|  |  |  |
| --- | --- | --- |
| **Course No: ISCG8052** | **The Internet of Things** | **Level: 8**  **Credits: 15** |

|  |  |
| --- | --- |
| **Student Name:** | **Assessor Name:** |
| **Student ID:** | **Programme Name: MComp** |
| **Assessment Type: Portfolio** | **Weighting: 50%** |
| **Date due: As per course schedule** | **Marks: 100** |

|  |  |
| --- | --- |
| **Student declaration**  I confirm that:  • This is an original assessment and is entirely my own work.  • Where I have used ideas, tables, diagrams etc. of other writers, I have acknowledged  the source in every case.  • This assessment has not previously been submitted as assessed work for any academic  course. | |
| **Student Signature:** | **Date:** |

# Assessment Mapping

After completing this assessment, the student will have met the following learning outcomes related to the graduate profile outcome.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Graduate Profile Outcome** | **Learning Outcome** | **Part A**  **Task 1** | **Part A**  **Task 2** | **Part B** |
| Be equipped with advanced academic capabilities, flexibility, creativity and attitudes to perform more effectively in the rapidly evolving field of applied computing with a distinctive edge, above and beyond the Bachelor of Computer Systems | 1. Critically evaluate development platforms and frameworks for the internet of things | ✓ | ✓ |  |
| Undertake one or more of architectural design, quality assurance, business process modelling and strategic planning of enterprise wide IT projects, showing initiative in project planning, design, development and management. | 1. Design and validate an internet of things system prototype to solve a real-world problem. |  |  | ✓ |

# Assessment Instructions

* This is a portfolio assessment
* There are two parts. Both parts are to be done individually.
* Correctly reference your used sources in-text and include a full reference list at the end of each part of the portfolio, using APA 7th edition or IEEE guidelines.

# Assessment submission instructions

* A portfolio is a collection of items to support assessment against the learning outcomes.
* Due dates for each part of this portfolio are defined individually in the table below.
* Make sure your portfolio has a cover page and page numbers.
* Upload your portfolio parts as a PDF file to the Moodle link “**Upload assessment one here”**.

|  |  |
| --- | --- |
| **Parts** | **Submission dates** |
| Part A | 9/08/2023 |
| Part B | 4/11/2023 |

## Part A (individual) Total = 40 marks

### Task 1 [24 marks]

A barometer is a scientific instrument that is used to measure air pressure in a certain environment. Pressure altimeters are basically barometers which are generally used to correlate atmospheric pressure to altitude.

Barometric pressure can also be used together with environmental signals to predict or characterize weather phenomena.

You’ll need to decide on the IOT development platform and framework for prototyping a system that is able to characterize weather phenomena with the use of the sensors on the TI SensorTag. Deciding from the sensors and signals, communication protocols, designing and developing the client, publishing the data and storing and processing it.

1. Other than altitude (elevation), which other environmental phenomena can be monitored/analysed with the help of a barometric sensor? Describe at least two that can be computed as a function of the barometric pressure and other environmental signals. [6 marks]
2. Design a system architecture to sense the signals described on Task 1.a from the TI SensorTag and publishing (and plotting) such information into a widely available IOT broker [6 marks]
3. Critically evaluate the development IOT platform and the framework\* you have chosen for designing the prototype, comparing it with a different dev IOT platform and a different framework. Your evaluation should be research based. Acceptable word length range for evaluation is from 800 to 1000 words. [6 marks]
4. Describe the security layers that would be required on the system proposed in Task 1.b [6 marks]

\*Dev IOT platforms refer to the main system that is doing the computation, either using a laptop, or an Arduino board, or a SBC board (like a Raspberry). The design framework includes the set of tools, workflows, protocols and subsystems, the operating system, the programming language and every element included.

### Task 2 [16 marks]

Identify and examine a real-world problem that was solved using an IOT approach.

Acceptable word length range is from 500 to 700 words.

## Part B (group) Total = 60 marks

## Task 1 [Total = 50 marks]

As mentioned in Part A, barometric pressure is widely used to calculate altitude, but can be also used together with environmental signals to predict or characterize weather phenomena.

You are encouraged to use the barometric sensor on the Sense Hat and the environmental sensors to set up an experimental IOT platform.

Barometric and environmental readings should be sampled and stored in a database using **json** format and include metadata such as: timestamp, signal-readings, location, device-label. Readings should be available publicly over the internet.

For the prototype you need to follow the steps below:

1. Examine barometric and environmental signals. Your examination must include the things listed below. [15 marks]

* What can be found from continuous monitoring of barometric pressure and environmental signals.
* How does barometric pressure affect people?

1. Based on your examination design, develop and validate an IOT intelligent system. [35 marks]

Prepare a formal final report which includes the evidence of examination, design, development and validation. Acceptable word length range is from 1700 to 2000.

**Task 2 [Total = 10 marks]**

**Instructions:**

* You will give an oral presentation on your IOT intelligent system prototype and findings from task 1.
* Your lecturer will decide the date and time of presentation.
* Your presentation needs to be maximum 15 minutes long.
* You need to prepare a multimedia presentation. You may use slides, animations, audio, pictures, videos, or any media that helps you to showcase your achievements making the best use of your time.
* You need to submit a copy of the material you’ll use on your presentation together with your report for task 1.
* Your presentation may be recorded for marking and moderation purposes.
* Familiarise yourself with the attached observation checklist on page 7 to ensure you meet the requirements.
* Your lecturer will complete the observation checklist (next page) for each of you.

**Presentation observation checklist**

Name of Learner:

Name of Observer:

Date of Presentation:

Indicate if the learner has met the criteria during the process of achieving the objective.  Use the space to add comment for feedback to the Learner and for moderation purposes.

|  |  |  |  |
| --- | --- | --- | --- |
| Observation | Comment | Max mark | Your mark |
| Appropriate body language (including movements and gestures) |  | 1 |  |
| Appropriate usage of voice, pronunciation and volume |  | 2 |  |
| Language used is suited to the audience (fits purpose, audience, and context?) |  | 1 |  |
| The subject matter was organised logically |  | 2 |  |
| Demonstration of the application |  | 4 |  |
| **TOTAL** |  | **10** |  |
| Extra Notes: | | |  |

COMP8832 The Internet of Things

Assessment 1 Mark Sheet

Student Name:

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Maximum**  **Marks** | **Your mark** | **Comment** |
| Part A  Task 1 | 24 |  |  |
| Part A  Task 2 | 16 |  |  |
| Part B  Task 1 | 50 |  |  |
| Part B  Task 2 | 10 |  |  |
| **TOTAL** | **100** |  |  |

**Marking criteria**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Part 1** | **Criteria** | **Break**  **down of marks** | **Marks awarded** | **Comments** |
| Task 1 a.  Evaluation  [6 marks] | * 2 different signals are explained, and it is stated how to compute them | 6 |  |  |
| Task 1 b.  Conclusion  [6 marks] | * The design includes diagrams and a coherent system architecture that allows the flow of information with the framework defined. | 6 |  |  |
| Task 1 c.  Evaluation  [6 marks] | * The conclusion explains under which constraints each of the platform and framework will be the best solution | 6 |  |  |
| Task 1 d.  Security  [6 marks] | * Different Security protocols and layers are explained | 6 |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Task 2  Identification and examination  [16 marks] | * Correct identification of a real IOT world problem * Examination of the identified problem includes * features that makes it IOT problem * describes the product IOT architecture | 6  10 |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Part 2** | **Criteria** | **Break**  **down of marks** | **Marks awarded** | **Comments** |
| Task 1a  Examination  [15 marks] | Examination includes   * Analysis * The effect of barometric pressure in people’s life | 8  7 |  |  |
| Task 1b  [35 marks] | **Design**   * Appropriate architecture and framework are proposed that will solve the problem * Network diagrams are provided * Appropriate protocols are used * Test plan is included   **Develop**   * A prototype is developed. * Prototype developed is working and doing what is required to do.   **Validate**  Test plan is validated | 10  15  10 |  |  |

# Late Submission of Assessment

Assessment submitted after the due date and time without having received an extension through Affected Performance Consideration (APC) will be penalised according to the following:

10% of marks deducted if submitted within 24hrs of the deadline

20% of marks deducted if submitted after 24hrs and up to 48hrs of the deadline

30% of marks deducted if submitted after 48hrs and up to 72hrs of the deadline

No grade will be awarded for an assignment that is submitted later than 72hrs after the deadline

Assessment handed in more than 72 hours late will not be marked unless Special Assessment Circumstances apply. So, it is better to hand in an incomplete assessment on time.

# Assistance to other Students

Students themselves can be an excellent resource to assist the learning of fellow students, but there are issues that arise in assessments that relate to the type and amount of assistance given by students to other students. It is important to recognise what types of assistance are beneficial to another’s learning and also what types of assistance are unacceptable in an assessment.

## Beneficial Assistance

* Study Groups.
* Discussion.
* Sharing reading material.
* Testing another student’s programming work using the executable code and giving them the results of that testing.

## Unacceptable Assistance

* Working together on one copy of the assessment and submitting it as own work.
* Giving another student your work.
* Copying someone else’s work. This includes work done by someone not on the course.
* Changing or correcting another student’s work.
* Copying from books, Internet etc. and submitting it as own work. Anything taken directly from another source must be acknowledged correctly: show the source alongside the quotation.

Do you want to do the best that you can do on this assignment and improve your grades? You could:

* Talk it over with your lecturer
* Visit Te Tari Awhina or Maia for learning advice and support
* Visit the Centre for Pacific Development and Support
* Contact the USU Advocate for independent advice
* For contact details and more information, go to www.usu.co.nz