UOW MALAYSIA KDU PENANG UNIVERSITY COLLEGE
PART OF THE UNIVERSITY OF WOLLONGONG AUSTRALIA GLOBAL NETWORK

ASSIGNMENT COVER PAGE

Validated by: UNIVERSITY OF LINCOLN UNITED KINGDOM

Programme	**Course code and title**
Bachelor of Computer Science (Hons)/ Bachelor of Computer Science (Hons) in Computer and Network Technology/ Bachelor of Information Systems (Hons)/ Bachelor of Software Engineering (Hons)	CET3063/N/CET3064 Internet of Things
Student's name / student's ID	**Lecturer's name**
CHAN SEOW FEN / 0207368	Dr. Khoo Hee Kooi

Date issued	**Submission deadline**	**Indicative weighting**
25th September 2023 (Week 3)	1st December 2023 (Week 12)	30%
Assignment 2 title	Feed sensor data onto a cloud service (400 words)	

This assessment assesses the following course learning outcomes

# as in course guide	**UOW Malaysia KDU Penang University College learning outcomes**
CLO1	N/A
CLO2	Evaluate IoT system architecture for a real world application.
CLO3	Develop a virtual IoT system for a specific application using cloud services and network sensors.
CLO4	N/A
# as in course guide	**University of Lincoln learning outcomes**
CLO1	Critically evaluate the strengths, weaknesses, and resource constraints of IoT computing systems in comparison to traditional computing models
CLO2	Design and implement a connected prototype IoT software system that utilises sensor data
CLO3	Implement industry standard IoT messaging protocols
CLO4	N/A

Student's declaration

I certify that the work submitted for this assignment is my own and research sources are fully acknowledged.

Student's signature: 

Submission date: 1/12/23

Assignment 2

ORIGINALITY REPORT

0%	0%	0%	%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

Exclude quotes	On	Exclude matches	Off
Exclude bibliography	On		

Table of Contents

1.0 Graphs of the Collected Sensor Datasets

The collected data from sensor were visualised through graphs below, portraying the magnitude variations over time. These graphs exhibit outstanding clarity, with sufficient datasets which is 50 data for each class of magnitude (Light, Moderate, Strong), ensuring a comprehensive overview. The resolution of the graphs contributes to a nuanced understanding of seismic activity and enables the identification of patterns and anomalies.

1.1 Magnitude - Light

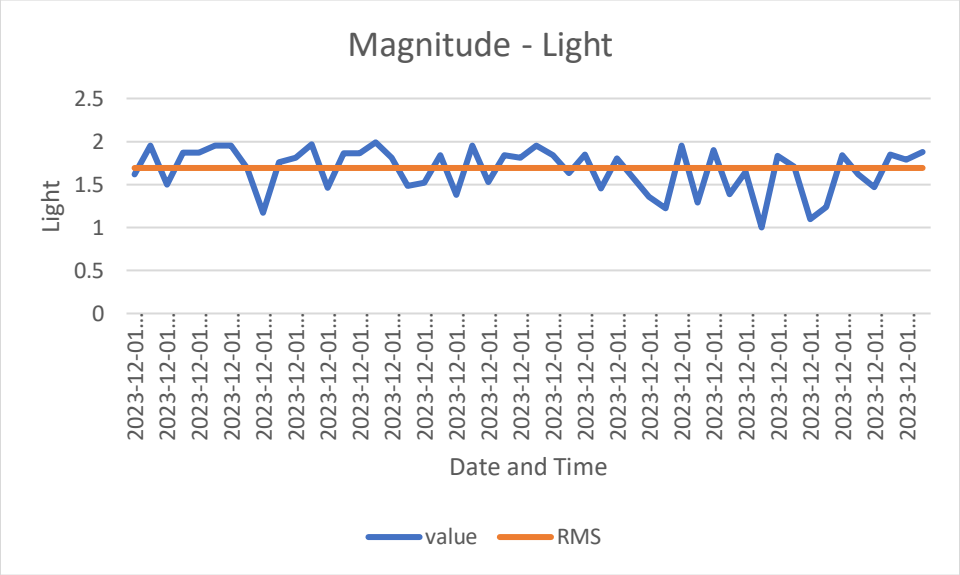

Figure 1.1 Magnitude (Light) Graph

1.2 Magnitude – Moderate

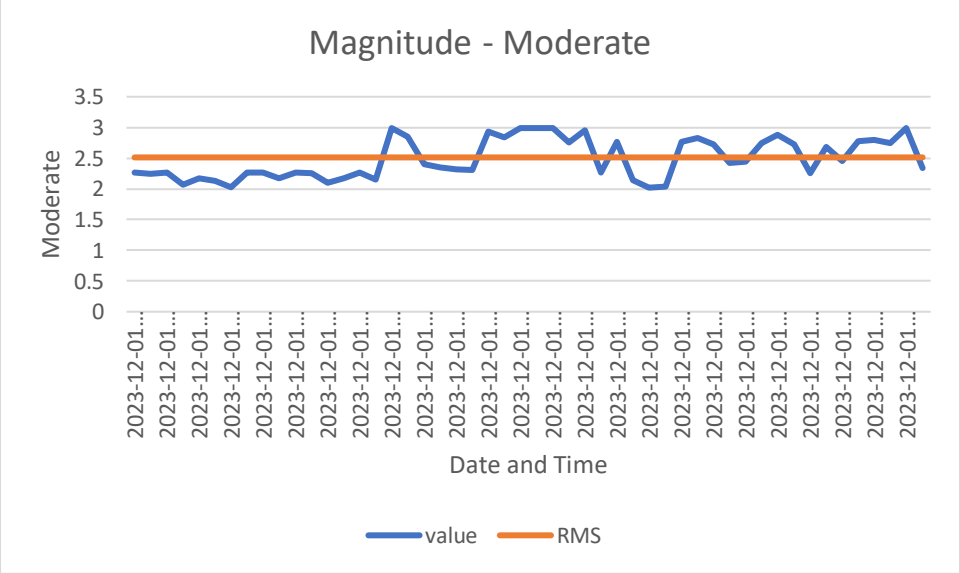

Figure 1.2 Magnitude (Moderate) Graph

1.3 Magnitude – Strong

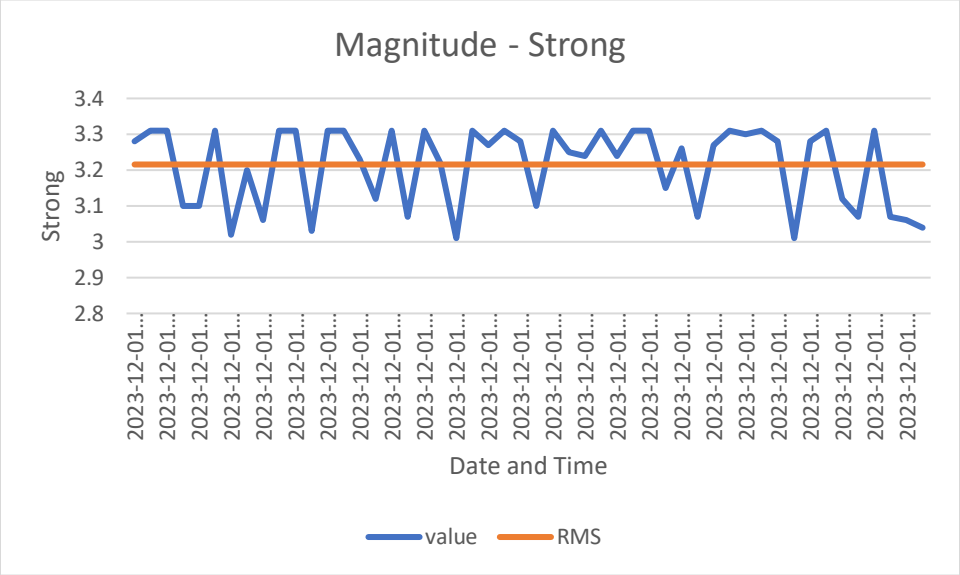

Figure 1.3 Magnitude (Strong) Graph

2.0 Analysation

The persistently high magnitudes seen in the diagrams imply an increased risk of potential catastrophic seismic events. This is a critical factor that requires precautionary measures and citizen warnings. Much like a vehicle poses a higher risk of an accident as its speed increases, seismic momentum in the high magnitude range means a greater potential for severe earthquakes. The system should be configured to detect and differentiate between sustained high magnitudes, triggering timely warnings to citizens in high-risk areas.

As the graphs indicate increasing seismic dynamics, evacuations become crucial, especially in areas where high earthquake magnitudes occur over an extended period of time. Drawing an analogy to the difficulty of controlling a vehicle during high impulse, it becomes clear how difficult it is to manage seismic events in this area. Evacuation plans should be activated promptly to mitigate the potential consequences of high magnitude earthquakes. To ensure that citizens receive timely and clear evacuation instructions, efficient communication channels such as mobile alarms and community sirens should be used.

3.0 Solution for Improving and Reconfigure the Earthquake Monitoring System

To improve the accuracy and stability of the earthquake monitoring system, several solutions are proposed. First, incorporating advanced machine learning algorithms can facilitate predictive analysis so that the system can predict seismic events based on historical data patterns. In addition, real-time monitoring of RMS values could provide early indications of seismic trends. These measures are analogous to road traffic, where predicting changes in speed helps to prevent accidents.

In view of the analogy with suddenly appearing obstacles, the system should also introduce a dynamic threshold for triggering warnings. This means that the threshold is adjusted based on current seismic conditions, similar to the real-time adjustment of vehicle safety measures to road conditions.

Moreover, in terms of the datasets, it is recommended that to increase from 50 data each class to 100 or even 1000 as the more the data a system have, the more the processing as well as the system could be relied upon. By having such improvements, the database will be highly enhanced and provide more and deeper insights.

4.0 Appendix

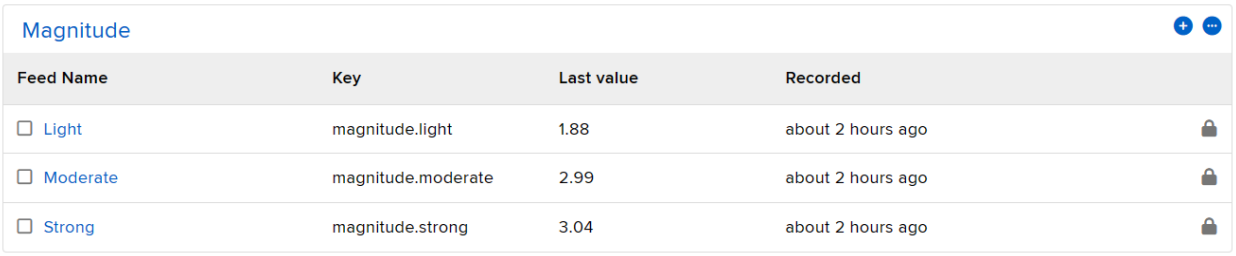

Figure 4.1 Adafruit Feeds

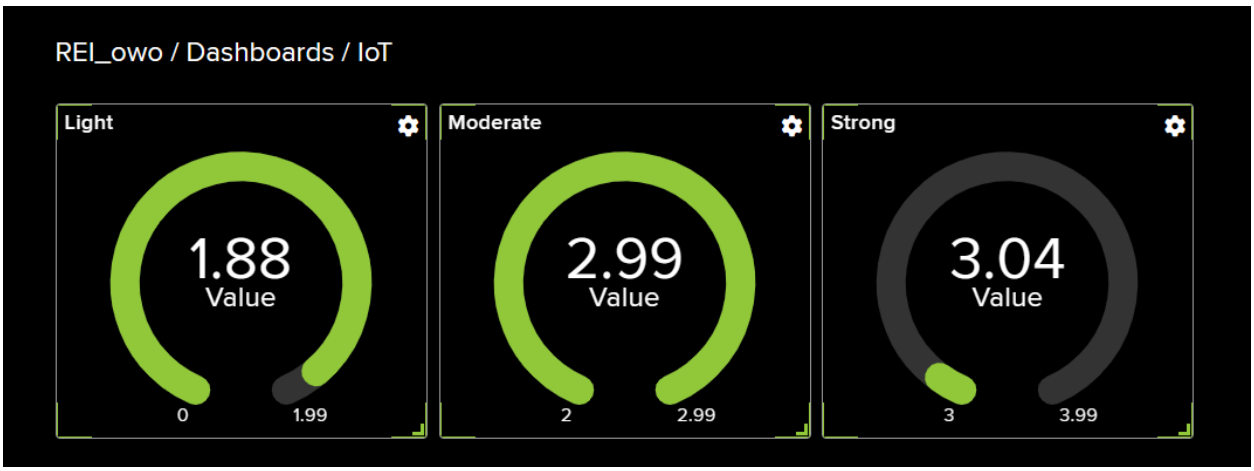

Figure 4.2 Adafruit Dashboard

	A	B	C	D
1	created_at	value	value^2	RMS
2	2023-12-01 12:00:00 UTC	1.62	2.6244	1.692136519
3	2023-12-01 12:00:01 UTC	1.95	3.8025	1.692136519
4	2023-12-01 12:04:25 UTC	1.5	2.25	1.692136519
5	2023-12-01 12:04:34 UTC	1.87	3.4969	1.692136519
6	2023-12-01 12:04:45 UTC	1.87	3.4969	1.692136519
7	2023-12-01 12:04:59 UTC	1.95	3.8025	1.692136519
8	2023-12-01 12:05:01 UTC	1.95	3.8025	1.692136519
9	2023-12-01 12:05:08 UTC	1.69	2.8561	1.692136519
10	2023-12-01 12:05:09 UTC	1.17	1.3689	1.692136519
11	2023-12-01 12:05:13 UTC	1.76	3.0976	1.692136519
12	2023-12-01 12:05:21 UTC	1.81	3.2761	1.692136519
13	2023-12-01 12:05:22 UTC	1.97	3.8809	1.692136519
14	2023-12-01 12:05:24 UTC	1.46	2.1316	1.692136519
15	2023-12-01 12:05:31 UTC	1.86	3.4596	1.692136519
16	2023-12-01 12:05:32 UTC	1.86	3.4596	1.692136519
17	2023-12-01 12:29:22 UTC	1.99	3.9601	1.692136519
18	2023-12-01 12:29:33 UTC	1.81	3.2761	1.692136519
19	2023-12-01 12:29:44 UTC	1.48	2.1904	1.692136519
20	2023-12-01 12:29:55 UTC	1.52	2.3104	1.692136519
21	2023-12-01 12:30:01 UTC	1.84	3.3856	1.692136519
22	2023-12-01 12:30:06 UTC	1.38	1.9044	1.692136519
23	2023-12-01 12:31:45 UTC	1.95	3.8025	1.692136519
24	2023-12-01 12:31:50 UTC	1.53	2.3409	1.692136519
25	2023-12-01 12:32:18 UTC	1.84	3.3856	1.692136519
26	2023-12-01 12:32:35 UTC	1.81	3.2761	1.692136519
27	2023-12-01 12:32:46 UTC	1.95	3.8025	1.692136519
28	2023-12-01 12:33:02 UTC	1.84	3.3856	1.692136519
29	2023-12-01 12:33:07 UTC	1.63	2.6569	1.692136519
30	2023-12-01 12:33:35 UTC	1.85	3.4225	1.692136519
31	2023-12-01 12:33:40 UTC	1.45	2.1025	1.692136519
32	2023-12-01 12:33:46 UTC	1.8	3.24	1.692136519
33	2023-12-01 12:34:02 UTC	1.58	2.4964	1.692136519
34	2023-12-01 12:34:08 UTC	1.36	1.8496	1.692136519
35	2023-12-01 12:34:24 UTC	1.22	1.4884	1.692136519
36	2023-12-01 12:34:41 UTC	1.95	3.8025	1.692136519
37	2023-12-01 12:34:46 UTC	1.29	1.6641	1.692136519
38	2023-12-01 12:35:08 UTC	1.9	3.61	1.692136519
39	2023-12-01 12:35:13 UTC	1.39	1.9321	1.692136519
40	2023-12-01 12:35:19 UTC	1.65	2.7225	1.692136519
41	2023-12-01 12:35:25 UTC	1	1	1.692136519
42	2023-12-01 12:35:30 UTC	1.83	3.3489	1.692136519
43	2023-12-01 12:35:46 UTC	1.71	2.9241	1.692136519
44	2023-12-01 12:36:03 UTC	1.1	1.21	1.692136519
45	2023-12-01 12:42:03 UTC	1.24	1.5376	1.692136519
46	2023-12-01 12:52:43 UTC	1.84	3.3856	1.692136519
47	2023-12-01 12:52:54 UTC	1.62	2.6244	1.692136519
48	2023-12-01 12:55:38 UTC	1.47	2.1609	1.692136519
49	2023-12-01 12:56:58 UTC	1.85	3.4225	1.692136519
50	2023-12-01 13:00:21 UTC	1.79	3.2041	1.692136519
51	2023-12-01 13:04:12 UTC	1.88	3.5344	1.692136519
52		Sum	143.1663	
53		Average	2.863326	
54		RMS	1.692136519	

Figure 4.3 Data for Light Magnitude

	A	B	C	D
1	created_at	value	value^2	RMS
2	2023-12-01 12:04:43 UTC	2.27	5.1529	2.512492786
3	2023-12-01 12:04:52 UTC	2.24	5.0176	2.512492786
4	2023-12-01 12:05:10 UTC	2.27	5.1529	2.512492786
5	2023-12-01 12:05:11 UTC	2.07	4.2849	2.512492786
6	2023-12-01 12:05:20 UTC	2.17	4.7089	2.512492786
7	2023-12-01 12:29:27 UTC	2.13	4.5369	2.512492786
8	2023-12-01 12:29:39 UTC	2.03	4.1209	2.512492786
9	2023-12-01 12:31:56 UTC	2.27	5.1529	2.512492786
10	2023-12-01 12:33:24 UTC	2.27	5.1529	2.512492786
11	2023-12-01 12:33:57 UTC	2.17	4.7089	2.512492786
12	2023-12-01 12:34:13 UTC	2.27	5.1529	2.512492786
13	2023-12-01 12:34:57 UTC	2.26	5.1076	2.512492786
14	2023-12-01 12:35:03 UTC	2.1	4.41	2.512492786
15	2023-12-01 12:35:41 UTC	2.17	4.7089	2.512492786
16	2023-12-01 12:35:52 UTC	2.27	5.1529	2.512492786
17	2023-12-01 12:35:57 UTC	2.15	4.6225	2.512492786
18	2023-12-01 12:41:03 UTC	2.99	8.9401	2.512492786
19	2023-12-01 12:41:14 UTC	2.85	8.1225	2.512492786
20	2023-12-01 12:41:19 UTC	2.4	5.76	2.512492786
21	2023-12-01 12:41:30 UTC	2.35	5.5225	2.512492786
22	2023-12-01 12:41:36 UTC	2.32	5.3824	2.512492786
23	2023-12-01 12:41:58 UTC	2.31	5.3361	2.512492786
24	2023-12-01 12:42:20 UTC	2.93	8.5849	2.512492786
25	2023-12-01 12:42:25 UTC	2.84	8.0656	2.512492786
26	2023-12-01 12:44:43 UTC	2.99	8.9401	2.512492786
27	2023-12-01 12:45:27 UTC	2.99	8.9401	2.512492786
28	2023-12-01 12:45:32 UTC	2.99	8.9401	2.512492786
29	2023-12-01 12:51:21 UTC	2.76	7.6176	2.512492786
30	2023-12-01 12:52:38 UTC	2.95	8.7025	2.512492786
31	2023-12-01 12:53:00 UTC	2.27	5.1529	2.512492786
32	2023-12-01 12:53:54 UTC	2.77	7.6729	2.512492786
33	2023-12-01 12:54:27 UTC	2.14	4.5796	2.512492786
34	2023-12-01 12:54:33 UTC	2.02	4.0804	2.512492786
35	2023-12-01 12:54:38 UTC	2.04	4.1616	2.512492786
36	2023-12-01 12:55:50 UTC	2.77	7.6729	2.512492786
37	2023-12-01 12:56:52 UTC	2.83	8.0089	2.512492786
38	2023-12-01 12:57:48 UTC	2.72	7.3984	2.512492786
39	2023-12-01 12:58:27 UTC	2.42	5.8564	2.512492786
40	2023-12-01 12:58:38 UTC	2.44	5.9536	2.512492786
41	2023-12-01 12:58:49 UTC	2.75	7.5625	2.512492786
42	2023-12-01 12:59:00 UTC	2.88	8.2944	2.512492786
43	2023-12-01 12:59:10 UTC	2.72	7.3984	2.512492786
44	2023-12-01 12:59:28 UTC	2.26	5.1076	2.512492786
45	2023-12-01 12:59:32 UTC	2.68	7.1824	2.512492786
46	2023-12-01 12:59:43 UTC	2.45	6.0025	2.512492786
47	2023-12-01 13:00:32 UTC	2.78	7.7284	2.512492786
48	2023-12-01 13:00:38 UTC	2.8	7.84	2.512492786
49	2023-12-01 13:00:54 UTC	2.75	7.5625	2.512492786
50	2023-12-01 13:01:00 UTC	2.99	8.9401	2.512492786
51	2023-12-01 13:01:11 UTC	2.34	5.4756	2.512492786
52		Sum	315.631	
53		Average	6.31262	
54		RMS	2.512492786	

Figure 4.4 Data for Moderate Magnitude

	A	B	C	D
1	created_at	value	value^2	RMS
2	2023-12-01 12:41:08 UTC	3.28	10.7584	3.215627777
3	2023-12-01 12:41:25 UTC	3.31	10.9561	3.215627777
4	2023-12-01 12:41:41 UTC	3.31	10.9561	3.215627777
5	2023-12-01 12:41:47 UTC	3.1	9.61	3.215627777
6	2023-12-01 12:41:55 UTC	3.1	9.61	3.215627777
7	2023-12-01 12:42:09 UTC	3.31	10.9561	3.215627777
8	2023-12-01 12:42:14 UTC	3.02	9.1204	3.215627777
9	2023-12-01 12:51:05 UTC	3.2	10.24	3.215627777
10	2023-12-01 12:51:10 UTC	3.06	9.3636	3.215627777
11	2023-12-01 12:51:16 UTC	3.31	10.9561	3.215627777
12	2023-12-01 12:52:49 UTC	3.31	10.9561	3.215627777
13	2023-12-01 12:53:49 UTC	3.03	9.1809	3.215627777
14	2023-12-01 12:54:00 UTC	3.31	10.9561	3.215627777
15	2023-12-01 12:54:05 UTC	3.31	10.9561	3.215627777
16	2023-12-01 12:54:11 UTC	3.23	10.4329	3.215627777
17	2023-12-01 12:57:53 UTC	3.12	9.7344	3.215627777
18	2023-12-01 12:57:59 UTC	3.31	10.9561	3.215627777
19	2023-12-01 12:58:05 UTC	3.07	9.4249	3.215627777
20	2023-12-01 12:58:10 UTC	3.31	10.9561	3.215627777
21	2023-12-01 12:58:16 UTC	3.22	10.3684	3.215627777
22	2023-12-01 12:58:21 UTC	3.01	9.0601	3.215627777
23	2023-12-01 12:58:43 UTC	3.31	10.9561	3.215627777
24	2023-12-01 12:58:54 UTC	3.27	10.6929	3.215627777
25	2023-12-01 12:59:05 UTC	3.31	10.9561	3.215627777
26	2023-12-01 12:59:16 UTC	3.28	10.7584	3.215627777
27	2023-12-01 12:59:21 UTC	3.1	9.61	3.215627777
28	2023-12-01 12:59:38 UTC	3.31	10.9561	3.215627777
29	2023-12-01 12:59:49 UTC	3.25	10.5625	3.215627777
30	2023-12-01 12:59:54 UTC	3.24	10.4976	3.215627777
31	2023-12-01 13:00:00 UTC	3.31	10.9561	3.215627777
32	2023-12-01 13:00:05 UTC	3.24	10.4976	3.215627777
33	2023-12-01 13:00:11 UTC	3.31	10.9561	3.215627777
34	2023-12-01 13:00:16 UTC	3.31	10.9561	3.215627777
35	2023-12-01 13:00:27 UTC	3.15	9.9225	3.215627777
36	2023-12-01 13:00:43 UTC	3.26	10.6276	3.215627777
37	2023-12-01 13:00:49 UTC	3.07	9.4249	3.215627777
38	2023-12-01 13:01:05 UTC	3.27	10.6929	3.215627777
39	2023-12-01 13:01:16 UTC	3.31	10.9561	3.215627777
40	2023-12-01 13:01:38 UTC	3.3	10.89	3.215627777
41	2023-12-01 13:01:49 UTC	3.31	10.9561	3.215627777
42	2023-12-01 13:01:55 UTC	3.28	10.7584	3.215627777
43	2023-12-01 13:02:55 UTC	3.01	9.0601	3.215627777
44	2023-12-01 13:03:06 UTC	3.28	10.7584	3.215627777
45	2023-12-01 13:03:23 UTC	3.31	10.9561	3.215627777
46	2023-12-01 13:03:34 UTC	3.12	9.7344	3.215627777
47	2023-12-01 13:03:39 UTC	3.07	9.4249	3.215627777
48	2023-12-01 13:03:44 UTC	3.31	10.9561	3.215627777
49	2023-12-01 13:04:06 UTC	3.07	9.4249	3.215627777
50	2023-12-01 13:04:23 UTC	3.06	9.3636	3.215627777
51	2023-12-01 13:04:28 UTC	3.04	9.2416	3.215627777
52		Sum	517.0131	
53		Average	10.340262	
54		RMS	3.215627777	

Figure 4.5 Data for Strong Magnitude

CET3063/N/CET3064 Internet of Things

MARKING RUBRIC

Assignment 2

Feed sensor data onto a cloud service (Weighted marks: 30%)

Question 1: Establish a cloud service (Score: 50%)

LEARNING OUTCOME	MARKING CRITERIA	SCALE					
		Failed (0% to 49%)	**3rd class (50% to 59%)**	**2nd lower (60% to 69%)**	**2nd upper (70% to 79%)**	**1st class (80% to 100%)**	**YOUR MARKS/COMMENTS**
CLO3: Develop a virtual IoT system for a specific application using cloud services and network sensors.	**1(a) Cloud service configuration (10%)**	No cloud service has created.	Cloud service has created, but without authentication and certain inappropriate settings have set.	Cloud service has created with an authentication feature, however certain inappropriate settings have set.	Good configuration of cloud service with proper authentication and settings have set.	Excellent configuration of cloud service with comprehensive authentication and parameters have set.	
	1(b) Code implementation (20%)	No implementation for the cloud service.	Erroneous in the implementation for the cloud service. CRUD operations could not be performed.	Good implementation for the cloud service. However, two CRUD operations could not be performed.	Good implementation for the cloud service. All required CRUD operations can be performed.	Excellent implementation for the cloud service. All required CRUD operations can be performed. Code are well written for efficiency.	
	1(c) Data structure (10%)	No implementation for the data structure.	Brief design for the data structure. It is relatively hard to interpret the sensor data.	Good implementation for the data structure, however there are some mistakes in the naming of attributes.	Good implementation for the data structure with correct naming of attributes. It is easy to interpret the sensor data.	Excellent implementation for the data structure with compact naming of attributes. It is relatively easy to interpret the sensor data.	
	1(d) Data estimation (10%)	No implementation for the data estimation.	Erroneous in the implementation for the data estimation. Inappropriate usages of formulation and data types in the program.	Good implementation for the data estimation. However, inappropriate usage of either formulation or data types in the program.	Good implementation for the data estimation. Appropriate usages of formulation and data types in the program. Accurate results are obtained.	Excellent implementation for the data estimation with comprehensive usages of formulations and data types in the program. Precise results are obtained.	
						Total (50%)	

Question 2: Evaluate sensor data (Score: 50%)							
LEARNING OUTCOME	**MARKING CRITERIA**	**SCALE**					
		Failed (0% to 49%)	**3rd class (50% to 59%)**	**2nd lower (60% to 69%)**	**2nd upper (70% to 79%)**	**1st class (80% to 100%)**	**YOUR MARKS/COMMENTS**
CLO2: Evaluate IoT system architecture for a real world application.	**2(a) Graph(s) representation (20%)**	No graph has generated.	Graph(s) has/have generated, but it is insufficient to represent the developed IoT system due to limited sensor datasets are collected.	Proper graph(s) has/have generated with sufficient datasets have collected. However, there are certain inappropriate uses of graphic elements.	Proper graph(s) has/have generated with sufficient datasets have collected and proper uses of graphic elements.	Outstanding graph(s) has/have generated with sufficient datasets have collected and proper uses of graphic elements, as well as resolution to highlight certain important.	
	2(b) Key points identification (10%)	No key point has identified.	Unclear points have identified to reflect the developed IoT system.	Good key points have identified to reflect the developed IoT system. However, there are certain misconceptions in the discussions.	Good key points have identified to reflect the developed IoT system with proper concepts. However, technical details need to be further clarified.	Excellent key points have identified to reflect the developed IoT system with proper concepts and technically sound.	
	2(c) Feasibility of the solutions (20%)	No solution has discussed.	Unclear solutions have suggested to improve the developed IoT system.	Good solutions have suggested to improve the developed IoT system. However, there are certain misconceptions in the discussions.	Good solutions have suggested to improve the developed IoT system with proper concepts. However, technical details need to be further clarified.	Feasible solutions have suggested to improve the developed IoT system with proper concepts and technically sound.	
	Total (50%)						
Overall score (100%)							
Weighted marks (30%)							