Faculty of Engineering, Environment and Computing

102SE Systems Project

Assignment Brief 2018/19

Module Title **Systems Project**	Group	Cohort Oct.	Module Code 102SE
Coursework Title (e.g. CWK1) Assignment 1			Hand out date:
Lecturer: Dr Sara Sharifzasdeh			Due date: **14/12/2018 18:00**
Estimated Time (hrs): 25 Word Limit*: 3000	Coursework type: Group work		% of Module Mark 40% (of overall module mark)
Submission arrangement online via CUMoodle: File types and method of recording: Mark and Feedback date (DD/MM/YY): Mark and Feedback method (e.g. in lecture, written via Gradebook): CUMoodle			

Module Learning Outcomes Assessed:

1. Develop and refine a project specification
2. Work together as members of a team to undertake a specific task
3. Design and implement a prototype (sub system component, system component)
4. Implement test and quality procedures
5. Understand tasks and processes involved in a product design process together with a schedule of events.
6. Report project outcomes.

Task and Mark distribution:

Marks breakdown	Max	Awarded
1. Design of the sensing and the electronic signal conditioning part	30%	
2. Software Development plus testing, Proteus system simulation	40%	
3. Product Design	10%	
4. Conclusion (Individual group member conclusion and learning outcomes from project)	10%	
5. Individual group member Bench Assessment on personal contribution to the project.	10%	

Marking Rubric

GRADE	ANSWER RELEVANCE		ARGUMENT & COHERENCE		EVIDENCE		SUMMARY	
First **≥70**	Innovative response, answers the question fully, addressing the learning objectives of the assessment task. Evidence of critical analysis, synthesis and evaluation.		A clear, consistent in-depth critical and evaluative argument, displaying the ability to develop original ideas from a range of sources. Engagement with theoretical and conceptual analysis.		Wide range of appropriately supporting evidence provided, going beyond the recommended texts. Correctly referenced.		An outstanding, well-structured and appropriately referenced answer, demonstrating a high degree of understanding and critical analytic skills.	
Upper Second **60-69**	A very good attempt to address the objectives of the assessment task with an emphasis on those elements requiring critical review.		A generally clear line of critical and evaluative argument is presented. Relationships between statements and sections are easy to follow, and there is a sound, coherent structure.		A very good range of relevant sources is used in a largely consistent way as supporting evidence. There is use of some sources beyond recommended texts. Correctly referenced in the main.		The answer demonstrates a very good understanding of theories, concepts and issues, with evidence of reading beyond the recommended minimum. Well organised and clearly written.	
Lower Second **50-59**	Competently addresses objectives, but may contain errors or omissions and critical discussion of issues may be superficial or limited in places.		Some critical discussion, but the argument is not always convincing, and the work is descriptive in places, with over-reliance on the work of others.		A range of relevant sources is used, but the critical evaluation aspect is not fully presented. There is limited use of sources beyond the standard recommended materials. Referencing is not always correctly presented.		The answer demonstrates a good understanding of some relevant theories, concepts and issues, but there are some errors and irrelevant material included. The structure lacks clarity.	
Third **40-49**	Addresses most objectives of the assessment task, with some notable omissions. The structure is unclear in parts, and there is limited analysis.		The work is descriptive with minimal critical discussion and limited theoretical engagement.		A limited range of relevant sources used without appropriate presentation as supporting or conflicting evidence coupled with very limited critical analysis. Referencing has some errors.		Some understanding is demonstrated but is incomplete, and there is evidence of limited research on the topic. Poor structure and presentation, with few and/or poorly presented references.	
Fail **<40**	Some deviation from the objectives of the assessment task. May not consistently address the assignment brief. At the lower end fails to answer the question set or address the learning outcomes. There is minimal evidence of analysis or evaluation.		Descriptive with no evidence of theoretical engagement, critical discussion or theoretical engagement. At the lower end displays a minimal level of understanding.		Very limited use and application of relevant sources as supporting evidence. At the lower end demonstrates a lack of real understanding. Poor presentation of references.		Whilst some relevant material is present, the level of understanding is poor with limited evidence of wider reading. Poor structure and poor presentation, including referencing. At the lower end there is evidence of a lack of comprehension, resulting in an assignment that is well below the required standard.	
Late submission	0		0		0		0	

Tasks and Report

The tasks are chosen to enable you to get experience in design, implementation and testing of real-time systems.

Your Group Project Report should be uploaded through Moodle to Turnitin via the link that will be provided. The report must consist of an objective, introduction about the overall applications, importance and impact of the project, a methodology section that describes the design and implementation aspects followed by an experimental result section describing the testing processes and results, and a discussion and conclusion. It must have an identifiable contribution by each group member together with each group member's personal conclusion.

Your laboratory groups will be as defined at the start of the assignment session (via the shared excel files) and cannot be changed. Groups are expected to work in pre-allocated bench areas. You need to attend these classes promptly and follow laboratory health and safety rules.

Task description

Your design task is to provide a solution to a programmable lift monitoring system that monitors the number of people in the lift with limited space (maximum 12 people). The number of entering and leaving people are counted by two light dependent resistor (LDR) / Optical beam arrangement as shown in Figure 1.

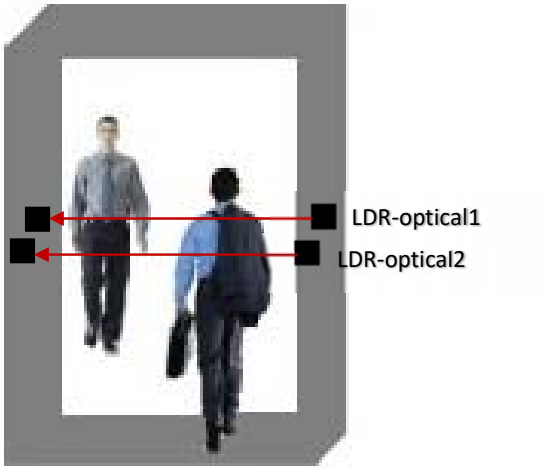

Figure 1. A conceptual diagram of the lift monitoring system

A direct, focused light beam illuminates the LDRs. The LDRs response are subsequently conditioned by the electronic signal conditioning subsystem as to give logic 1 and logic 0 signal levels that indicate the presence or absence of a human in the path of the sensing arrangements. The corresponding light levels sensed by the LDRs and associated circuitry are further processed by a PIC18F microcontroller through a Digital Input Port. As each person enters, he moves in front and away from the LDR1 and then LDR 2. While in the case of a leaving person, LDR2 is triggered before LDR1. The corresponding logic level changes are used to count each entry/leaving and display the current count of entries on a 2 digit 7-segment display. In addition, two red and green LEDs are used for visual feedback on full capacity status (red on and green off) or available space condition (green on and red off). The system should also be able to provide audio or visual feedback in case of overload condition.

Task description

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Introduction

In this project, we will apply our previous experimental work of the PIC microcontroller in connection with the earlier work we undertook on the LDR and signal conditioning techniques plus we will use the programming experience and experimental activity on the PIC18 Microcontroller to:

1. Develop and refine a project specification
2. Work together as members of a team to undertake a specific task
3. Design and implement a prototype (subsystem component, system component)
4. Implement test and quality procedures
5. Design suitable container for the cell (Visualise your product)
6. Report and demonstrate project outcomes.
7. Evaluation of Individual Group member contribution to the project.

Scenario:

You are asked to create part of a prototype light cell that converts optical pulses into digital electronic pulses in order to count them. The optical switching rate is very low i.e. pulses per minute.

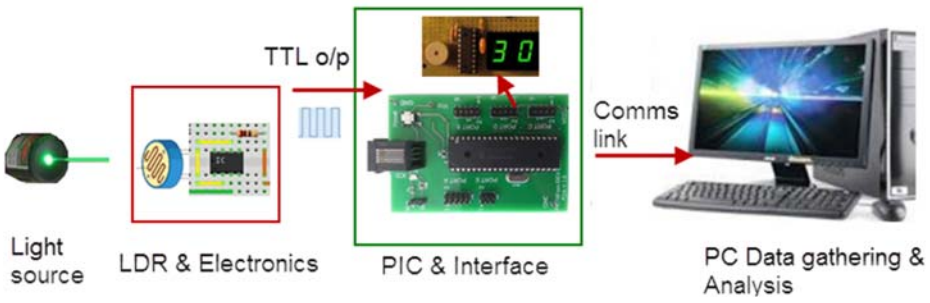

Figure 2: Outline of the System

To convert optical pulses into digital pulses there is a need to set up the LDR in conjunction with an electronic module (built with OP-AMPS/Comparators). The functionality of the LDR and electronic module is shown as per the arrangement in figure 2. Two distinct logic levels are provided by the LDR and electronic conditioning circuitry as shown in Figure 3. The two conditions are: one logic level for no LDR illumination and the inverted logic level for LDR illumination.
Remember that the correct operational logic levels for your micro are 0 - 0.7 volt for logic 0 and 2.5 - 5 volt for logic 1.

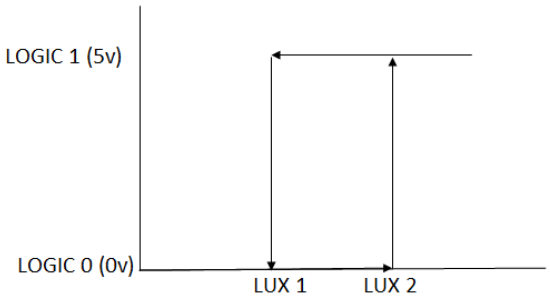

Figure 3: Input / Output Characteristic of LDR / Electronic Module

Report

Each Group is required to submit a single report (**Approx. 3000 words**) with identifiable contributions by **ALL** group members. Your report should concentrate on the following points with the following marking scheme:

1. **Analogue design implementation**. (30 marks)
   a. Sensor and signal conditioning circuit design, Proteus simulation (10 marks)
   b. Analogue design implementation (10 marks)
   c. Test procedures, calibration / comparisons of simulation with practical findings / references to Datasheets (10 marks)

2. **Digital circuit design and Software** (40 marks)
   d. UML design (5 marks)
   e. Full code listing with comments and analysis of code functions (15 marks)
   f. Overall system Proteus simulation (5 marks)
   g. Overall system practical implementation and test results (15 marks)

3. **Product Design** (10 marks)
   a. Concept design, system implementation and application, discussion of possible issues in its implementation) (5 marks)
   b. Enhancing system functionality by the provision of connectivity and other possible features (5 marks)

4. **Conclusion and Learning Outcomes** (10 marks)

Conclusions (Individual group member conclusion and Learning Outcomes from project activity) (10 marks)

5. **Bench assessment** (10 marks)

Individual group member Bench Assessment on personal contribution to the project (10 marks)

Submission:

Only one group report to be submitted by one team member. Other team members should upload a completed cover sheet with all details as specified in the document. The link will be made available on your Moodle module. The naming convention for the coversheet should be:

Coversheet_yoursurname

Notes:

1. You are expected to use the Coventry University Harvard Referencing Style. For support and advice on this students can contact Centre for Academic Writing (CAW).
2. Please notify your registry course support team and module leader for disability support.
3. Any student requiring an extension or deferral should follow the university process as outlined here.
4. The University cannot take responsibility for any coursework lost or corrupted on disks, laptops or personal computer. Students should therefore regularly back-up any work and are advised to save it on the University system.
5. If there are technical or performance issues that prevent students submitting coursework through the online coursework submission system on the day of a coursework deadline, an appropriate extension to the coursework submission deadline will be agreed. This extension will normally be 24 hours or the next working day if the deadline falls on a Friday or over the weekend period. This will be communicated via email and as a CUMoodle announcement.
6. You are encouraged to check the originality of your work by using the draft Turnitin links on your Moodle Web.
7. Collusion between students (where sections of your work are similar to the work submitted by other students in this or previous module cohorts) is **taken extremely seriously** and will be reported to the academic conduct panel. This applies to both courseworks and exam answers.
8. A marked difference between your writing style, knowledge and skill level demonstrated in class discussion, any test conditions and that demonstrated in a coursework assignment may result in you having to undertake a Viva Voce in order **to prove** the coursework assignment is entirely your own work.
9. If you make use of the services of a proof reader in your work you must keep your original version and make it available as a demonstration of your written efforts.
10. You must not submit work for assessment that you have already submitted (partially or in full), either for your current course or for another qualification of this university, unless this is specifically provided for in your assignment brief or specific course or module information. Where earlier work by you is citable, ie. it has already been published/submitted, you must reference it clearly. Identical pieces of work submitted concurrently will also be considered to be **self-plagiarism**.