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
When finished, export your spreadsheet as a pdf file so that a reviewer can easily see your

Hazard ID	Situational Ana			
	Operational Mode	**Operational Scenario**	**Environmental Details**	**Situation Details**
HA-001	OM03 - Normal Driving	OS04 - Highway	EN06 - Rain (slippery road)	High speed
HA-002	OM03 - Normal Driving	OS03 -Country road	EN07 - Normal Condition	High speed
HA-003	OM03 - Normal Driving	OS04 - Highway	EN07 - Normal Condition	High speed
HA-004	OM03 - Normal Driving	OS04 - Highway	EN03 - Fog (degraded view)	High speed

the HA-003 and HA-004 rows.
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Other Details (optional)	Item Usage (function)	Situation Description	Function
	IU01 - Correctly used	Normal driving on a highway during Rain 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
	IU02 - Incorrectly used	Normal driving on a country road during normal condition with low speed and incorrectly used system.	Lane Keeping Assistance (LKA) function shall apply the steering torque when active in order to stay in ego lane
	IU01 - Correctly used	Changing lane while Normal driving on a highway in normal condition with high acceleration and correctly used system.	Autopilot system used to assist driver while driving on highway with Lane keeping and lane change
	IU01 - Correctly used	Normal driving on a highway during fog (degraded view) with low speed and correctly used system.	Lane Keeping Assistance (LKA) function shall apply the steering torque when active in order to stay in ego lane

Hazard Identification			
Deviation	**Deviation Details**	**Hazardous Event (resulting effect)**	**Event Details**
DV04 - Actor effect is too much	LDW(Lane Departure warning system) applies very high torque on steering wheel	EV00 - Collition with other vehicle.	High torque can result in high heptic feedback and can affect the driver's ability to drive and vehicle can collide with other vehicles
DV03 - Function always activated	Lane Keeping Assistance (LKA) function is always activated	EV00 - Collition with other vehicle.	Driver treats the function as if it is fully autonomous driving syatem and can’t react on critical situations.
DV04 - Actor effect is too much	Autopilot system changes lane over very short distance causing jerks	EV03 - Car spins out of control	Autopilot tries to do sharp change lane over very short distance results in high lateral acceleration and jerk
DV19 - Sensor detection is wrong	Camera sensor does not detect the lane due to fog (degraded view)	EV00 - Collition with other vehicle.	LKA cannot detect lane

	Hazard

Hazardous Event Description	Exposure (of situation)	Rationale (for exposure)	Severity (of potential harm)
Driver can loose control and cause accident	E3 - Medium probability	Driving on highway with snow Occurs more often for an average driver	S3 - Life Threatning or fatal injuries
LKA can loose control and cause accident	E2 - Low probability	Driver is on country road and misusing the system	S3 - Life Threatning or fatal injuries
high lateral acceleration and jerk can cause vehicle to go out of control	E4 - High probability	Driver drives on High way with high speed oftenly	S3 - Life Threatning or fatal injuries
LKA cannot detect lane and can go out of lane causing collision with other vehicle	E3 - Medium probability	Driver don't drives on High way in fog with high speed too often	S3 - Life Threatning or fatal injuries

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Rationale (for severity)	Controllability (of hazardous event)	Rationale (for controllability)
Collision at hig speed can cause Life Threatning or fatal injuries	C3 - Difficult to control or uncontrollable	It is difficult control and react properly when the steering well is oscliatting too much
Collision at hig speed can cause Life Threatning or fatal injuries	C3 - Difficult to control or uncontrollable	Lane keeping assistance system is always on, driver can take hands off the steering wheel and therefore looses control entirely
Collision at high speed can cause Life Threatning or fatal injuries	C3 - Difficult to control or uncontrollable	Sudden sharp steer is hard to control
Collision at high speed can cause Life Threatning or fatal injuries	C1 - Simpally controllable	An alert driver can control the vehicle

Determination of ASIL and Safety Goals	
ASIL Determination	**Safety Goal**
C	The oscillating steering torque from the LDW function shall be limited.
B	LKA function shall be time limited and the additional steering torque shall end after a given timer period so that the driver can not misuse the system for fully autonomous driving.
D	Autopilot function should change lane over large distance to make lane change smooth and reduce the jerk and high acceleration
A	LKA system should show a warning when it is not able to detect lane lines, so driver can take control of the vehicle immediately