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| **Hydraulic system** |
| Situation: Hydraulic cylinder in the body and rig of the forklift, which is installed in the front masts to help the engine while lifting objects.  Intended behavior: The forks should move up or down through the lever and the monitor should show the driver the situation by the turn signals.  D:\behnoosh\FH Dortmund\5.Mechatronic Systems Engineering\EXERCISE\pic\2022-06-24_9-51-27.jpgD:\behnoosh\FH Dortmund\5.Mechatronic Systems Engineering\EXERCISE\pic\2022-06-24_9-36-04.jpg |

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| **Cruise control** |
| Situation: The system receives a constant speed command via a lever or key  Intended behavior: Speed must be constant and be displayed to the driver for feedback if the cruise control light is successful.  D:\behnoosh\FH Dortmund\5.Mechatronic Systems Engineering\EXERCISE\pic\2.2.jpgD:\behnoosh\FH Dortmund\5.Mechatronic Systems Engineering\EXERCISE\pic\2.3.jpg |

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| **Transmission system** |
| Situation: The forklift gearbox is part of the engine assembly that connects the engine and the wheels so that they can rotate at the same time and it is responsible for transferring engine power to the wheels  Intended behavior: Power transmission from the engine to the wheels must be done and the forklift to bales  D:\behnoosh\FH Dortmund\5.Mechatronic Systems Engineering\EXERCISE\pic\3.1.jpgD:\behnoosh\FH Dortmund\5.Mechatronic Systems Engineering\EXERCISE\pic\3.2.jpg |

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| **Acceleration** |
| Situation: The forklift receives a steering command by applying force to the accelerator pedal.  Intended behavior: The forklift should be moved in the desired direction by the driver and move the object.  D:\behnoosh\FH Dortmund\5.Mechatronic Systems Engineering\EXERCISE\pic\4.1.jpgD:\behnoosh\FH Dortmund\5.Mechatronic Systems Engineering\EXERCISE\pic\4.2.jpg |

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| **Brake** |
| Situation: When the operator pushes down on the brake pedal, the brake shoes press against the brake drum, creating friction, which slows down the lift truck. The forklift is driven by hydraulic oil from a pump driven by the engine to hydraulic motors at the wheels.  Intended behavior: The forklift must be stopped at the desired location and the D:\behnoosh\FH Dortmund\5.Mechatronic Systems Engineering\EXERCISE\pic\5.1.jpgD:\behnoosh\FH Dortmund\5.Mechatronic Systems Engineering\EXERCISE\pic\5.2.jpg |

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| **Differential** |
| Situation: It is a mechanical system which control the amount of torque to be transferred to moving wheels in an automobile or a forklift truck. It consists of a number of parts such as pinion drive gear, ring gear, side/ spider gears, differential case assembly, rear drive axle & bearings and axle housing.  Intended behavior: The wheels have to spin at different speeds and both drive wheels (front or rear) have to travel different distances. This is where the differential comes into play.  D:\behnoosh\FH Dortmund\5.Mechatronic Systems Engineering\EXERCISE\pic\6.1.jpgD:\behnoosh\FH Dortmund\5.Mechatronic Systems Engineering\EXERCISE\pic\6.2.jpg |

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| **Traction control** |
| Situation: The system reduces the force coming from the engine side to prevent slipping like ABS and EBD systems.  Intended behavior: The forklift truck must prevent slipping and imbalance when moving objects, and if the traffic light is successful, the balance light will be activated to provide feedback to the driver.  D:\behnoosh\FH Dortmund\5.Mechatronic Systems Engineering\EXERCISE\pic\7.1.jpg |

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| LIDAR |
| Intended behavior: for determining ranges (variable distance) by targeting an object with a laser and measuring the time for the reflected light to return to the receiver.  D:\behnoosh\FH Dortmund\5.Mechatronic Systems Engineering\EXERCISE\pic\8.1.jpg |

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| **Global Positioning System(GPS)** |
| Situation: The use of wireless communication technologies integrated on board (in the driver’s pockets) is the key to connecting vehicles.  Intended behavior: GPS in tractors send and receive signals to each other and from the satellites in an effort to determine their current position.  https://tse1.mm.bing.net/th?id=OIP.UtoxOeQIjCmdR1yV7ffAGAHaDM&pid=Api&P=0&w=427&h=184https://tse1.mm.bing.net/th?id=OIP.j-mZvkgE9rdoDpH6Z0hNVQHaFc&pid=Api&P=0&w=215&h=158 |

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| **Turning The Lights** |
| Situation: Tractors flash their lights under certain circumstances to get the attention to prevent any possible collision.  Intended behavior: all the lights should be turned on after the sunset until the sunrise, also depending on the current weather (eg. Cloudy, foggy, etc) lights should react in the same way.  C:\Users\sibetalaee\Downloads\foggytractor2.jpeg C:\Users\sibetalaee\Downloads\baledark1.jpeg |

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| **Final Drive:** |
| Intended behavior: After lifting the objects by the forks according to the mentioned steps, the cargo is placed in the collection center. When the car doesn’t have its own bale to carry, it can help another car to carry the bales. For example, small car can help mid car to carry mid bales, and large car can help small car and middle car carry their own bales.  D:\behnoosh\FH Dortmund\5.Mechatronic Systems Engineering\EXERCISE\pic\9.1.jpg D:\behnoosh\FH Dortmund\5.Mechatronic Systems Engineering\EXERCISE\pic\9.5.jpg |