

CAR PARK OOA/D

In order to allow visitors to enjoy an area of outstanding natural beauty, Regional Car Parks have decided to construct a large multi-storey car park on the site.

The building will have multiple parking levels. Access to the car park will be via a ramp on the ground floor. As a car approaches the barrier it will activate a pressure pad set into the access road. This will dispense a ticket from a small machine, set at driver height, just before the barrier. When the ticket is taken by the driver, the barrier will open, allowing the car to proceed inside. After 30 seconds the barrier will lower. The car park will have a maximum capacity. If the number of cars inside the building is equal to this capacity then the barrier will not open.

The ticket dispensed to a driver upon entry is to be placed on the windscreen of a parked car. These tickets will be checked regularly by a parking attendant who wanders around the facility. This is designed to stop two or more vehicles entering the car park during the single 30 second period that the barrier is raised. A car without a ticket will be clamped, and the driver will have to pay a fine to release it.

Cars will leave the facility via an exit ramp. This will also be blocked by a barrier. A manned kiosk is placed just before the barrier. The driver will pay the kiosk attendant a sum based on a period of time parked. After payment is made the attendant will press a button, and the barrier will open. The car may then proceed through. After passing through the barrier the car will drive over a pressure pad set into the exit ramp. This reduces the total of vehicles in the car park by one.

What to do

Draw an object-oriented analysis model of this problem domain description using an OO Class diagram notation.

Provide a textual description of your rationale for choosing the classes and objects that you use, and for the structure of your diagram.

Car Park Use Cases

Use Case 1: Enter Car Park

Actors: Driver

Context: The Driver wants to park in the local “Regional Car Park” so the Driver can go shopping.

Pre-condition: There are parking spaces available inside the car park.

Main flow of events:

1. The Driver drives to the ticket machine.
2. The Driver presses the ticket button.
3. The ticket machine dispenses a ticket.
4. The Driver takes the ticket.
5. The entry barrier raises.
6. The Driver drives into the car park.
7. The entry barrier lowers.
8. The Driver parks the car.

Exceptional flow of events:

3. The ticket machine fails to dispense a ticket. The Driver calls for assistance.

Post condition: There is one less space available inside the car park.

Use Case 2: Exit Car Park

Actors: Driver, Car Park Attendant

Context: The Driver wants to leave the car park.

Pre-condition: -

Main Flow of Events:

1. The Driver drives to the exit barrier.
2. The Driver hands the car park ticket to the Car Park Attendant.
3. The Car Park Attendant checks the ticket against a tariff list.
4. The Car Park Attendant informs the Driver of how much to pay.
5. The Driver pays the Car Park Attendant.
6. The Car Park Attendant raises the exit barrier.
7. The Driver drives out of the car park.
8. The exit barrier lowers.

Exceptional flow of events:

2. The Driver has no car park ticket. The Car Park Attendant charges a standard fee.

Exceptional flow of events:

5. The Driver has no money. The Car Park Attendant impounds vehicle.

Post-condition: There is one more space available in the car park.