INSTRUCTIONS:
Fill out the hazard analysis and risk assessment below.
HA-001 should be for the lane departure warning function as discussed in the lecture.
HA-002 should be for the lane keeping assistance function as discussed in the lecture.
Then come up with your own situations and hazards for the lane assistance system. Fill in the HA-003 and HA-00
When finished, export your spreadsheet as a pdf file so that a reviewer can easily see your work.

Hazard ID	Situational Analysis				
	Operational Mode	Operational Scenario	Environmental Details	Situation Details	Other Details (optional)
HA-001	OM03 Normal Driving	OS04 Highway	EN06 Rain (slippery ro	SD02 High Speed	
HA-002	OM03 Normal Driving	OS03 Country Road	EN01 Normal Conditions	SD02 High Speed	Driver is misusing lane keeping assistance as autonomous function.
HA-003	OM03 Normal Driving	OS03 Country Road	EN07 Snow (Slippery road)	SD01 Low Speed	
HA-004	OM03 Normal Driving	OS02 City Road	EN01 Normal Conditions	SD01 Low Speed	

)4 rows.

		Hazard Identification			
Item Usage (function)	**Situation Description**	**Function**	**Deviation**	**Deviation Details**	**Hazardous Event (resulting effect)**
IU01 Correctly Used	Normal driving on highway during rain (slippery road) with high speed and correctly used system.	Lane Departure Warning (LDW) function shall apply an oscillating steering torque to provide the driver with haptic feedback	DV04	Lane departure warning applies too high of a torque	EV04 Car comes off road
IU01 Incorrectly Used	Normal driving on country roads 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	DV03	Lane keeping function always activated.	EV00 Collision with other vehicle
IU01 Correctly Used	Normal driving on country roads during snow	Lane Keeping	DV04	Steering input too high	EV03 Car spins out of control
IU01 Correctly Used	Normal driving on city roads	Lane Departure	DV15 Sensor Activation Late	Lane departure warns operator too late	EV-04 Front collision with obstacle

				Hazard
Event Details	**Hazardous Event Description**	**Exposure (of situation)**	**Rationale (for exposure)**	**Severity (of potential harm)**
Vehicle drives off of lane boundaries	Sensor is unable to detect lane boundaries and vehicle drives out of lane boundaries.	E3	Situation is an expected in typical driving condition.	S3
Ego collides with another vehicle	Lane keeping function stays activated, applying torque and driver loses control of vehicle	E3	Unlikely driver is driving at high speed without controlling steering wheel	S3
Lane keeping actuator over compensates	On a low traction surface, system over actuates causing loss of control of vehicle.	E4	Situation is an expected in typical driving condition.	S2
Collision with static obstacle occurs when lane departure warns too late	System warning occurs too late and vehicle departs lane and collides with static obstacle.	E4	Situation is an expected in typical driving condition.	S2

dous Event Classification			Determin
Rationale (for severity)	**Controllability (of hazardous event)**	**Rationale (for controllability)**	**ASIL Determination**
At high speeds, a collision has capactity for severe injury	C3	Driving on highways in rain a common situation for most drivers and controllability of car is not degraded.	C
At high speeds, a collision has capactity for severe injury	C3	With hands off wheel, controllability severely reduced and risk of driver overcompensating to regain control is high.	B
At lower speeds, risk of sever injury is decreased.	C3	Overactuation could quickly lead to uncontrollable conditions in low traction environments.	C
At lower speeds, risk of sever injury is decreased.	C1	In typical operating conditions and without degradation of control system, situation is easily controllable.	A

ation of ASIL and Safety Goals
Safety Goal
The oscillating steering torque from the lane departure warning function shall be limited.
The lane keeping function shall be limited in time and additional steering torque shall end after given interval to prevent misuse.
The lane keeping function shall not provide excessive torque in low traction environments.
The lane departure warning shall occur before the vehicle departs from the lane.