INSTRUCTIONS:
Fill out the hazard analysis and risk assessment below.
HA-001 should be for the lane departure warning function as discussed in th
HA-002 should be for the lane keeping assistance function as discussed in t
Then come up with your own situations and hazards for the lane assistance
When finished, export your spreadsheet as a pdf file so that a reviewer can

Hazard ID	Operational Mode	Operational Scenario	Environmental Details
HA-001	OM03 - Normal driving	OS04 - Highway	EN06 - Rain (slippery road)
HA-002	OM03 - Normal driving	OS03 - Country Road	EN01 - Normal conditions
HA-003	OM03 - Normal driving	OS02 - City Road	EN01 - Normal conditions
HA-004	OM03 - Normal driving	OS09 - Road tunnel	EN01 - Normal conditions

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system. Fill in the HA-003 and HA-004 rows.
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Situational Analysis		
Situation Details	**Other Details (optional)**	**Item Usage (function)**
SD02 - High speed		IU01 - Correctly used
SD02 - High speed		IU02 - Incorrectly used
SD01 - Low speed		IU01 - Correctly used
SD02 - High speed		IU01 - Correctly used

Situation Description	Function
Normal driving on highway during rain with high speed	Lane Departure Warning (LDW) function shall apply an oscillating steering torque to provide the driver with haptic feedback
Normal driving on country road during normal conditions with high speed (the driver is misusing the lane keeping assistance function as an autonomous function)	Lane Keeping Assistance (LKA) function shall apply the steering torque when active in order to stay in ego lane
Normal driving on city road during normal conditions with low speed	Lane Departure Warning (LDW) function shall apply an oscillating steering torque to provide the driver with haptic feedback
Normal driving in road tunnel during normal conditions with high speed	Lane Keeping Assistance (LKA) function shall apply the steering torque when active in order to stay in ego lane

Deviation	Deviation Details
DV04 - Actor effect is too much	The lane departure warning function applies an oscillating torque with very high torque amplitude (above limit) and the lane departure warning function applies an oscillating torque with very high torque frequency
DV03 - Function always activated	The lane keeping assistance function is not limited in time duration which leads to misuse as an autonomous driving function
DV02 - Function unexpectedly activated	The lane departure warning function unexpectedly activates and starts oscillating the steering wheel during normal city driving
DV19 - Sensor detection is wrong	The lane keeping assistance function is not able to detect lane markings in darken tunnel

Hazardous Event (resulting effect)	Event Details
EV-05 - Front collision with ahead traffic	Vehicle crashes into the ahead traffic with injury to driver
EV-06 - Front collision with oncoming traffic	Vehicle crashes into the oncoming traffic with injury to driver
EV-05 - Front collision with ahead traffic	Vehicle crashes into the ahead traffic with injury to driver
EV-05 - Front collision with ahead traffic	Vehicle crashes into the ahead traffic with injury to driver

Hazardous Event Description	Exposure (of situation)	Rationale (for exposure)
Loss of steering	E3 - Medium probability	Driving on highway when it is raining occurs once a month or more often for an average driver
Driving on country road at high speed and misusing the system	E2 - Low probability	The driver in on country road and misusing the system.That combination probably does not happen often.
Driving on city road at low speed and partial loss of steering	E4 - High probability	Driving on city road is a regular activity
Driving in road tunnel at high speed and partial loss of steering	E2 - Low probability	Driving in road tunnel at high speed is not a regular activity for most drivers

Hazardous Event Classification	
Severity **(of potential harm)**	**Rationale** **(for severity)**
S3 - Life-threatening or fatal injuries	On highway speed of vehicle is expected to be high
S3 - Life-threatening or fatal injuries	because the driver is travelling at high speed, severity would be big.
S1 - Light and moderate injuries	In city traffic, speed of vehicle is expected to be low
S3 - Life-threatening or fatal injuries	because the driver is travelling at high speed, severity would be big.

Controllability (of hazardous event)	Rationale (for controllability)
C3 - Difficult to control or uncontrollable	The malfunction was that the Lane Departure Warning applied too much oscillating torque and frequency, so drivers loss control of the vehicle steering. Because steering was lost at high speeds, a vehicle accident would not be controllable.
C3 - Difficult to control or uncontrollable	The malfunction was that the Lane Keeping Assistance was always on and had no time limit, so drivers could take both hands aren't on the wheel at high speeds, a vehicle accident would not be controllable.
C0 - Controllable in general	At city speed most dirvers will be able to contro the situation by applying brakes.
C3 - Difficult to control or uncontrollable	At high speed most drivers will not be able to control the situation since the lane keeping assitance malfunction led to an undefined steering torque application.

Determination of ASIL and Safety Goals	
ASIL Determination	Safety Goal
C	The oscillating steering torque from the lane departure warning function shall be limited
B	The lane keeping assistance function shall be time limited, and the additional steering torque shall end after a given time interval so that the driver cannot misuse the system for autonomous driving
QM	The camera sensor ECU shall check the LA on/off, active/inactive and malfunction warning status before sending torque requests to the lane departure warning system
B	The lane keeping assistance function shall deactivate when the camera sensor stops detecting road markings and shall warn the driver of this deactivation