Cardiff School of Computer Science and Informatics

Coursework Assessment Pro-forma

Module Code: CM2306
Module Title: Communication Networks [Spring Semester]
Lecturer: Charith Perera
Assessment Title: Group Coursework (4 Students per Group)
Assessment Number: 2
Date Set: 08 March 2021 (Beginning of Week 6)
Submission Date and Time: 10 May 2021 at 10am (Beginning of Week 12)
Return Date: 07th Jun 2021 (Beginning of Week 16)

This assignment is worth 50% of the total marks available for this module. If coursework is submitted late (and where there are no extenuating circumstances):

1. If the assessment is submitted no later than 24 hours after the deadline, the mark for the assessment will be capped at the minimum pass mark;
2. If the assessment is submitted more than 24 hours after the deadline, a mark of 0 will be given for the assessment.

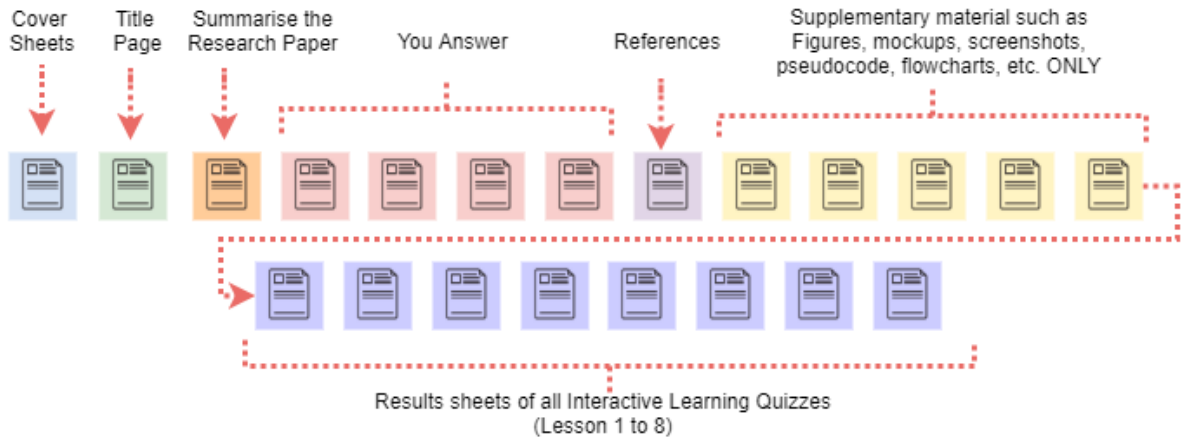
Your submission must include the official Coursework Submission Coversheet, which can be found here:
https://docs.cs.cf.ac.uk/downloads/coursework/Coversheet.pdf

Submission Instructions

The assessment must be submitted via Learning Central.

You should create a single PDF by combining the following material in the following order. Therefore, your submission (Single PDF) should not include more than 12 pages.

- 1 coversheet page
- 1 title page
- 1 page to Summarise the given research paper
- A maximum of 4 pages (excluding references)
- 1-2 Reference pages (References Only)
- Up to 5 pages as supplementary material
- 8 Results sheets of Interactive Learning Quizzes (Please attached the full results sheets. Each results sheet may longer than one page. That is fine). Please use the group ID to generate the results sheets.



The title page in the PDF file **MUST** include your student IDs as well as group ID (this enables us to correctly award marks).

Description		Type	Name
Answers	**Compulsory**	One PDF (.pdf)	Essay_[Group ID].pdf

Any deviation from the submission instructions above (including the number and types of files submitted) may result in a mark of zero for the assessment or question part. Staff reserve the right to invite students to a meeting to discuss coursework submissions

Assignment

- **Lectures:** Through a series of lectures, you will gain knowledge on different aspects of the Internet of Things.

- **Labs:** Through a series of labs, you will gain experience of full-stack IoT application development process. During this process, you will learn and use different software and hardware components as well as tools and frameworks.

- Complete the **Interactive Learning Quizzes** related to all eight sessions. Please make sure you download the results sheets at the end of each quiz. Please use the group ID to generate the results sheets. As illustrated in the above figure, you must attach all the results at the end of the main coursework. You are required to complete the quizzes as a group. We encourage you to get together and go through the quizzes as a team. You much achieve above 90% marks to be considered as complete. However, you can try **Interactive Learning Quizzes** unlimited times. Each results sheet worth **1.25 marks**. Therefore you will gain **10 marks** for completing and submitting the eight results sheets related to 8 lessons. There will be no partial marks.

- **Reading Task 1 [Compulsory]:** Study the following paper.

  > Tianshi Li, Yuvraj Agarwal, and Jason I. Hong. 2018. Coconut: An IDE Plugin for Developing Privacy-Friendly Apps. *Proc. ACM Interact. Mob. Wearable Ubiquitous Technol*. 2, 4, Article 178 (December 2018), 35 pages. DOI: https://doi.org/10.1145/3287056 https://dl.acm.org/citation.cfm?id=3287056

- **Your Task:** Based on your knowledge (lectures) and experience (labs), **envision and propose a tool / plugin / extension / framework** that you could develop in order **assist** software engineers to implement privacy-protecting IoT applications **easily (with less time / less knowledge / less effort)**. An example is given below.

  You studied one such example in **Reading Task 1** where the paper discusses how to augment the mobile application development process and support privacy-aware mobile application development. This paper discusses how to encourage software engineers to use location information in a more privacy-aware manner.

  Your task is to select one privacy-protecting feature you would like to implement.

Discusses how you will develop a **tool / plugin / extension / framework** to support IoT application development process.

- Explain what the **tool / plugin / extension / framework** you propose;
- How it makes the IoT application development process easier?
- How does it help to protect privacy?
- How feasible it is to develop your proposed **tool / plugin / extension / framework**?
- Position your **tool / plugin / extension / framework** in comparison to other existing IoT development tools.

When possible, strengthen your arguments with appropriate evidence / references. Feel free to use mock-ups, flowcharts, pseudocodes or any other diagrams and figures to support your discussion. You are allowed to use up to 5 pages to present additional information listed above.

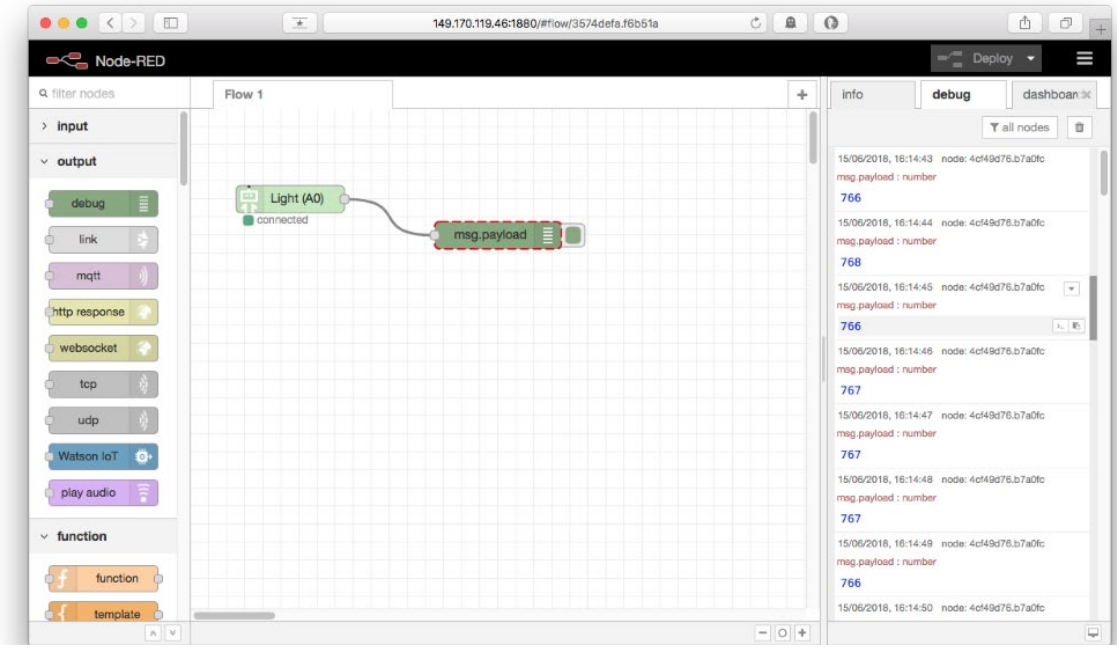
- **Optional Reading Material**

Following list is not complete and are optional reading material. They are just starting points for you to explore further. It is your responsibility to search and find a privacy-preserving technique. You may use your favourite search engine to conduct your exploration. Further, note that some of the following links may or may not work as they are third party resources.

- Designing Privacy-aware Internet of Things Applications https://arxiv.org/pdf/1703.03892.pdf
- https://privacypatterns.org/
- http://privacypatterns.wu.ac.at:8080/catalog/
- https://privacypatterns.eu/

Let's think about a potential example:

You all have seen and used Node-RED. If you open up Node-RED, you will see different types of node palettes on the left-hand side as shown below.



Imagine if there were a dedicated palette called 'Privacy' and within that palette imagine you have independent nodes called **Minimise**, **Aggregate, etc.**

Can you think about how the aggregation node would look and how it would behave? Once you drag and drop the aggregate node how should it guide the developers to aggregate the incoming data from a sensor appropriately…What are the configurations that developers may need to use or implement with regards to an **Aggregate Node.** This is an example of a type of tool/plugin/extension/framework which you could write about in your coursework. There are of course others (another example would be 'Minimise' as suggested above) and you are free to choose whichever you like. The important thing is to relate your chosen tool/plugin/extension/framework to the bullet points above under 'Your Task'

Learning Outcomes Assessed

The assignment assesses the following Learning Outcomes:

1. Demonstrate the understanding of full-stack IoT application development process.
2. Demonstrate the understanding of privacy-protecting techniques.
3. Identify how to extend tools used in IoT application development process to better assist software engineers to easily incorporate privacy-protecting features in IoT applications.

Criteria for assessment

You will be awarded marks for:

- **Argument and Analysis:** The clarity and correctness of your argument. State and defend the problem you are discussing as well as your own position clearly and convincingly. **[17 marks]**
- **Knowledge and Research:** The appropriate use of supporting material. Research and use existing work that is relevant for your problem and the discussion. Give references to the related work and sources used. References must be given in a numbered list at the end, and the numbers must be used in the text where a reference is made. **[17 marks]**
- **Language and Presentation:** The structure of your work. Use a clear structure and ensure that the reader understands how your work is structured (e.g., you may explicitly describe the structure). **[6 marks]**
- **Understand Learning Material:** Completion of Interactive learning quizzes and submit appropriate evidence of completion (i.e., 8 results sheets) **[10 marks]**

Please consider the following when writing your essay. These points are important to achieve a good mark:

- Your essay should focus on one specific privacy-protecting feature – and not attempt to provide general coverage of privacy in IoT. Do not repeat material that has already been covered in the lecture notes.
- Better to pick one privacy-protecting feature and discuss in-depth than try to discuss many privacy-protecting features at a high level.
- Pick a privacy-protecting feature that is challenging to implement.

- Whether the essay is a coherent piece of work that clearly describes and defends an argument. Always provide evidence to back up your arguments.
- Use visual mediums (i.e., Figures, mock-ups, etc.) to better explain your approach.

Component & Contribution	**Fail**	**3rd**	**2:2**	**2:1**	**1st**
Argument and Analysis (17 marks)	Errors in reasoning or argument. No evidence of understanding or application of principles	Some logical argument. Some understanding and application of relevant principles	Emerging understanding and application of relevant principles	Developing understanding and application of relevant principles Clear argument.	Capable understanding and application of relevant principles. Some Evidence of original thinking
Knowledge and Research (17 marks)	No evidence of further reading. No appreciation of context of privacy in Internet of Things application development.	Some evidence of further study. Emerging awareness of privacy in Internet of Things application development.	Some use of further sources to back up argument. Developing appreciation of context.	Developing appreciation of context. Use of material not presented in lectures.	Additional sources used to strengthen argument. Capable understanding of context Use of material not presented in lectures.
Language and Presentation (6 marks)	Little or no structure to output Poor use of language.	Output is structured. Some grammatical errors. Presentation is inconsistent.	Well organised and structured. Minor grammatical issues. Developing presentation.	Well organised and structured. Very minor grammatical issues. Consistent presentation.	Excellent structure and organisation. No grammatical errors. Excellent presentation.
Understand Learning Material (10 marks)	• For each interactive learning quiz, you will get full 1.25 marks, if you complete the quiz **AND** achieve equal or above 90% marks **AND** submit the results sheet as evidence. • Each Interactive quiz is marked independently.				

Feedback and suggestion for future learning

Feedback on your coursework will address the above criteria. Feedback and marks will be returned on 07th Jun 2021 (Beginning of Week 16) via Learning Central.