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						Hazardous Event Classification						Determination of ASIL and Safety Goals	
	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	Exposure (of situation)	Rationale (for exposure)	Severity (of potential harm)	Rationale (for severity)	Controllability (of hazardous event)	Rationale (for controllability)	ASIL Determination	Safety Goal
HA-001	OM03 - Normal driving	OS04 - Highway	EN06 - Rain (slippery	SD02 - High speed	-	IU01 - Correctly used	Normal driving on highway during rain (slippery roads) 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	DV04 - Actor effect is too much	The LDW vibration torque is too strong.	EV00 - 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).	E3 - Medium probability	Can occur once a month or more often for an average driver, or 1-10% of average operating time.	S3 - Life-threatening or fatal injuries	Collision at high speed can use significant injuries	C3 - Difficult to control or uncontrollable	Most drivers may not react in time to safely miligate the unexpected event of loss of steering control.	ASIL C	The oscillating steering torque from the LDW function shall be limited.
HA-002	OM03 - Normal driving	OS03 - Country Road	EN01 - Normal conditions	SD02 - High speed	-	IU02 - Incorrectly used	Normal driving on country road during normal conditions with high speed and 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 lane keeping assistance function is always activated	EV00 - Collision with other vehicle	The driver misuses the function by taking both hands off the wheel and incorrectly treating the car as a fully autonomous vehicle.	The LKA function applies corrective steering torque for too long (above limit).	E2 - Low probability	Driving on country roads is somethhing that most drivers do only a few times a year, or less than 1% of the driving time.	S3 - Life-threatening or fatal injuries	Collision at high speed can cause significant injuries, especially on country roads	C3 - Difficult to control or uncontrollable	Most drivers may not react in time to manoeuvre a vehicle to safety if the LKA function suddenly stops due to encountering a scenario it is not designed for, such as worn out lane markings, fog, multiple lane lines, etc.	ASIL B	The additional steering torque from LKA function shall be time limited.
HA-003	OM03 - Normal driving	OS04 - Highway	EN01 - Normal conditions	SD02 - High speed	-	IU01 - Correctly used	Normal driving on highway 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	DV04 - Actor effect is too much	The LKA function applies a steering torque that is too strong	EV00 - Collision with other vehicle	A high torque applied by the steering controller can affect the driver's ability to override the LKA function manually by applying a counter-torque on the steering wheel.	The LKA function applies corrective steering torque that is too strong.	E3 - Medium probability	Can occur once a month or more often for an average user, or 1-10% of average operting time.	S3 - Life-threatening or fatal injuries	Collision at high speed can cause significant injuries.	C3 - Difficult to control or uncontrollable	Most drivers may not be able to apply sufficient counter-torque to override or limit the toque applied by the LKA function.	ASIL C	The additional steering torque from the LKA function shall be limited in magnitude.
HA-004	OM03 - Normal driving	OS10 - Road with construction site	EN01 - Normal conditions	SD01 - Low speed	-	IU01 - Correctly used	Normal driving on road with construction site during normal driving at 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	DV02 - Function unexpectedly activated	The LKA function applies a steering torque unexpectedly.	EV-04 - Front collision with obstacle	The steering torque applied unexpectedly by the LKA function may impede the driver's ability to steer away from obstacles while driving through a construction site.	The LKA function applies steering torque unexpectedly.	E2 - Low probability	Occurs rarely for most drivers	S1 - Light and moderate injuries	Low speed collisions typically don't cause injuries or cause light injuries (for instance, caused by the air bag going off)	C0 - Controllable in general	Most drivers can gain control of the vehicle in this situation by braking and bringing it to a complete stop before a collision.	QM	The additional steering torque from the LKA function shall not be activated at low speeds.