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**PROJECT -- Self-driving Car System -- High-level Design**

## ❖ SYSTEM DESCRIPTION

- CORE
  - Design a system that moves a self-driving car from a starting location to a destination.
    - The system will devise a route for the car to drive.
    - You will accept user inputted destination
    - The current location is known.
  - NOTE:
    - Some roads may be one-way.
    - Assume constant speed.
  - Your code will command the car to go forward, stop, right and left.
  - You will be given a file with the street information to be used to make a route and travel to the inputted destination.
- META
  - Requirements always have the word "shall" in the sentence.
  - Each requirement must have a unique identifier.
  - Each requirement is testable.
    - That is if you wrote a test procedure to test a function described in the requirements, your code will either pass or fail the requirement.
    - You shouldn't write a requirement that contains two things to test.
      - In other words, do not use the word "and" to test two things.
      - Instead, break it into two requirements.
        - That way you can pass one requirement and fail the other but with the word and, you fail the whole requirement.
  - EXAMPLES:
    - Some ways to begin writing a requirement:
      - The system shall provide the capability to …
      - The system shall allow the operator to …
      - The system shall limit the number of …
- HIGH-LEVEL DESIGN
  - Identify classes with methods
  - design a high-level activity diagram for the self-driving car
  - design a high-level sequence diagram for the self-driving car

## ❖ HIGH-LEVEL DESIGN

- CLASSES
  - Control
    - Interior
      - Climate Control
        - *getCabinTemp()*
        - *setCabinTemp()*
    - Body
      - Illumination

        - *getOutsideBrightness()*
        - *setBodyLighting()*
- Engine
    - Emissions
        - *selfTest()*
        - *logResults()*
        - *warnUser()*
- Safety
    - Active Systems
        - Airbags
            - *selfTest()*
            - *activate()*
            - *deactivate()*
            - *deploy()*
        - Automatic Emergency Braking
            - *selfTest()*
            - *activate()*
            - *deactivate()*
            - *modulate()*
        - Hill-start Assist
            - *selfTest()*
            - *activate()*
            - *deactivate()*
            - *modulate()*
        - Lane-change Assist
            - *selfTest()*
            - *activate()*
            - *deactivate()*
            - *deploy()*
        - Lane-keep Assist
            - *selfTest()*
            - *activate()*
            - *deactivate()*
            - *deploy()*
        - High-speed Steering Assist
            - *selfTest()*
            - *activate()*
            - *deactivate()*
            - *deploy()*
    - Sensors
        - Sonar
            - *startDataStream()*
            - *stopDataStream()*
            - *reset()*
            - *calibrate()*

        - Radar
            - *startDataStream()*
            - *stopDataStream()*
            - *reset()*
            - *calibrate()*
        - LiDar
            - *startDataStream()*
            - *stopDataStream()*
            - *reset()*
            - *calibrate()*
        - Optical
            - *startDataStream()*
            - *stopDataStream()*
            - *reset()*
            - *calibrate()*
- Wireless
    - Communications
        - Cellular
            - *activate()*
            - *deactivate()*
            - *connect()*
            - *disconnect()*
            - *reset()*
        - WiFi
            - *activate()*
            - *deactivate()*
            - *connect()*
            - *disconnect()*
            - *reset()*
        - Bluetooth
            - *activate()*
            - *deactivate()*
            - *connect()*
            - *disconnect()*
            - *reset()*
        - Proprietary
            - *activate()*
            - *deactivate()*
            - *connect()*
            - *disconnect()*
            - *reset()*
    - Navigation
        - GPS
            - *activate()*
            - *deactivate()*

        - *connect()*
        - *disconnect()*
        - *reset()*
- Sales
    - On-board Entertainment
        - *authorizePurchase()*
    - Luxury Amenities
        - *selectOptions()*
        - *authorizePurchase()*
    - Point of Sale
        - Card Processor
            - *authorizePurchase()*
        - NFC
            - *authorizePurchase()*