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							Hazard Identification					
	Operational Mode	Operational Scenario	Environmental Details	Situation Details	Other Details (optional)	Item Usage (function)	Situation Description	Function	Deviation	Deviation Details	Hazardous Event (resulting effect)	Event Details	Hazardous Event Description
HA-001	Normal driving	Highway	Rain (slippery road)	High speed		Correctly used	Normal driving on a 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	Actor effect is too much	The LDW function applies an oscillating torque with very high torque (above limit).	Collision with other vehicle	High haptic feedback can affect driver's ability to steer as intended. The driver could lose control of the vehicle and collide with another vehicle or with road infrastructure.	The LDW function applies too high an oscillating torque to the steering wheel (above limit).
HA-002	Normal driving	Country road	Normal conditions	High speed		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	Function always activated	The LKA is always activated and the driver is not forced to keep his hands at the steering wheel.	Collision with other vehicle	The driver is misusing the lane keeping assistance function as an autonomous function and collides with another vehicle as he does not observe the traffic.	The LKA is always activated and the driver is not forced to keep his hands at the steering wheel.
HA-003	Backward driving	City road	Snowfall	Much traffic		Correctly used	Backward driving vehicle with on a city road during snowfall with much traffic and correctly used system.	Lane Departure Warning (LDW) function shall apply an oscillating steering torque to provide the driver with haptic feedback	Function always activated	The LDW is always activated and the driver who wants to park his car at a parking spot cannot leave lane.	Rear collision with trailing traffic	Unexpectedly not being able to drive backward into a parking spot can cause other road user to brake to late. Thus another car can collide in the rear with low speed.	The LDW function is always activated while it shouldn't.
HA-004	Normal driving	Road with construction side	Cross-wind	High braking		Correctly used	Normal driving on a road with construction Side during cross-wind with high braking and correctly used system.	Lane Keeping Assistance (LKA) function shall apply the steering torque when active in order to stay in ego lane	Actor action too late	The LKA applies the torque too late and thus the car gets of ego lane.	Side collision with obstacle	The driver expects the LKA to react in time and help him driving safely at all times. In strong cross-wind conditions the driver may react too slow and depends even more on the help system. A slow reaction of the LKA can surprise the driver and results in side collisions.	The LKA function reacts too late.

Hazardous Event Classification						Determination of ASIL and Safety Goals	
Exposure (of situation)	**Rationale (for exposure)**	**Severity (of potential harm)**	**Rationale (for severity)**	**Controllability (of hazardous event)**	**Rationale (for controllability)**	**ASIL Determination**	**Safety Goal**
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	C3	Most drivers would have difficulty controlling the vehicle when the steering wheel vibrates exkessively.	ASIL C	The oscillating steering torque from the lane departure warning function shall be limited.
E4	Driving on a country road on normal conditions occurs almost every drive on average	S3	Driving with high speed can cause fatal injuries	C1	Most drivers can control the vehicle again as soon as they take back their hand on the steering wheel.	ASIL B	The LKA function shall be time limited and the additional steering torque shall end after a given time intrehval so that the driver cannot misuse the system for autonomous driving.
E3	Driving backwards into a parking spot happens often in Europe but not on every day.	S1	A collision while driving backwards with low speed can cause light injuries	C1	Most drivers can control the vehicle again as soon as they stop the car or deactivate LDW.	QM	The LDW function shall be turned of when the driver wants to get into a parking spot driving backwards.
E2	Depending on the area the driver lives strong cross-winds may happen often and big construction sides stay open for a long time and small ones appear regularly.	S3	Collisions on construction sides are always dangerous as there is not much space on the road and construction equipment will be on side.	C2	Most drivers can control the vehicle when driving on a construction side with strong cross-wind.	ASIL A	The LKA function shall always react on time or inform the driver that it has a malfunction and turns itself off.