UNIVERSITY OF LONDON

BSc Computer Science

Module: CM3040 Physical Computing and Internet-of-Things (IoT)

Final coursework assignment: Final report and IoT project

Submission deadline: week 22

IMPORTANT: your overall total word count should not exceed 2,500 words (weighted at 70% of the final mark for the module)

Coursework description
The final end-of-term **individual** coursework consists of performing four key tasks.

1. The first task is to submit feedback on **3** of your peers' projects on your course. This feedback is **MANDATORY** and will not impact peers' final grades. However, it will allow your peers to enhance their projects and you the opportunity to learn from their proposal. **DEADLINE – WEEK 12.**
2. The second task is to develop your proposed IoT project and submit all the source code in a separate zip file.
3. The third task is to submit a report documenting and reflecting upon the project with a 2,500 max words limit.
4. The final task is to submit a maximum of 3-minute-long video, demonstrating the core features of your IoT project.

TASK 1: Peer Feedback (Pass/Fail)
Peer feedback should be submitted for **3** submissions.
This peer feedback is a **MANDATORY** component and should at least cover the following:

A. Critical reflections/feedback on project idea clarity, strengths and weaknesses of allocated projects.
B. Include suggestions on how to potentially enhance their proposal with suitable references to materials.
C. Any inspirations that you learn from fellow peers and would incorporate in your own project.

Maximum 250 words per feedback.

TASK 2: System Implementation (30%)
Develop and implement the proposed functional and non-functional requirements set out for the IoT project in the first submission.

A. Document system development methodology employed, implementation details and justification of decisions taken throughout the project in the final report.

(1) Screenshots of the final source code that is successfully compiled and deployed to all the microcontrollers should be included in the appendices.
(2) Include instructions on how to develop the physical computing circuit with a circuit drawing and the components list should be included in the appendices.

B. Please ensure that your IoT project implementation adheres to the requirements set out in the initial submission and they are:

(1) A maximum of 3 ESP-based microcontrollers nodes can be used for the project.
(2) A minimum of 3 sensors and/or actuators should be used per node.
(3) All source code should be compilable and developed using Arduino IDE ONLY.
(4) All ESP-based microcontrollers nodes should be in-/directly linked.
(5) All ESP-based microcontrollers nodes should have a dashboard and respond to REST-based HTTP requests in a JSON format.
(6) Supporting external libraries for Arduino IDE and commercial devices such as Smart Speakers (i.e., Alexa or Google Home) and one Raspberry Pi can be used but NOT mandatory.
(7) Project-specific sensors and actuators outside the prerequisite kits can be purchased at their own cost but should be limited to a total of 3 components ONLY. Consult with the tutor if you require more.

C. All system source code files should be submitted as a single zip file.

(1) All source code files should include multiline comments at the start of the program to provide an overview of the code, include relevant comments throughout the code and list all dependency libraries required.
(2) A supporting circuit diagram image and pin connections information should be included.

TASK 3: Final Report (30%)
The final report should contain the following:

A. Description of each of the major components
Provide a clear explanation of the problem and objectives. Include a clear explanation of each of the major aspects of the product including a rationale for each of the design and implementation decisions. Include academic references throughout the report or where possible, to support your justifications/decisions and resources used.

B. Description of the development lifecycle
Provide clear evidence of the application of an appropriate software development methodology. Discussion of each of the major stages including how validation and verification were applied at each stage.

C. Critical analysis and reflection
Include a critical analysis and reflection of what went wrong and what was right throughout the project? What could be done differently next time? Appraisal of the product; analysis of the approach taken (with hindsight); analysis of software/tools used.

D. Presentation
In general, the report should be free of spelling errors and suitable grammar and consistent writing style should be adapted. Also, please ensure to include the following items to enhance the presentation of your report: table of contents, page numbers, referencing list, etc.
The structure for your final report should follow a similar structure to the initial submission but no duplicate submission. For example, the abstract, introduction, and proposal section can be revised and made concise while methodology, literature review, system design, test plan, and implementation progress can be revised or removed completely. Additional sections to fulfill the above objectives can be added such as evaluation results, implementation details, critical reflection, and conclusion.

TASK 4: Video Demonstration (10%)
The main goal of this video demonstration is to provide a short overview of your project and demonstrate the key features of your IoT project. This video serves a twofold purpose, to verify the functionality of your project and validate that it is your work.

You will not be marked on video editing skills, however, please see the following guidelines to support you further.

- A maximum of 3-minute-long video with a video quality of 720p+ should be submitted.
- The video should include a brief introduction to the project and a demonstration of all the major components of your IoT project.
- Video can include yourself or your voice-over as a minimum.
- No background music.
- Recommended video format is MP4.

- Support: video recording and editing software
  - Screen recording: Google chrome extension such as Screen recorder, and Screencastify - Screen Video Recorder
  - Video editing tools such as free and paid-for versions are available
    - Open source: Shotcut, kdenlive,
    - Other: DaVinci, VideoPad, Movie Maker, VSDC, Openshot, iMovie, ...

Some tips: a script can be written for each slide to introduce your project and prepare key features to demonstrate and record it in one take or multiple takes. You can use the above video editing tools to edit and merge the video clips into one final one to submit. Ensure to include your name in the video.

Assessment Criteria

Area	Criteria	Marks
TASK 1: Peer Feedback (Mandatory) *250 words max each*	Missing or incomplete feedback.	Pass/ Fail
	Covered all three areas in sufficient dept but inappropriate suggestions were made or poor language was used.	
	A clear grasp of peer's proposal and appropriate suggestions made. However, lacked details and no supporting reference(s) were provided.	
	Excellent feedback, proposed suitable enhancements with complementing materials. Showed inspiration and identified areas for self-improvement.	
	Exceptional feedback, proposed innovative enhancements with suitable materials. Showed inspiration and identified areas for self-improvement.	
	Submitted 3 peer feedbacks.	
TASK 2: System Implementation (30%)	Limited or no IoT features were implemented. No documentation or missing submission.	0
	Single zip file was submitted and some set requirements followed. Few proposed requirements developed were implemented. Limited or lack of innovation and details provided on the implementation. Fragment of the code with syntax errors and unclear circuit drawing provided with limited explanations or annotations. Missing testing report and screenshots/images of the system running.	10
	Most of the requirements were met and requirements implemented. A reasonable effort was made to document the technologies used, justification of implementation decisions and evaluation results in the final report. Most of the proposed requirements/features were implemented and tested with clear results. Most of the code files were developed and submitted with some comments on how to compile and run the system. Some testing reports and screenshots/images of the system running are provided.	15
	The majority of the requirements were met and requirements implemented. A reasonable effort was made to document the technologies used, justification of implementation decisions, and evaluation results in the final report. Most of the proposed requirements/features were implemented and tested with clear results. A complete code was developed and submitted with some comments on how to compile and run the system. Some testing reports and screenshots/images of the system running are provided.	20
	All the requirements were met and requirements were implemented with some inaccuracies or robustness issues. A good effort was made to document the technologies used, justification of design documentation and evaluation results in the final report. All, if not most, proposed requirements/features were implemented and tested with clear results. Some supporting screenshots/images of software/hardware circuits, pin diagrams and etc provided as pieces of evidence. A complete set of sketches/source code files were commented on and submitted with clear user instructions.	25

	All the requirements were met and requirements implemented. An excellent effort was made to document the technologies used, the justification of design documentation, and the evaluation results in the final report. All, if not most, proposed requirements/features were implemented and tested with clear results. Supporting screenshots/images of software/hardware circuits, pin diagrams and etc provided as pieces of evidence. A complete set of sketches/source code files were commented on and submitted with clear user instructions.	30
TASK 3: Final Report (30%) *2,500 words max* *(this excludes the title page, acknowledgement, abstract, table of contents, list of figures, list of tables, reference list, and appendices.)*	Missing or incomplete report submitted with core sections missing.	0
	Limited or unclear description/objectives of each major component. Limited or no evidence of system development life cycle such as requirements analysis, design, implementation, testing, maintenance, and planning. Vague or no critical analysis and reflection on a project developed. Poor structure and presentation of the report with several spelling and grammar mistakes, missing sections such as table of content, references, page numbers, abstract and conclusion.	10
	Adequate description/objectives of each major component. Reasonable evidence of system development life cycle such as requirements analysis, design, implementation, testing, maintenance, and planning. Some critical analysis and reflection on the project were developed. Adequate structure and presentation of the report with some spelling and grammar mistakes, some missing sections such as table of content, references, page numbers, abstract, and conclusion.	15
	Good description/objectives of each major component. Good evidence of system development life cycle such as requirements analysis, design, implementation, testing, maintenance and planning. Good critical analysis and reflection on the project developed. Well-structured report and good presentation of the report with the suitable writing style and covered most of the core sections.	20
	Excellent description/objectives of each major component. Excellent evidence of system development life cycle such as requirements analysis, design, implementation, testing, maintenance and planning. Excellent critical analysis and reflections on the project developed. Excellent structure and presentation of the report with the suitable writing style and covered most of the core sections.	25
	Exceptional description/objectives of each major component. Exceptional evidence of system development life cycle such as requirements analysis, design, implementation, testing, maintenance, and planning. Exceptional critical analysis and reflections on the project developed. Exceptional report structure and presentation with the suitable writing style and covered most of the core sections.	30

TASK 4: Video Demonstration (10%)	No video submitted or poor video quality submitted or video length drastically exceeds the 3-minute-length requirement.	0
	No project introduction was provided and some features were implemented with a vague description. Limited or no voice-over provided to showcase the developed project.	2
	Adequate project introduction provided with vague rationale and demonstration of few features showcased. Adequate walkthrough of the project with voice/video.	4
	Reasonable project introduction provided with clear rationale and demonstration of most of the key features showcased. Reasonable walkthrough of the project with voice/video.	6
	Good project introduction provided with clear rationale and demonstration of most of the key features showcased. A good walkthrough of the project with voice/video.	8
	Excellent presentation of the proposed project with clear planning and structure of the video. Excellent demonstration of most, if not all, key features. Excellent walkthrough of the project with voice/video.	10

[END OF COURSEWORK ASSIGNMENT]