Module: Internet of Things

Module Assignment: IoT Scenario Analysis: From Business needs to Architecture Design, Implementation, and IoT-Enabled Innovation
Assignment Deadline: **8th Jan 2024 by 16:00 (For Part-time CSTE students 22nd Jan 2024 by 16:00)**

Assignment Brief

During the week you have covered a range of topics on IoT, from key concepts and enabling technologies, to design, architecture, as well as implementation and challenges, business innovation concepts, highlighting the need to have an "ecosystem" approach to IoT-enabled innovation.

Your assignment is to produce an original (no plagiarism!) report wherein you have the opportunity to demonstrate the application of skills necessary for IoT enabled applications and services innovation by proposing your own IoT enabled solution, taking on board key takeaways from the topics covered above to present to your hypothetical manager. This will include a demonstrator, which will help to communicate specific aspects of the developed solution. Each member of the team has been asked to produce a report and a prototype solution different from other members of the team.

The hypothesis is that your essay will introduce the IoT scenario to your organisation and you are therefore required to analyse it, through a concise report, including benefits, challenges and drawbacks in a critical manner to allow your management to make an informed decision. Your assignment should cover several of the issues below (only include them with some justification/argument and to the extent they contribute to making a comprehensive but concise and cohesive case for your management, within the essay length limit):

1. Describe key project requirements (functional description)
2. Identify key stakeholders for the project
3. Identify key technology enablers (e.g. sensors, actuators, communication/connectivity options)
4. Sketch out architecture options (data flow, functional, implementation, etc)
5. Identify security approach based on one of the methods such as STRIDE, PASTA, ATTACK TREES or other, or, alternatively, a method such as LINDUNN for privacy threats
6. Map the value network for your scenario, mentioning the benefits for the key involved stakeholders; sketch out a business model canvas for the scenario

The Assignment should be submitted by **8th Jan 2024 by 16:00 (For Part-time CSTE students 22nd Jan 2024 by 16:00)** – please contact your SAS lead for any queries on submission practicalities.

Dr Sandeep Jagtap
S.Z.Jagtap@cranfield.ac.uk

Assignment Marking Scheme

The assignment will be marked according to the following criteria:

Criterion 1. 40%. Evidence of how well have the subject matter and its subtopics have been grasped
Criterion 2. 45%. How effectively have you practised critical and analytical thinking; relevance of content and logical coherence of proposed arguments; creativity / originality / synthesis.
Criterion 3. 15%. Degree of mastery of skills involved in communicating your ideas

Penalties
The recommended length is 3000 words. This is to ensure that your report sufficiently covers the business requirements, while being concise. If you exceed the recommended length a penalty will be applied on your mark (proportionally, 1 mark reduced for every 10% (300 words), i.e. a report of 3450 words will receive a penalty of 1.5 marks.

Good Practice
You are welcome to collaborate to exchange ideas with other students but don't copy each – other: you will receive bonus points for originality in your writing and presentation, but you will miss those if your report looks very similar to other reports.

Description of Use Cases

An opportunity for introducing a new product or service driven by IoT technologies is being considered in your organisation. You are tasked with analysing this to deliver a report and a quick small-scale IoT platform implementation prototype to include the following:

1. Describe key project requirements (functional description)
2. Identify key stakeholders for the project
3. Identify key technology enablers (e.g. sensors, actuators, communication/connectivity options)
4. Sketch out architecture options (data flow, functional, implementation, etc)
5. Identify security approach based on one of the methods such as STRIDE, PASTA, ATTACK TREES or other, or, alternatively, a method such as LINDUNN for privacy threats
6. Map the value network for your scenario, mentioning the benefits for the key involved stakeholders; sketch out a business model canvas for the scenario

Marking rubric

	Fail (<50%)	Pass (50-59%)	Good (60-69%)	Very Good (70-79%)	Excellent (80-100%)
Criterion 1	Insufficient coverage of subject matter and subtopics with major shortcomings, demonstrating a lack of understanding of key concepts.	While there are significant shortcomings, there is overall adequate coverage of the subject matter and subtopics. There might be some parts deemed less than adequate but are compensated by others which are well or very well covered.	Good coverage of the subject matter and subtopics overall. Even if there are shortcoming and some parts are deemed less than good, the majority are at least good with some very good or better, demonstrating a good level of understanding use of key concepts. .	Very good on the balance coverage of the subject matter and subtopics. Some part might even be excellent while other less well developed. There are no major shortcomings and the overall outcome demonstrates a good level of understanding of key concepts. .	All aspects are excellently covered, including the prototype. The work demonstrated excellent understanding of business concepts, technologies and challenges and a prototype of equally high quality. Any shortcomings are minor.
Criterion 2	The reports lacks an adequate level of analysis overall or in the majority of the topics of the subject matter. It fails to demonstrate appropriate use of the key concepts and technologies. In some parts at least there is a lack of logical cohesion in the arguments, or simply insufficient arguments for any choices made.	While there are significant shortcomings, there is overall adequate argument flow to make the case for the choices made. The discussion demonstrated the report applies adequate use of the relevant concepts or technologies and if the level of analysis is less than adequate for some parts, it is compensated by good arguments for others.	The report demonstrates a good level of putting into practice key concepts and technologies, including the practice of the prototype solution. While there might be some parts which are less than good in terms of the quality of the analysis, they are compensated by others which are very good.	The reported work clearly demonstrates that the key concepts and technologies are very effectively put in practice. The level of analysis is of very good quality overall, and even if there are some shortcomings in the argument flow or the analysis, these are not major.	The output demonstrates excellent synthesis, analytical thinking, and argument flow. It clearly puts in practice all the key elements and any shortcomings are minor.
Criterion 3	The report employs poor layout, structure and format; language lacks precision or clarity, and often uses inadequate vocabulary for the discussed topics. Excessive number of typos. Overall, it does not achieve to effectively communicate choices and ideas.	The report has basic but adequate layout and format and mostly appropriate structure. It uses minimal but adequate visualisation for the key concepts and ideas. Language has issues with precision, clarity, and vocabulary at times but overall it is adequate.	A good layout, structure and format, including some relevant visualisation features make the report good to read. Key ideas and concepts are communicated with appropriate vocabulary, supported by clear and arguments.	High quality characterises this report in terms of its layout and structure, including very appropriate visualisation options for conveying key messages. Very appropriate vocabulary usage, aided by precision and clarity in language mark this as an outcome of very good quality.	The report has gone the extra mile in producing excellent quality in terms of layout, structure, and format, including some very appropriate visualisation features. Highly appropriate vocabulary is employed in a text characterised by clarity and precision, resulting in highly effective communication of ideas.