Ultrasonic Range Sensor Assessment

Mechatronics Microcontroller Project MXEN2003

Scenario

A code library has been created for the "PING)))" ultrasonic range sensor, intended to measure and display the distance on an Atmega2560 through serial.

- You must add the comments and improve the readability of the code, explain how the program functions and reads the ultrasonic range sensor's distance.
- The comments and function descriptions for the serial functions can be used as a guide for appropriate commenting style.
- You will need to refer to the range sensor datasheet to explain the functions, you can find the datasheet linked below.
- You may use TinkerCad to simulate the project using Arduino Uno R3 wired to use the range sensor.

https://www.mouser.com/datasheet/2/321/28015-PING-Sensor-Product-Guide-v2.0-461050.pdf

Task

You must provide appropriate comments to improve the level of readability. You must provide short descriptions of the functions in the program. You must complete the sections of the code where your student ID is used.

This is an individual assignment and must be your own work. You must be able to explain your additions adequately.

You must submit:

- A short report explaining the functionality of the range sensor (maximum 2 pages).
- The edited code with comments and changes made to it

The report must include:

- A summary of the range sensor functionality
- Calculations relevant to the range sensor and timers
- A description of the logic involved (flow chart)
- A summary of how to communicate with the range sensor
- An outline of each of the function's logic
- A description of how the interrupts and timers have been setup

Marking Rubric

Description	Marks Available
Summary of range sensor functionality	3
Appropriate calculations (Timers and Sensor)	1
Flowchart of logic	4
Overview of communication protocol	1
Function descriptions	2
Interrupt and timer descriptions	4
Macros clarity	1
Code commenting	2
Report presentation/professionalism	2

Use of generative AI tools must be properly acknowledged, see Gen-AI - UniSkills - Curtin Library (https://uniskills.library.curtin.edu.au/digital/gen-ai/). This includes what prompt(s) were used and how the output of the tool was used in your submission. You must critically analyse the tools output to demonstrate an understanding of the code content and sensor functionality.