Analiza și Modelarea Sistemelor Software - Lab 3[1]

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2025

[1]Thanking Andrian Babii @ Endava for slide content

Agenda

- Class diagrams
- Package diagrams
- Component diagrams

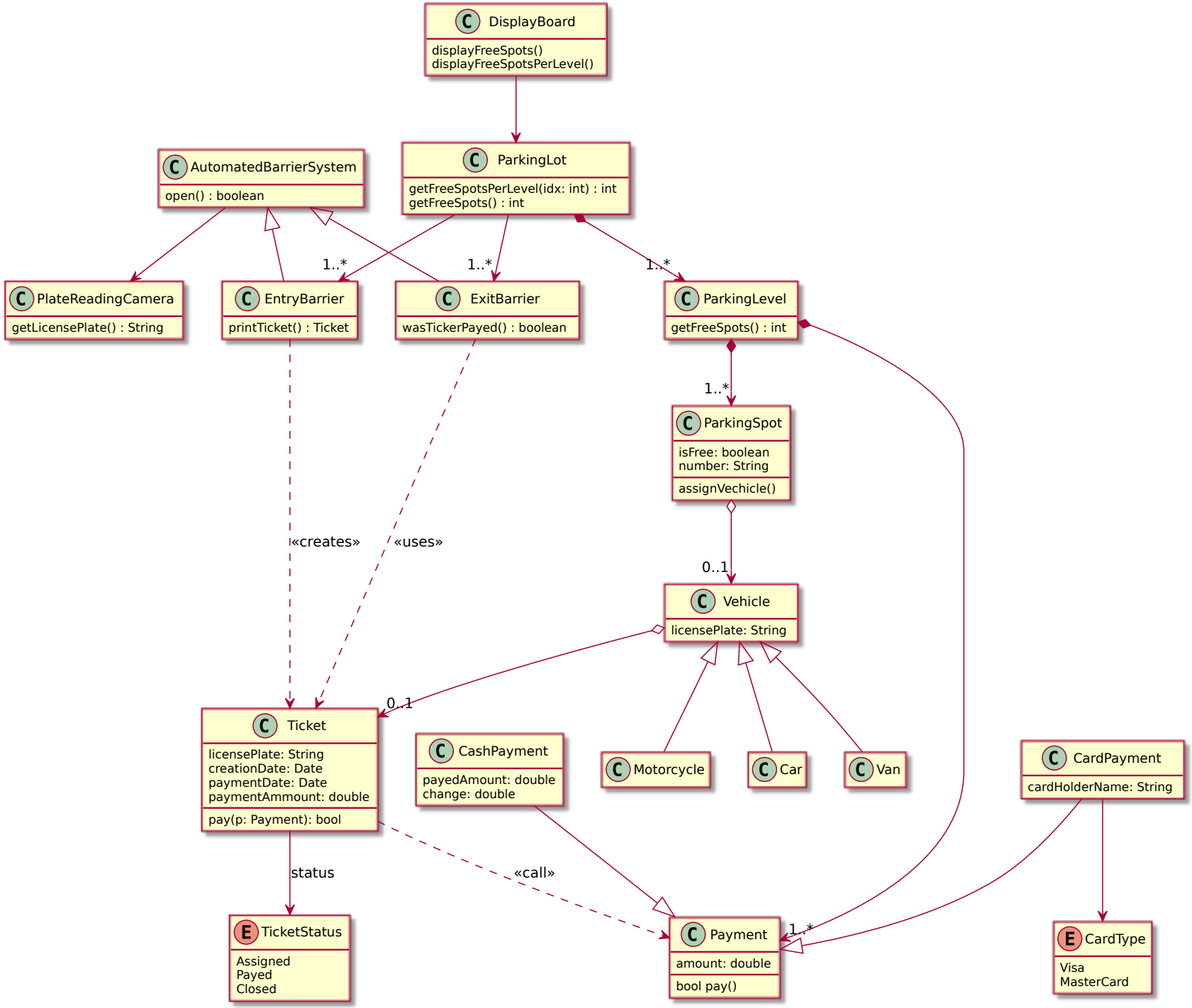
Tools

- Lucidchart — component and package diagrams
- Mermaid.js — class diagrams

Parking Lot Exercise

Scenario: Airport parking lot

- Contains multiple levels
- Sensors at each parking slot to detect if a slot is free or not
- Multiple entrances and exits
- By the entrances there are displays showing:
  - Total free spots
  - Free spots per level
- Both entrance and exit have cameras that reads license plates
- Entrance generates a ticket
- Exit Opens the barrier if the ticket was paid
- Multiple payment kiosks on each level
- Payment can be made with **cash** or **credit card**

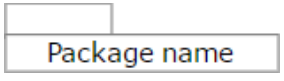

DisplayBoard
displayFreeSpots()
displayFreeSpotsPerLevel()
AutomatedBarrierSystem
open() : boolean
ParkingLot
getFreeSpotsPerLevel(idx: int) : int
getFreeSpots() : int
PlateReadingCamera
getLicensePlate() : String
EntryBarrier
printTicket() : Ticket
ExitBarrier
wasTickerPayed() : boolean
ParkingLevel
getFreeSpots() : int
1..*
1..*
1..*
1..*
ParkingSpot
isFree: boolean
number: String
assignVechicle()
«creates»
«uses»
0..1
Vehicle
licensePlate: String
0..1
Ticket
licensePlate: String
creationDate: Date
paymentDate: Date
paymentAmmount: double
pay(p: Payment): bool
CashPayment
payedAmount: double
change: double
Motorcycle
Car
Van
CardPayment
cardHolderName: String
status
«call»
TicketStatus
Assigned
Payed
Closed
Payment
amount: double
bool pay()
1..*
CardType
Visa
MasterCard

Package Diagram

- A **package** is a collection of logically related UML elements.
  - Simplify complex class diagrams by grouping classes into *packages*.

Package diagrams are commonly used to:

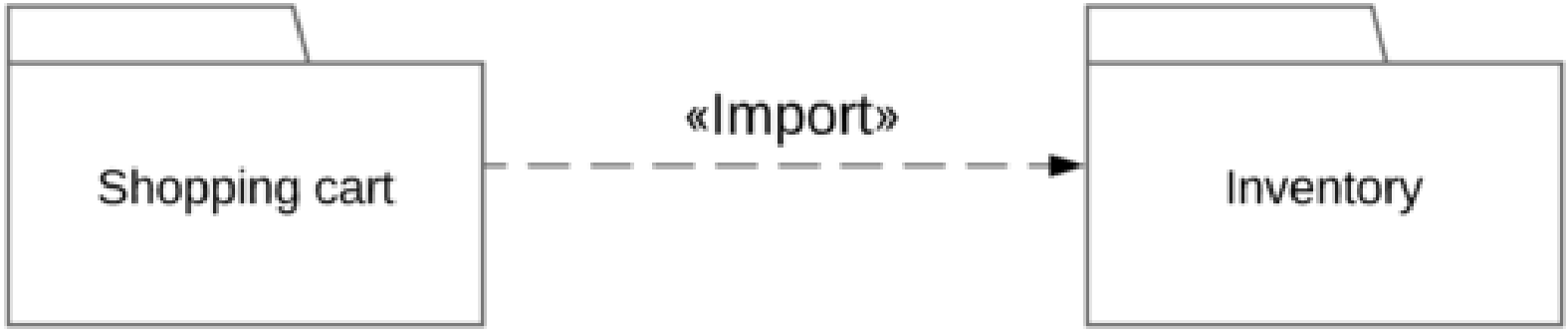
- Provide a visual organization of layered architecture
- Represent logical structure within UML classifiers (like software systems)

Symbol	Name	Description
	Package	Groups common elements based on data, behavior, or user interaction
	Dependency	Depicts the relationship between one element (package, named element, etc) and another

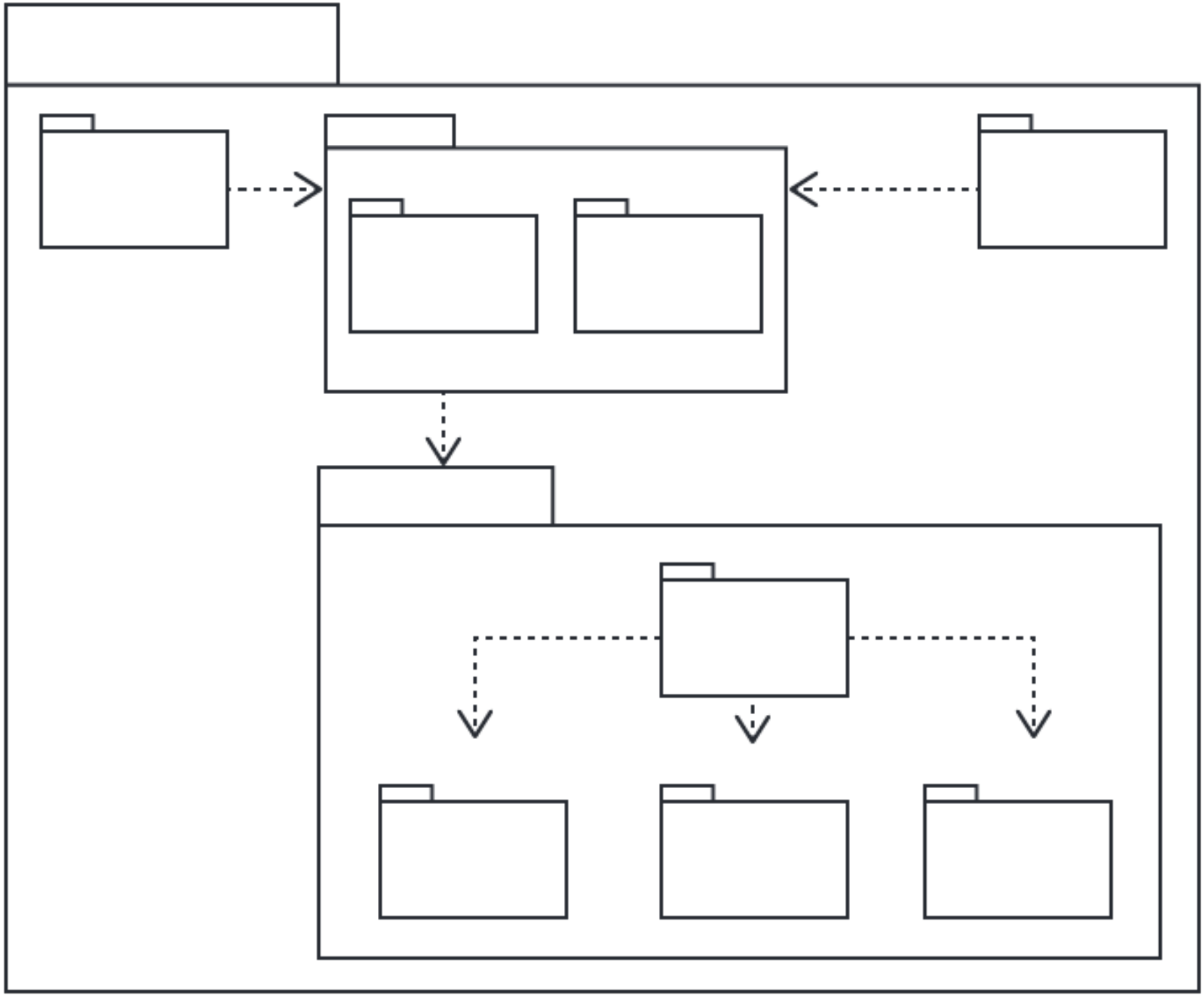
Dependencies in Package Diagrams

There are two main types of dependencies between packages:

1. **Import dependency** — allows access to all public elements of another package



2. **Access dependency** — limits access to specific elements only

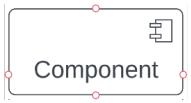


Exercise

Create a **package diagram** based on the **class diagram for the parking lot**.

Component Diagrams

- Specialized class diagrams that focus on a system's **components**.
- Used to model the **static implementation view** of a system.

Symbol	Name	Description
	Component	Modular part of a system that encapsulates its contents and whose manifestation is replaceable within its environment
	Required interface	Represents the services needed/used by the component
	Provided interface	Represents the services delivered by the component

Exercise

Create a **component diagram** based on the **class diagram for the parking lot**.