ISLAMIC UNIVERSITY OF TECHNOLOGY

SWE 4301

EXTRA ASSIGNMENT

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1 TASK

1.1 Automated Parking Lot system

Imagine you own a parking lot. Now, you want to create a system that that can handle your parking lot automatically. To create an automated ticketing system for your parking lot, the task can be break down into detailed steps and components. You have to follow the system details and code to create the system with your best object oriented concept knowledge. Y**ou will need to submit the .Java files and a short description with the design diagram with clear indications of your built system. The last day of submission will be 17th April 2025.**

1.2 System Requirements

1.2.1 Parking Lot Initialization

- The system should initialize a parking lot with n slots, where n is provided as input.
- Each slot is numbered from 1 to n, with 1 being the closest to the entry point.

1.2.2 Ticket Issuance

When a car enters, the system should:

- Assign the nearest available slot to the car.
- Record the car's registration number and color.
- Generate a ticket with the allocated slot number, registration number, and color.

1.2.3 Ticket Return

When a car exits, the system should:

- Mark the slot as available.
- Remove the car's details from the system.

1.2.4 Government Regulation Queries

The system should support the following queries:

- Find registration numbers of all cars of a particular color.

- Find the slot number where a car with a given registration number is parked.
- Find slot numbers of all cars of a particular color.

1.2.5 Input Modes

The system should have an interactive command prompt.

1.3 Commands to Support

The system should support the following commands:

1. Create Parking Lot:
    - Command: `create_parking_lot <n>`
    - Action: Initializes a parking lot with n slots.
    - Output: `Created a parking lot with <n> slots`
2. Park a Car:
    - Command: `park <registration_number> <color>`
    - Action: Allocates the nearest available slot to the car and issues a ticket.
    - Output: `Allocated slot number: <slot_number>`
    - If no slots are available: `Sorry, parking lot is full`
3. Leave a Slot:
    - Command: `leave <slot_number>`
    - Action: Marks the slot as available and removes the car's details.
    - Output: `Slot number <slot_number> is free`
4. Status of Parking Lot:
    - Command: status
    - Action: Displays the current occupancy of the parking lot.
    - Output: A table showing slot numbers, registration numbers, and colors of parked cars.
5. Query Registration Numbers by Color:

- Command: `registration_numbers_for_cars_with_colour <color>`
- Action: Returns a comma-separated list of registration numbers for cars of the specified color.
- Output: `<registration_number_1>, <registration_number_2>, ...`
- If no cars match: `Not found`

6. Query Slot Number by Registration Number:
   - Command: `slot_number_for_registration_number <registration_number>`
   - Action: Returns the slot number where the car with the given registration number is parked.
   - Output: `<slot_number>`
   - If not found: `Not found`
7. Query Slot Numbers by Color:
   - Command: `slot_numbers_for_cars_with_colour <color>`
   - Action: Returns a comma-separated list of slot numbers where cars of the specified color are parked.
   - Output: `<slot_number_1>, <slot_number_2>, ...`
   - If no cars match: `Not found`
8. Exit the System:
   - Command: `exit`
   - Action: Exits the interactive command prompt.

1.4 Example

> create_parking_lot 6
Created a parking lot with 6 slots
> park KA-01-HH-1234 White
Allocated slot number: 1
> park KA-01-HH-9999 White
Allocated slot number: 2
> park KA-01-BB-0001 Black

Allocated slot number: 3
> park KA-01-HH-7777 Red
Allocated slot number: 4
> park KA-01-HH-2701 Blue
Allocated slot number: 5
> park KA-01-HH-3141 Black
Allocated slot number: 6
> leave 4
Slot number 4 is free
> status
Slot No. Registration No. Colour
1 KA-01-HH-1234 White
2 KA-01-HH-9999 White
3 KA-01-BB-0001 Black
5 KA-01-HH-2701 Blue
6 KA-01-HH-3141 Black
> park KA-01-P-333 White
Allocated slot number: 4
> park DL-12-AA-9999 White
Sorry, parking lot is full
> registration_numbers_for_cars_with_colour White
KA-01-HH-1234, KA-01-HH-9999, KA-01-P-333
> slot_numbers_for_cars_with_colour White
1, 2, 4
> slot_number_for_registration_number KA-01-HH-3141
6
> slot_number_for_registration_number MH-04-AY-1111
Not found
> exit