Intelligent Control Lab Assignment Guide

The focus of the lab session is to train students to simulate the design, implementation, and validation of a mechatronics project, involving software and hardware. This lab session will also act as a preparation for the student's final thesis research projects. The hardware we are using is Raspberry Pi, the software shall be programmed using Python. Occupies 50% of the total grade of the course Intelligent Control, minimum passing grade 5.5.

Description:

The students are divided into groups of 3. Each group have their full freedom to design their own assignment. This assignment that you design ideally should be using Python and Raspberry Pi together to solve problems in a real-life scenario or create interesting gadgets. However, all ideas are welcomed as long as it represents the workload and shows that the student can use python with hardware to design, implement, test, and validate ideas in the mechatronics field.

Deliverables:

- a report with code as appendix,
- original .py file.
- Optional: a multi-media demo (for example a video)

General requirements:

1. The assignment shall roughly represent the workload of this course which is around 42 hours.
2. This assignment you design should be involving using hardware including Raspberry Pi.
3. The report should be compact, to the point and contains at least all necessary contents:
    a. Introduction & Assignment description
    b. Planning (you can skip it but I'll ask about the planning)
    c. Design
    d. Implementation
    e. Result
    f. Validation or explanation
    g. Source code & necessary log file

Requirement for report: (almost the same as the 'Spy school' assignment)

1. Use proper, meaningful report structure. You have the freedom to pick what chapters to include, but please follow a meaningful and logical order. Make sure your report structure can properly present your work.
2. Provide justification for all your statements.

3. If pictures, diagrams, tables, etc. are used, make sure they are of high quality and readable.
4. To the point. Text like *"In the modern world, technology is evolving fast. We are at the crossroads of……."* are not appreciated.
5. Necessary points to explain in the report:
    a. Cover page, title, student numbers, date, page numbers, table of contents
    b. Necessary background information, the problem formulation, goal of your assignment
    c. How you came to your solution, specific design of your solution, make sure to document carefully if extra rules or assumptions made in your report. Specify the inputs and outputs, use visual tools/diagrams to demonstrate if necessary.
    d. How did you implement your solution
    e. Pros and cons of your solution, performance of your solution, if not succeed explain why
    f. Reflection, possible improvements, etc.
    g. Reference
    h. Code in appendix
6. Main body of the report is no shorter than 3 pages but should not exceed ~21 pages in principle. Use professional formatting, do not compress the font size or paragraph spacing too much in order to fit in the page limit.

    If you really have difficulties meeting the page limit, either put things in the appendix without sabotaging the story telling in the main body or you can compress the format a little bit. The bottom line of the format compression is the format of this document. This document is using Calibri(Body), font size 11, multiple line spacing *1.08, 8 pt spacing after each paragraph. Based on the bottom-line of this most compact format, students have the freedom to select the formatting.

Quality of code:

1. Readable, with consistent style, easy to understand
2. Well-documented
3. Reusable
4. Can be tested
5. Secure to use, with essential input/output control and error tolerance (rules upon dealing with errors can be self-defined but please document this in the report)
6. Provide change logs and version control if necessary. (optional)

Assessment:

1. Report (~40%)
2. Code~(40%)
3. A simple defence session will be held prior to the grade announcement session.(~20%)