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
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.
HA-002	Normal driving	Country Road	Normal conditions	High speed		Incorrectly used	Normal driving on country roads during normal conditions with high speed and incorrectly used system.
HA-003	Normal driving	Country Road	Rain (slippery road)	High speed		Correctly used	Normal driving on country roads during rain (slippery road) with high speed and correctly used system.
HA-004	Normal driving	Country Road	Normal conditions	High speed		Incorrectly used	Normal driving on country roads during normal conditions with high speed and incorrectly used system.

Hazard Identification					
Function	**Deviation**	**Deviation Details**	**Hazardous Event (resulting effect)**	**Event Details**	**Hazardous Event Description**
Lane Departure Warning (LDW) function shall apply an oscillating steering torque to provide the driver with haptic feedback	DV04 - 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).
Lane Keeping Assistance (LKA) function shall apply the steering torque when active in order to stay in ego lane	DV03 - Function always activated	The driver was misusing the function by taking both hands off the wheel and incorrectly treating the car as a fully autonomous vehicle.	Collision with other vehicle	The lane keeping assistance function is always acitvated. In this case, the driver may misuse the function by taking both hands off the wheel, incorrectly treating the car as a fully autonomous vehicle and lead to collision with other vehicle.	The LKA function was always on and had no time limit, the driver cannot treat the function as if it were meant for fully autonomous driving.
Lane Departure Warning (LDW) function shall apply an oscillating steering torque to provide the driver with haptic feedback real time	DV07 - Actor action too late	The LDW function applies an oscillating torque too late (above limit)	Collision with other vehicle	Too Late 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 late an oscillating torque to the steering wheel (above period limit)
Lane Keeping Assistance (LKA) function shall apply the steering torque when active in order to stay in ego lane	DV02 - Function unexpectedly activated	The driver was misusing the function by changing lane without turnning light.	Collision with other vehicle	If the driver misuse the function by changine lane without turnning light, the LA system may activate LKA system works unexpected.	The LKA function works against driver's intend for driver's wrong operation.

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 - Medium probability	Driving on wet load is more offten for an average driver.	S3 - Life-threatening or fatal injuries	The driver is traveling at high speed and severity is fatal	C3 - Difficult to control or uncontrollable	Most of average drivers can not control the high speed vehicle with excessively oscillating torques on wet road.	ASIL C	The oscillating steering torque from the lane departure warning function shall be limited.
E2 - Low probability	The misusing probably does not happen offen.	S3 - Life-threatening or fatal injuries	The driver is traveling at high speed and severity is fatal	C3 - Difficult to control or uncontrollable	The drivers 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.
E3 - Medium probability	Driving on wet load is more offten for an average driver.	S3 - Life-threatening or fatal injuries	The driver is traveling at high speed and severity is fatal	C3 - Difficult to control or uncontrollable	Some average drivers can not control the high speed vehicle with unexpected oscillating torques on wet road.	ASIL C	The oscillating steering torque from the lane departure warning function shall be real time.
E3 - Medium probability	The wrong driving operation is more offten.	S3 - Life-threatening or fatal injuries	The driver is traveling at high speed and severity is fatal	C2 - Normally controllable	Generally most of drivers can control the vehicle if they found their wrong operation against with LA system. However in some critical cases, some drivers may can not control vehicle.	ASIL B	The LKA function should be robost engough for some wrong driving operation to tell driver's real intend and wrong operation.