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-004 rows.
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)**	**Item Usage (function)**	**Situation Description**	**Function**
HA-001	Normal driving	Highway	Rain (slippery road)	High speed		Correctly used	Normal driving on a highway in rainy conditions with high speed and a correctly used system	Lane Departure Warning (LDW) function shall apply an oscillating steering torque to provide the driver with haptic feedback
HA-002	Normal driving	Country roads	Normal conditions	High speed		Incorrectly used	Norma driving on country roads during normal conditions with high speed where the drivier has misused the LKA function as an autonomous driving function	Lane Keeping Assistance (LKA) function shall apply the steering torque when active in order to stay in ego lane
HA-003	Normal driving	City Roads	Snow (slippery road)	Low speed		Correctly used	Normal driving on a highway in snowy conditions with low speed and a correctly used system	Lane Departure Warning (LDW) function shall apply an oscillating steering torque to provide the driver with haptic feedback
HA-004	Normal driving	Highway	Rain (slippery road)	High speed		Correctly used	Normal driving on a highway in rainy conditions with high speed and a correctly used system	Lane Keeping Assistance (LKA) function shall apply the steering torque when active in order to stay in ego lane

Hazard Identification					Hazardous Event Classificati			
Deviation	**Deviation Details**	**Hazardous Event (resulting effect)**	**Event Details**	**Hazardous Event Description**	**Exposure (of situation)**	**Rationale (for exposure)**	**Severity (of potential harm)**	**Rationale (for severity)**
Actor effect is too less	The LDW function applies an oscillation torque with very low torque	Collision with other vehicle	Low haptic feedback can fail to warn the driver of a lane departure. The driver was failed to be notified of a lane departure would could lead to a collision with another vehicle or road infrastructure.	The LDW function applies too low of an oscillation torque to the steering wheel	E3	Driving on a highway with slippery road once a month or more often for an average driver	S3	Driving with high speed can cause fatal injuries
Function always activated	The LKA is always activated and the driver is not required to keep his hands on the steering wheel	Collision with other vehicle	The driver assumed the LKA function was acting as autonomous driving function and collided with another vehicle due to the negligence of not paying attention to the oncoming traffic.	The LKA is always activated and the driver is not required to keep his hands on the steering wheel	E4	Driving on a country road occurs during almost every drive on average	S3	Driving with high speed can cause fatal injuries
Actor effect is too much	The LDW function applies an oscillation torque with very high torque	Collision with other vehicle	High haptic feedback can affect the driver's ability to steer the vehicle as intended. This could cause the driver to lose control of the vehicle and collide with another vehicle.	The LDW function applies too high of an oscillation torque to the steering wheel	E2	Driving on a city road with snow road occurs a few times a year for the great majority of drivers	S2	Driving with low speed can cause severe and life-threatening injuries
Actor effect is too much	The LDW function applies an steering torque that is too high and causes the vehicle to drift into another lane	Collision with other vehicle	High steering torque can cause the vehicle to drift in the other lane if the system is too aggressive in attempting to stay in the ego lane	The LDW function applies too high of a steering torque when attempting to stay in the ego lane	E3	Driving on a highway with slippery road once a month or more often for an average driver	S3	Driving with high speed can cause fatal injuries

on		Determination of ASIL and Safety Goals	
Controllability (of hazardous event)	**Rationale (for controllability)**	**ASIL Determination**	**Safety Goal**
C2	90% or more of all drivers should be able to realize that they are departing the lane without warning and avoid harm	ASIL B	The oscillating steering torque from the lane departure warning function shall provide a sufficient torque to the steering wheel.
C1	Most drivers should be able to re-take control of the vehicle if they put their hand on the steering wheel	ASIL B	The LKA function shall be time limited so the driver cannot continuously use the system as an autonomous driving function
C3	Less than 90% driviers are able to avoid harm with a difficult to control vehicle	ASIL A	The oscillating steering torque from the lane departure warning function shall be torque limited.
C3	Less than 90% driviers are able to avoid harm with an automated function that is out of their control to stay in the ego lane	ASIL C	The steering torque from the lane keeping function shall be torque limited.