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)
HA-001	(OM03) Normal driving	(OS04) Highway	(EN06) Rain (slippery road)	(SD02) High speed		(IU01) Correctly used
HA-002	(OM03) Normal driving	(OS03) Country Road	(EN01) Normal conditions	(SD02) High speed	the driver is misusing the lane keeping assistance function as an autonomous	(IU02) Incorrectly used
HA-003	(OM03) Normal driving	(OS05) Mountain Pass	(EN06) Rain (slippery road)	(SD01) Low speed		(IU01) Correctly used
HA-004	(OM03) Normal driving	(OS04) Highway	(EN02) Sun blares (degraded view)	(SD02) High speed		(IU01) Correctly used

	Hazard Identification					
Situation Description	**Function**	**Deviation**	**Deviation Details**	**Hazardous Event (resulting effect)**	**Event Details**	**Hazardous Event Description**
(OM03) Normal driving on a (OS04) Highway during (EN06) Rain (slippery road) with (SD02) High speed and (IU01) Correctly used system.	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)	(EV00) Collision with other vehicle	The LDW function applies an oscillating torque with very high torque (above limit) with possible resulting effect of (EV00) Collision with other vehicle and injury to driver.	Driver is unable to maintain grip on the steering wheel.
(OM03) Normal driving on a (OS03) Country Road during (EN01) Normal conditions with (SD02) High speed the driver is misusing the lane keeping assistance function as an autonomous and (IU02) Incorrectly used system.	Lane Keeping Assistance (LKA) function shall apply the steering torque when active in order to stay in ego lane	(DV03) Function always activated	The LKA function is constantly active allowing some drivers to misinterpret this as a fully autonomous vehicle	(EV00) Collision with other vehicle	The LKA function is constantly active allowing some drivers to misinterpret this as a fully autonomous vehicle with possible resulting effect of (EV00) Collision with other vehicle and injury to driver.	Driver intentionally removes hands from steering wheel.
(OM03) Normal driving on a (OS05) Mountain Pass during (EN06) Rain (slippery road) with (SD01) Low speed and (IU01) Correctly used system.	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)	(EV04) Car comes off the road	The LDW function applies an oscillating torque with very high torque (above limit) with possible resulting effect of (EV04) Car comes off the road and injury to driver.	Driver is unable to maintain grip on the steering wheel.
(OM03) Normal driving on a (OS04) Highway during (EN02) Sun blares (degraded view) with (SD02) High speed and (IU01) Correctly used system.	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)	(EV-06) Front collision with oncoming traffic	The LDW function applies an oscillating torque with very high torque (above limit) with possible resulting effect of (EV-06) Front collision with oncoming traffic and injury to driver.	Driver is unable to maintain grip on the steering wheel.

Hazardous Event Classification						Determin
Exposure (of situation)	**Rationale (for exposure)**	**Severity (of potential harm)**	**Rationale (for severity)**	**Controllability (of hazardous event)**	**Rationale (for controllability)**	**ASIL Determination**
(E3) Medium probability	High way driving in Rain (slippery road) is a fairly common event for a driver.	(S3) Life-threatening or fatal injuries	Highway driving is at high speed (> 40 KPH) and any collision in this speed zone has the highest severity level.	(C3) Difficult to control or uncontrollable	Violent steering wheel jerk would make it difficult to control the vehicle.	(S3) intersection with (C3) -> (E3) = ASIL C
(E2) Low probability	Country road driving with the driver's hands removed from the steering wheel would not occur often.	(S3) Life-threatening or fatal injuries	Highway driving is at high speed (> 40 KPH) and any collision in this speed zone has the highest severity level.	(C3) Difficult to control or uncontrollable	The driver's hands are not on the steering wheel at high speed.	(S3) intersection with (C3) -> (E2) = ASIL B
(E2) Low probability	Mountain Pass driving in Rain (slippery road) is a Low probability event for a driver.	(S3) Life-threatening or fatal injuries	Mountain Pass driving at any speed, if Car comes off the road is likely to be fatal.	(C3) Difficult to control or uncontrollable	Violent steering wheel jerk would make it difficult to control the vehicle.	(S3) intersection with (C3) -> (E2) = ASIL B
(E2) Low probability	Highway driving in Sun blares (degraded view) is a Low probability event for a driver.	(S3) Life-threatening or fatal injuries	Highway driving is at high speed (> 40 KPH) and any collision in this speed zone has the highest severity level.	(C3) Difficult to control or uncontrollable	Violent steering wheel jerk would make it difficult to control the vehicle.	(S3) intersection with (C3) -> (E2) = ASIL B

ation of ASIL and Safety Goals

Safety Goal
Reduce maximum steering oscillating torque to prevent hazardous event : Driver is unable to maintain grip on the steering wheel.
Set time limit on function activation to prevent hazardous event : Driver intentionally removes hands from steering wheel.
Reduce maximum steering oscillating torque to prevent hazardous event : Driver is unable to maintain grip on the steering wheel.
Reduce maximum steering oscillating torque to prevent hazardous event : Driver is unable to maintain grip on the steering wheel.