PARTIAL I BACKEND WEB APPLICATION DEVELOPMENT 2025-10

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Movies UPB Parking Management System

Our brand, "Movies UPB," aims to improve the experience for customers who visit us in their vehicles. The current parking management process is manual, which creates lines at the exit and prevents us from automatically offering benefits to our most loyal customers. To modernize this service, we will install an automated system. At the entrance, a machine will capture the license plate and vehicle type (car or motorcycle) to register entry. Upon exit, the customer will approach an automated payment kiosk, scan their ticket (which is linked to their license plate), and the system will calculate the amount due. The key requirement is that the system can differentiate between a regular visitor and a store customer, as parking will be free for the latter. We need you to develop the backend system that will orchestrate all this logic and allow us to obtain a balance of the revenue generated at the end of the day. Your work is important for providing a more efficient service and strengthening our customer loyalty program. We are confident in your ability to deliver a robust, scalable, and well-designed solution.

Functional Requirements (FR)

The system must fulfill the following functionalities:

RF-01. Vehicle Entry Registration: The system must expose an endpoint for the entry machine to register the entry of a vehicle. The request must include the license plate number. The system must store this information along with the exact date and time of entry. There are 38 spaces for cars and 26 for motorcycles.

RF-02. Calculation and Output Process: The system must provide an endpoint for the automated checkout. This will receive the vehicle's license plate number. To receive their benefit, customers must have registered their license plate and vehicle type with the store cashiers.

- If the user is a customer of the store, the cost of the service is $0.
- If you are not a customer, the system must calculate the amount to be paid based on the total time in minutes since your entry and the corresponding rate.
- Once the charge is calculated (whether zero or an amount), the system must record the departure time and mark the parking cycle as 'finished'.
- The value-added tax is 19%.

RF-03. Service Rates: The system must have the following per-minute rates configured:

- Car: $88 pesos per minute.
- Motorcycle: $66 pesos per minute.

RF-04. Daily Balance Generation: An endpoint must be implemented that allows users to view the income balance for a specific day. The report must include:

- Total Amount Collected: The sum of all payments received on that date.
- Details of Departures: A list of all vehicles that ended their stay that day, specifying their license plate, whether they were a customer of the store and the amount they paid.

Non-Functional Requirements (NFR)

RNF-01. The development must be associated with a clean architecture (Ports and Adapters). Furthermore, it must be implemented using the topics covered in class, without the use of third-party libraries or tools; any other approach will be discarded.

RNF-02. Simulation of External Devices: The input machine and the automatic payment box will be simulated using an HTTP client (such as Postman, cURL or a script).

RNF-03. Data Persistence: Information on clockings and employees must be stored in a database (e.g., PostgreSQL, MySQL) or non-relational database (e.g., MongoDB), at the student's choice.

RNF-04. Vehicle Entrance:

Request /api/v1.0/parking/revenue {
 	
"license plate": "XYZ-123"
}
	Response 201
	{
	"recordId": "uuid-park-112233", "plate":
	"XYZ-123",
	"entrytime": "2025-09-15T14:30:00Z"
	}

RNF-05. Payment Exit and Calculation:

Request /api/v1.0/parking/exits {
 	
"license plate": "XYZ-123"
}
	Response 200
	{
	"license plate": "XYZ-123",
	"type": "CAR",
	"timeIn": "2025-09-15T14:30:00Z", "timeOut":
	"2025-09-15T16:00:00Z", "timeParkedMinutes":
	90, "amountToPay": 7920
	
	}

RNF-06. Daily Balance Inquiry:

Request /api/v1.0/parking lot/daily reports/balance
 	
Example:
/api/v1.0/parking/reports/daily-balance?date=2025-09-15
	Response 200
	
	{
	"fechaReporte": "2025-09-15",
	"recaudoTotalDelDia": 25500.0,
	"detalleVehiculos": [
	{
	"license plate": "XYZ-123",
	"type": "CAR",
	"esClienteTienda": false,
	"montoPagado": 7920.0
	},
	{
	"plate": "ABC-78D",
	"type": "MOTORCYCLE",
	"esClienteTienda": true,
	"montoPagado": 0.0
	},
	{
	"license plate": "MOT-456",
	"type": "CAR",
	"esClienteTienda": false,
	"montoPagado": 17580.0
	}
	]
	}