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)
HA-001	Normal Driving	Highway	Rain (Slippery Road)	High Speed	Medium Traffic
HA-002	Normal Driving	Country Road	Normal Conditions	High Speed	High Traffic
HA-003	Backward driving	City Road	Fog	Low Speed	Low Traffic
HA-004	Normal Driving	Mountain Pass	Sun blares (degraded view)	Normal Acceleration	Curvy Road Conditions

		Hazard Identification			
Item Usage (function)	**Situation Description**	**Function**	**Deviation**	**Deviation Details**	**Hazardous Event (resulting effect)**
Correctly used	Normal driving on a highway during rain (slippery road) with high speed and medium traffic and correctly used system	Lane Departure Warning (LDW) function shall apply an oscillating steering torque to provide the driver with haptic feedback	Actor effect is too much	LDW applies an oscillating torque above limit	Collision with other vehicle
Incorrectly used	Normal driving on country roads during normal conditions with high speed and high traffic and incorrectly used (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	Function always activated	Function is not designed for a fully autonomous function and cannot handly all situations	Collision with other vehicle
Correctly used	Backwad driving on a city road during fog with low speed and low traffic and correctly used				
Correctly used	Normal driving on a mountain pass during sun blares with normal acceleration and curvy road conditions and correctly used				

		Hazardous Event Classification			
Event Details	**Hazardous Event Description**	**Exposure (of situation)**	**Rationale (for exposure)**	**Severity (of potential harm)**	**Rationale (for severity)**
High haptic feedback affects driver's ability to steer as intended. Loss of control and collision with other vehicle of road infrastructure	LDW applies too high oscillating torque to the steering wheel (above limit)	E3	Quite often a rainy day on a highway is encountered	S3	An incident during high speed can harm the driver impactfully
In a curve with high curvature the system cannot follow the lane and drifts into the neighbouring lane	Function always activated results in over confidence of driver and a collision with other vehicles because the function could not handle a curve with high curvature	E2	Combination of country road with misues does not occur often, but sometimes	S3	High speed and high traffic can harm the driver impactfully
		E2	Mountain passes with sun blares are generally only encountered sometimes (taking all cars into account) as most streets are flat	S3	The mountain road probaly has a lot of curves and a incident of falling over the cliffs is very harmful

		Determination of ASIL and Safety Goals	
Controllability (of hazardous event)	**Rationale (for controllability)**	**ASIL Determination**	**Safety Goal**
C3	Difficult to control since the road is slippery and for untrained drivers a high vibration is hard to control	ASIL C	The oscillating steering torque from the lane departure warning function shall be limited
C3	The malfunction was that the lane keeping assistance was always on and had no time limit, so drivers could take both hands off the wheel. Because hands aren't on the wheel at high speeds, a vehicle accident would not be controllable	ASIL 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
C2	Medium contollable for untrained drivers as the reaction time is very short	ASIL A	The camera subsystem shall detect adverse weather conditions like sun blares in advance so that the driver can be informed ahead of time of a possible diengangemend of the function