**Assignment 1**

Follow the V-model to design the following mechatronics system:

* Design a four wheels robot that moves in the forward, backward, left and right directions with different speeds.
* The robot supports obstacle collision avoidance by stopping the robot when there is an object Infront of the robot within 20 cm range.
* The robot can be controlled using an internet device.

**Solution:**

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| **Requirement** | **Requirement Analysis** |
| The robot shall move in the forward, backward directions | Agreed, the robot will have a servo motor with a suitable driver that can change direction (has H bridge and PWM) |
| The robot shall move in the left and right directions | Agreed, the robot will have another servo motor to rotate the wheels right and left with the suitable mechanism (e.g. 4 bar mechanism) |
| The robot shall support obstacle collision avoidance by stopping the robot when there is an object Infront of the robot within 20 cm range | Agreed, an ultrasonic sensor will be used to detect objects within 20cm range. also brakes will be used to stop the robot from crashing into the object. |
| The robot shall be controlled using an internet device. | Agreed, a microcontroller that has ethernet module will be used to receive commands -and sends back data if needed- |
| The system shall have a human control | Agreed, the system may have an application on a website that has suitable front, back-end codes. |
| The robot shall have a control algorithm | Agreed, the MCU will have a control code that translates direction and speed commands into bytes that will be sent to the motors and keeps reading the ultrasonic sensor to avoid collisions (suitable PID can be used to have precise control over the motors) |
| The robot shall report system errors in the display | Agreed, Diagnostic SW will be used to report system errors on the website. |

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