DIT636 / DAT560 - Quality Scenario Exercise

You have been asked to develop a new automated parking system at the Gothenburg Landvetter airport.

The core functionality offered by this system includes:

- Allowing users to enter the parking garage.
    - (Option 1) A user can insert their credit or debit card into the card reader at the ramp entrance. This will record the time they entered airport parking.
    - (Option 2) The system should also support ticketed parking, where the user receives a ticket on entering. This ticket records the time they entered.
- Allowing users to pay for parking.
    - (If the user used Option 1). The user uses the same credit or debit card to pay at an exit lane.
    - (If the user used Option 2). The user inserts the ticket, then pays using a credit card, debit card, or physical currency.
- Allowing users to exit the garage after paying.

You may infer additional functionality from the information below.

The system should be fully automated. The system needs to interact with a number of entities and systems, including:

- Customers parking in the ramp
- Airport police and emergency responders (who should be able to enter without paying or getting a ticket).
- External systems for validating credit card details and submitting payments
- The airport's accounting system.
- External physical gate systems with basic controllers (raise / lower).
- External physical systems for signage indicating whether there are remaining parking spots.

The system will be deployed within the physical architecture of the airport parking garage, incorporating:

- Entrance Kiosks
    - Card dispensers
    - Credit card reader
    - Card reader for contract parking
    - Signage: {OPEN / CLOSED}
    - Entry gate
- Parking Entrance
    - Signage {FULL / NOT FULL}
- Exit Kiosks
    - Signage: {OPEN / CLOSED}
    - Staffed kiosks
    - Automated kiosks
    - Exit gate
- Security cameras
- Hardware for Parking System
    - Dual server w/failover (can switch in event of failure)
    - Clustered DB
    - Storage area network

You will describe scenarios using the following template:

- Overview
  - Brief description of what the scenario illustrates, provides important context.
- System State
  - Aspects of the system state that affect quality (e.g., information stored in the system, number of concurrent logged-in users, previous failures that may influence execution).
- Environment State
  - Significant observations about the environment that the system is running in that could influence the quality of the system (e.g., factors related to other pieces of software, hardware, users, or the physical environment).
- External Stimulus
  - Input event(s) or environmental factor(s) that initiate the scenario. (e.g., requests, user interactions, timing events, infrastructure changes, software or infrastructure failures, security attacks, etc.).
  - Name both the actor who initiated the stimulus and the action performed.
- Required System Response
  - How should the system respond (from a functional point of view)? (e.g., how should it handle a defined increase in requests?).
  - Focus on actions that relate to the quality attribute of interest.
- Response Measure
  - How success is defined and measured, along with a threshold that must be defined for success.
  - Based on the quality attribute of interest.

Based on the above template, create the following scenarios:

1. **Create a reliability scenario.**
2. **Create an availability scenario.**
3. **Create a performance scenario.**
4. **Create a scalability scenario.**

You may make any assumptions you want about unstated elements of system functionality. State all assumptions made.