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)	SD02-High Speed
HA-002	OM03-Normal Driving	OS03-Country Road	EN01-Normal conditions	SD02-High speed
HA-003	OM03-Normal Driving	OS05-Mountain Pass	EN07-Snow(Slippery Road)	SD01-Low speed
HA-004	OM03-Normal Driving	OS01-Any road	EN01-Normal conditions	SD02 - 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 Highway during rain (slippery road condition) 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 roads during normal conditions with high speed and the system is incorrectly used.	Lane Keeping Assistance (LKA) function shall apply the steering torque when active in order to stay in ego lane.
	IU01-Correctly used	Normal driving on Mountain pass covered with snow(slippery road conditions) with low speed and correctly used system.	Lane Departure Warning (LDW) function shall apply an oscillating steering torque to provide the driver with haptic feedback
	IU01 - Correctly used	Normal driving on any road during normal conditions with high 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	The Lane Departure Warning function applies an oscillating torque with very high torque(above limit)	EV00-Collision with other vehicle	High haptic feedback can affect driver's ability to steer as intented. The driver could lose control and collide with another vehicle or side of the road.
DV03 - Function is always activated	The Lane Keeping Assistance function is always activated.	EV00-Collision with other vehicle	Driver may have had too much relied on the lane keeping assistance and lost his attention.
DV11-Actor effect is wrong	The Lane Departure Warning function applies false oscillating torque frequently	EV03-Car spins out of control	Snow will cover the lanes lines on mountain pass thus causing difficulty in detection for Lane Departure Warning function.
DV02 - Function unexpectedly activated	The camera sensor stop working and the Lane Keeping Assistance function continue to be activated.	EV00 - Collision with other vehicle.	Camera Sensor stopped working and the Lane Departure Warning function starts providing random torque to steering wheel making the driver to lose control.

	Hazard		
Hazardous Event Description	**Exposure (of situation)**	**Rationale (for exposure)**	**Severity (of potential harm)**
The Lane Departure Warning function applies an oscillating torque to the steering wheel(above limit)	E3-Medium probability	Driving on a slippery road of highway(because of rain) could happen between 1-10% of the time during travel.	S3-Life-threatening or fatal injuries
The Lane Keeping Assistance function is not meant for fully autonomous driving.	E2-Low probability	Driving at a high speed on a country road relying on lane keeping assistance system not happens often, maybe 1% of the time.	S3-Life-threatening or fatal injuries
The Lane Departure Warning function applies false oscillating torque to steering wheel	E4-High probability	Snowfall is common in Mountain passes	S3-Life-threatening or fatal injuries
The Lane Departure Warning start acting randomly when the camera sensor is not working.	E3 - Medium probability	Camera failure can happen any time anywhere with medium probability as it is a electronic item.	S3 - Life-threatening or fatal injuries

dous Event Classification

Rationale (for severity)	Controllability (of hazardous event)	Rationale (for controllability)
Speed Limits on highway are generally high, so collision at a high speed would be very fatal, thus life-threatening.	C3-Difficult to control or uncontrollable	It is difficult to control the vehicle in such situations, and avoid any harm.
Crashing at a high speed with anything could be fatal.	C3-Difficult to control or uncontrollable	It is difficult to re-focus if the driver loses focus during driving in case of an imminent collision.
Losing the control of car counld be fatal in mountain areas	C3-Difficult to control or uncontrollable	It is difficult to control the vehicle when it spins off on a slippery road
At a high speed, collision with anything would be very fatal	C3 - Difficult to control or uncontrollable	It is difficult to control the vehicle when Lane Departure function is providing any random troque to the steering wheel.

Determination of ASIL and Safety Goals	
ASIL Determination	**Safety Goal**
ASIL C	The oscillating steering torque from the Lane Departure Warning function shall be limited.
ASIL B	The Lane Keeping Assistance function shall be time limited, and additional steering torque shall end after a given time interval so the driver cannot misuse the system for autonomous driving.
ASIL D	The oscillating steering torque from the Lane Departure Warning function shall stop when driver is attempting to control the car in bad weather/road conditions.
ASIL C	The Lane Departure Warning function shall be deactivated when the camera sensor stops working.