

HOMEWORK 2 -- Requirement analysis for a self-driving car system

❖ 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 ...

❖ REQUIREMENTS SPECIFICATION

➤ r001

- The car shall not depart for a trip that is longer than the vehicle has fuel or battery capacity to reach.

➤ r002

- The car shall acquire a GPS lock prior to departing.

➤ r003

- The car shall determine its route prior to departing.

➤ r004

- The car shall be capable of re-calculating its route to avoid major traffic disturbances or blockages.

➤ r005

- The car shall stop at all stop signs.

➤ r006

- The car shall prefer to stop at all yellow lights if possible rather than proceed through them.

- r007
 - The car shall stop at all red lights.
- r008
 - The car shall not blindly proceed through green lights without simultaneously checking for traffic as it does.
- r009
 - The car shall always favor preserving vulnerable street users rather than itself.
- r010
 - The system shall reduce the number of left turns whenever possible.
- r011
 - The system shall always yield control to a human operator on command.
- r012
 - The system shall provide the capability to detect physical distance to all nearest objects.