CM12002 – Computer Systems Architecture
Coursework 2: Mult-Arduino Project

Set: 10/11/2023 (week 6) **Due: 11/12/2023 (week 11), 8pm**
Percentage of overall unit mark: 20%
Submission Location: Moodle **Submission Components: zip file containing the code, report and one-minute video and pdf file with Group Contribution Form (GCF)** **Submission Format: 2 files:** **(1) .zip file named 'Submission_CM12002_CW2' and** **(2) .pdf Group Contribution Form name ` GCF_CM12002_CW2'**
Anonymous Marking: Y

1 Overview & Learning Outcomes

Work in groups of four students, by the end of this coursework, you will be able to create a prototype of an idea with Arduino boards, including designing and developing a communication solution.

2 Description

This assignment is to be completed in **groups of 4**. Students must be from the same lab group.

You are free to select your own groups. You have until the 19th of November to select your group and confirm your group details via Moodle (use the "Coursework 2: Group Sign-up" link under Coursework 2 section). **If you have not confirmed your group by the end of 17/11/2021, tutors will assign you to groups within your lab.**

This coursework consists of developing an interactive system that uses a minimum of 3 Arduinos to communicate with each other in some way. You will be required to conduct research into how best to make them communicate in a meaningful way, including looking at the Arduino language reference and forum. **By meaningful - we want to see examples of systems which require or benefit from more than a single Arduino in order to function.**

You are expected to identify a real world problem and develop a prototype solution for this.

2.1 System Functionality

Your system must consist of the following functionality and features:

- Use a minimum of 3 Arduinos that must communicate in a meaningful way.
- Include a minimum of 4 unique inputs (buttons, potentiometers, sensors etc)
- Include a minimum of 3 outputs (serial monitor, LCD, LEDs, servo etc)

You are not limited to the above conditions - these are the minimum requirements. Additional marks will be awarded for innovation and creativity. You should focus on quality – features need to have a purpose.

If you need additional components, advice, or some inspiration, we strongly advise you to visit Alvin in the Lovelace Lab (WH1.05). Alvin is usually available in the lab during afternoons (13:00-15:45) from Monday to Friday, but you need to book a meeting with him in advance.

2.2 Criteria for Marking

The coursework should be submitted via Moodle. The group will submit 2 files (only one group member should submit the coursework):

- a .zip file that includes a video, the complete code and a pdf report.
- a second file (pdf) containing the Group Contribution Form.

This must consist of:

1. A short (no longer than 1 minute) video with audio/written comments of your implementation, showing what it does and how. Your video should be under 30MB - if you need to compress it, you can use any software such as http://www.squared5.com or http://handbrake.fr The .avi, .mkv or .mp4 file types are recommended.
2. All code used, with appropriate commenting. These should be your .ino files, not text files (in case you use an external library, do include the code of this library when submitting your code)
3. A report (4 to 5 pages) which explains your motivation, process, and implementation. Report must be in PDF format. At a minimum, your report should include the following (approximate length is just to give an idea of what is typical, not a strict requirement):
    - An introduction to the problem area that you have identified. You should indicate your motivation for selecting this problem area. (approx ½ page)
    - A literature and technology review. This should help provide evidence for your chosen problem area and justification for your development decisions. (approx ½ - 1 page)
    - An overview of the development process - what you did, how you did it, what additional research you conducted, any problems you encountered and how you overcame these. (approx 1 page)
    - Description of your final prototype implementation - provide a description of the components used in the final prototype and how these interact with one another in your system. (approx ½ - 1 page)

- Short summary and conclusions (approx ½ page)
- Bibliography (or References) section which has the list of work referenced in the report (please refer to Library's Referencing guide)
- Please add an appendix (as an additional page to the report) which shows a clear photo of your solution. (e.g., if your main report has 5 pages, the appendix will be a 6th page which is fine)
- Extra marks will be given for the inclusion of a schematic of your solution, which can also be included in the appendix in addition to the photo page. You can use schematic drawing tools such as Autodesk Eagle (free for students) or Fritzing (not free). Alternatively, you may choose to draw this on paper and upload a picture or similar.
- The appendix will have a maximum of 2 pages, one page for photo and another one for schematic.

4. A separate contribution.pdf with a Group Contribution Form as described in a separate document "Group Contribution Explained". This document will only be used once the report is marked, to preserve the anonymity of the submission.

2.3 Assessment criteria:

This coursework is worth 20% of your CM12002 unit overall mark. Your work will be assessed (out of 100) on three criteria:

1) Solution + Presentation	**50 marks**	Solution works according to your own specified requirements, calibrated according to challenge of the problem. Demo is well executed. Shows clear understanding of the solution.
2) Code	**20 marks**	Clear code. Appropriate comments, names of functions and variables. Easy to understand.
3)Written Report	**30 marks**	Clarity and conciseness of communication; appropriate presentation (written, graphic, etc). Photo of the solution. Includes reference to sources if necessary.

3 Feedback

You will receive written feedback on your work within 3 semester weeks of the submission deadline. The feedback will discuss your performance based on the criteria for marking, including what you did well and how specific components/sections could have been improved.

4 Academic Integrity

Your work will be checked to ensure that you have not plagiarised. For more information about the plagiarism policy at the University see: https://library.bath.ac.uk/referencing/plagiarism

Remember that published work that you refer to in your report should be clearly referenced in your text

and listed in a bibliography section given at the end of your report. For more information see, https://library.bath.ac.uk/referencing

Code will also be checked according to Academic Integrity principles (whenever you reuse or adapt code, you need to disclose it as otherwise you are automatically claiming you created it).

5 Generic Section

This coursework should be submitted to Moodle no later than the stated deadline. University rules apply to submissions after this deadline. Please check "Late Submission of Coursework" rules in the Comp Sci Undergraduate Programmes Handbook located on Moodle's "Computer Science Undergraduate Zone"

Requests for extensions should be made to the Director of Studies. Lecturer and tutors cannot approve extensions. Please make sure you are familiar with the department's coursework deadline extension policy.

It is your responsibility to check that you correctly submit your work. Once you have submitted to Moodle you should download your submission and **check it**.

Submission is anonymous, so do not include your names in your code, report, or file names. The fact that the submission is anonymous means we cannot contact you if there is a problem with a submission, so it is **doubly important follow the instructions and check it**.

If you have any problems, please email the tutors: teaching-cm12002@lists.bath.ac.uk