Assessment for Practical: Naan Mudhalvan
LEARN TO SIMULATE AND TEST YOUR ADAS ECU

Test 1	**Implementation of LED Blinking Control via Switch Press using CANoe Simulation Tool**
Test 2	**Design and Simulation of Autonomous Emergency Braking System Using CANoe**
Test 3	**Simulation of Automatic Door Locking System in CANoe**
Test 4	**Development of Pre-Crash Seat Belt Control System**
Test 5	**Development and Simulation of Tire Pressure Monitoring System in CANoe**

Test 1: Implementation of LED Blinking Control via Switch Press using CANoe Simulation Tool

Objectives:

a. Gain an understanding of digital input and output control through LED and switch interaction.

b. Simulate basic on/off LED control in response to switch presses using CANoe.

c. Use CAPL scripting to control the LED state based on switch activation.

Tasks:

CANoe Setup for LED and Switch Simulation:

- Configure the CANoe environment to simulate a digital switch input and LED output.
- Ensure both components are accurately represented within the simulation.

CAPL Scripting for LED Control:

- Develop CAPL code to monitor switch status and toggle the LED accordingly.
- Implement logic that handles various switch press scenarios for blinking control.

Testing and Validation:

- Conduct testing within CANoe to confirm the LED responds accurately to simulated switch inputs.
- Ensure timing and response consistency.

Test 2: Design and Simulation of Autonomous Emergency Braking System Using CANoe

Objectives:

a. Understand the structure of an Autonomous Emergency Braking (AEB) system and its application in vehicle safety.

b. Develop a CANoe simulation to demonstrate AEB behavior.

c. Integrate CAPL scripting with GUI elements to visualize the braking system's response to obstacle detection.

Tasks:

CAPL Scripting for AEB Logic:

- Write CAPL code to activate braking based on the proximity of detected obstacles
- Use CAN signals to initiate braking sequences.

GUI Panel Setup for Braking System:

- Design a GUI panel in CANoe to display the system's operational state.
- Include indicators for detected obstacles and braking status.

Simulation Testing:

- Test the AEB system using simulated inputs under various conditions.
- Ensure the braking engages appropriately upon obstacle detection.

Test 3: Simulation of Automatic Door Locking System in CANoe

Objectives:

a. Develop an automatic door locking system in CANoe to demonstrate real-time locking based on vehicle speed.

b. Use DBC files for signal mapping to ensure alignment with standard protocols.

c. Formulate test cases to verify system functionality.

Tasks:

DBC File Integration:

- Import relevant DBC files into CANoe for signal mapping related to door locking control.

CAPL Scripting for Lock Control:

- Write CAPL code to simulate automatic door locking at a predefined speed threshold.
- Enable unlocking when speed drops below the threshold.

Test Case Development:

- Create test cases simulating varying speeds to verify lock/unlock behavior.
- Document results and refine scripts for optimal reliability.

Test 4: Development of Pre-Crash Seat Belt Control System

Objectives:

a. Implement a pre-crash seat belt control system for improved passenger safety.

b. Design a CANoe panel to display real-time seat belt system status.

c. Automate pre-crash seat belt engagement using CAPL scripting.

Tasks:

CAPL Scripting for Seat Belt Engagement:

- Write code to engage seat belts in pre-crash scenarios using crash impact data.

Panel Visualization:

- Design a CANoe panel to visualize the state of seat belts during simulated crash events.

Testing for Responsiveness:

- Run tests with various crash simulation parameters.
- Evaluate the system's response time and reliability.

Test 5: Development and Simulation of Tire Pressure Monitoring System in CANoe

Objectives:

a. Simulate a Tire Pressure Monitoring System (TPMS) in CANoe with real-time data.

b. Use DBC files for streamlined signal mapping and configuration.

c. Develop alerts for abnormal tire pressure conditions.

Tasks:

DBC File Import for TPMS Signals:

- Import DBC files to configure TPMS signals accurately for each tire.

Real-Time Pressure Data Simulation:

- Simulate varied pressure levels for each tire and map them to TPMS signals.

Testing and Real-Time Monitoring:

- Test the TPMS under simulated conditions to confirm alerts for abnormal pressure levels.