**Problem Statement for Technical Lead Interview**

**Name of the Candidate: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_**

**Problem Statement:**

A Vehicle is equipped with a device for uploading of critical data like Location and Speed of the vehicle. Also, there is a non-critical diagnostic data that is uploaded for later analysis. The system raises alarms on crossing 80 km/hour speed, on crossing a geo fencing. The system also accepts commands to control the vehicle engine on/off, air conditioner on/off, lights on/off. The system shall not lose the critical data whenever it is not able to upload the data.

Design a Software System to achieve a solution for the above functionality. Please elaborate your solution with the following aspects:

1) Software Requirements

2) Software Architecture & Design details

3) Testing Approach

**Instructions:**

- Based on the above problem statement you are free do have your assumptions for the minor details or data.

- Please carry the solution with you while coming to the interview.

- Use separate papers for elaboration of your solution.

- Elaborate the solution aspects by applying the methodologies that are known to you. However, please try to be precise and to the point in elaboration.

- Please put all the design details on paper. Also, please make sure the solution details written on paper and neat and clean.

**Software Requirements**

1. **GIVEN**

Vehicle is in Status On

**WHEN**

A new diagnostic message has been received

**THEN**

Upload the diagnostic message onto the Cloud

1. **GIVEN**

Vehicle is in Status On

**WHEN**

Location value received has changed

**THEN**

Upload the location value onto the Cloud

1. **GIVEN**

Vehicle is in Status On

**WHEN**

Speed value received has changed

**THEN**

Store the Speed value onto the Cloud

1. **GIVEN**

Vehicle is in Status On

**AND**

Cloud Link is lost

**WHEN**

Location value received has changed

**THEN**

Store the Location value in a local queue

1. **GIVEN**

Vehicle is in Status On

**AND**

Cloud Link is lost

**WHEN**

Speed value received has changed

**THEN**

Store the Speed value in a local queue

1. **GIVEN**

Vehicle is in Status On

**AND**

Queue in req #3 is not empty

**WHEN**

Cloud Link is active

**THEN**

Upload the values from the local queue mentioned in req #3

1. **GIVEN**

Vehicle is in Status On

**AND**

Queue in req #4 is not empty

**WHEN**

Cloud Link is active

**THEN**

Upload the values from the local queue mentioned in req #4

1. **GIVEN**

Vehicle is in Status On

**WHEN**

Location value received has changed

**AND**

Location value is of geo fencing

**THEN**

Play sound Geo\_Fencing.mp3

1. **GIVEN**

Vehicle is in Status On

**WHEN**

Speed value received has changed

**AND**

Speed value is of 80 km/h

**THEN**

Play sound Warning.mp3

1. **GIVEN**

Vehicle is in Status On

**WHEN**

Vehicle status changes to Off

**THEN**

Set Vehicle Status as Off

1. **GIVEN**

Vehicle is in Status Off

**WHEN**

Vehicle status changes to On

**THEN**

Set Vehicle Status as On

1. **GIVEN**

Vehicle is in Status On

**AND**

AC Status is On

**WHEN**

AC changes to Off

**THEN**

Set AC Status as Off

1. **GIVEN**

Vehicle is in Status On

**AND**

AC Status is Off

**WHEN**

AC changes to On

**THEN**

Set AC Status as On

1. **GIVEN**

Vehicle is in Status On

**AND**

Lighting Status is On

**WHEN**

Lighting changes to Off

**THEN**

Set Lighting Status as Off

1. **GIVEN**

Vehicle is in Status On

**AND**

Lighting Status is Off

**WHEN**

Lighting changes to On

**THEN**

Set Lighting Status as On

**2) Software Architecture & Design details**

Speaker

Speed Monitor

Database on the cloud

The Core Application

Geo Location Monitor

Aux System1

Aux System2

RegistrationHelper

registerObserver

deregisterObserver

Isubject\*

ISubject

registerObserver

deregisterObserver

DiagnosticMonitor

registerObserver

deregisterObserver

newDiagnosticData

LocationMonitor

registerObserver

deregisterObserver

locationChanged

SpeedMonitor

registerObserver

deregisterObserver

speedChanged

IObserver

update

Speaker

update

DataUploader

update