle	Parking Ticket: Ticket Number: 001 Spot Number: 1 Entry Date-time: 29-May-2022 14:04:07
2	Park scooter	Parking Ticket: Ticket Number: 002 Spot Number: 2 Entry Date-time: 29-May-2022 14:44:07
3	Park scooter	No space available
4	Unpark scooter, ticket number 002	Parking Receipt: Receipt Number: R-001 Entry Date-time: 29-May-2022 14:44:07 Exit Date-time: 29-May-2022 15:40:07 Fees: 10
5	Park motorcycle	Parking Ticket: Ticket Number: 003 Spot Number: 2 Entry Date-time: 29-May-2022 15:59:07
6	Unpark motorcycle, ticket number 001	Parking Receipt: Receipt Number: R-002 Entry Date-time: 29-May-2022 14:04:07 Exit Date-time: 29-May-2022 17:44:07 Fees: 40

Example 2: Mall parking lot

Spots:

- Motorcycles/scooters: 100 spots
- Cars/SUVs: 80 spots
- Buses/Trucks: 10 spots

Fee Model: Please refer to the **Mall fee model** and its examples, mentioned in the **‘Fee Models’** section

Scenarios: The park and unpark steps shown in the previous example have been skipped to reduce the text in the problem statement.

- Motorcycle parked for 3 hours and 30 mins. Fees: 40
- Car parked for 6 hours and 1 min. Fees: 140
- Truck parked for 1 hour and 59 mins. Fees: 100

Example 3: Stadium Parking Lot

Spots:

- Motorcycles/scooters: 1000 spots
- Cars/SUVs: 1500 spots

Fee Model: Please refer to the **Stadium fee model** mentioned in the **'Fee Models'** section

Scenarios: The park and unpark steps shown in the previous example have been skipped to reduce the text in the problem statement.

- Motorcycle parked for 3 hours and 40 mins. Fees: 30
- Motorcycle parked for 14 hours and 59 mins. Fees: 390.
    - 30 for the first 4 hours. 60 for the next 8 hours. And then 300 for the remaining duration.
- Electric SUV parked for 11 hours and 30 mins. Fees: 180.
    - 60 for the first 4 hours and then 120 for the remaining duration.
- SUV parked for 13 hours and 5 mins. Fees: 580.
    - 60 for the first 4 hours and then 120 for the next 8 hours. 400 for the remaining duration.

Example 4: Airport Parking Lot

Spots:

- Motorcycles/scooters: 200 spots
- Cars/SUVs: 500 spots
- Buses/Trucks: 100 spots

Fee Model: Please refer to the **Airport fee model** mentioned in the **'Fee Models'** section

Scenarios: The park and unpark steps shown in the previous example have been skipped to reduce the text in the problem statement.