KOLEJ UNIVERSITI TUNKU ABDUL RAHMAN
FACULTY OF COMPUTING AND INFORMATION TECHNOLOGY

ACADEMIC YEAR 2021/2020
MIDTERM TEST
INFORMATION TECHNOLOGY BAIT2123
INTERNET OF THINGS

TUESDAY, 26 JULY 2020 TIME: 4.30 PM – 5.30 PM (1 HOUR)

BACHELOR OF INFORMATION TECHNOLOGY (HONOURS) IN INTERNET TECHNOLOGY
BACHELOR OF INFORMATION TECHNOLOGY (HONOURS) IN SYSTEM DEVELOPMENT

Instructions to Candidates:

Answer ALL questions in the requested format or template provided.

- This is an open book final online assessment. You MUST answer the assessment questions on your own without any assistance from other persons.
- You must submit your answers within the following time frame allowed for this online assessment:
    - The deadline for the submission of your answers is 15 minutes from the end time of this online assessment.
- Penalty as below WILL BE IMPOSED on students who submit their answers late as follows:
    - The final marks of this online assessment will be reduced by 10 marks for answer scripts that are submitted within 15 minutes after the deadline for the submission of answers for this online assessment.
    - The final marks of this online assessment will be downgraded to zero (0) mark for any answer scripts that are submitted after 30 minutes from the end time of this online assessment.

Additional Instructions to Candidates:

- Read all the questions carefully and understand what you are being asked to answer.
- Marks are awarded for your own (original) analysis. Therefore, use the time and information to build well-constructed answers.
- For the answer that includes a diagram, draw it on a piece of paper, snapshot and include it in the answer sheet. A direct copied diagram(s) from peers will be awarded zero marks.
- Generate PDF version of answer script, rename the PDF file as: ProgGroup_Name_ID.pdf
  Example: RSD3G2_WongAhKau_20WRM12345.pdf
- Submit (turn in) to the Midterm Test Classwork.

STUDENT'S DECLARATION OF ORIGINALITY

By submitting this online assessment, I declare that this submitted work is free from all forms of plagiarism and for all intents and purposes is my own properly derived work. I understand that I have to bear the consequences if I fail to do so.

Midterm Test Submission

Course Code :BAIT2123

Course Title :Internet of Things

Signature : 

Name of Student :Ng Jin Yuan

Student ID :20WMR10215

Programme / Group :RSD3S1G12

Date :27th July 2021

MIDTERM TEST 1 HOUR

Q1. (a) The number of IoT devices is growing. Explain **TWO (2)** reasons for the increase of this number based on the Internet of Things (IoT) concept. (3 marks)

One of the factors that is contributing to the hype of numbers of IoT devices' growth is because of sensors, processors and networking components and devices' price had been greatly reduced compared to when they were first manufactured hence allowing a wide variety and huge numbers of user to purchase without many difficulties. This had involved with IoT's world-wide network of interconnected object concept.

The other reason is the involvement of Moore's Law which indicate the speed and capability of computers can be expected to double every 2 years which will result in

increasing the number of IoT components such as transistors and microchip can contain.

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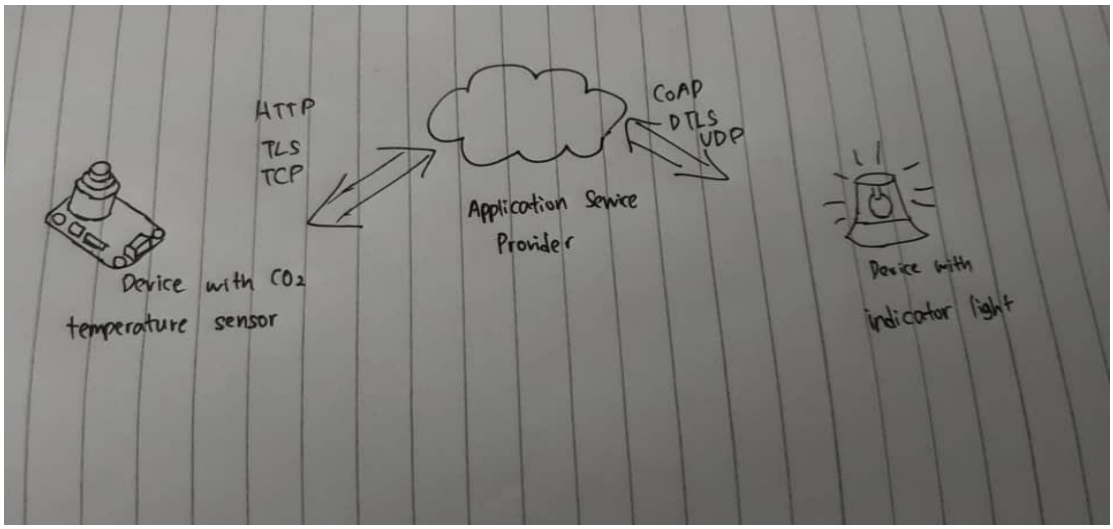
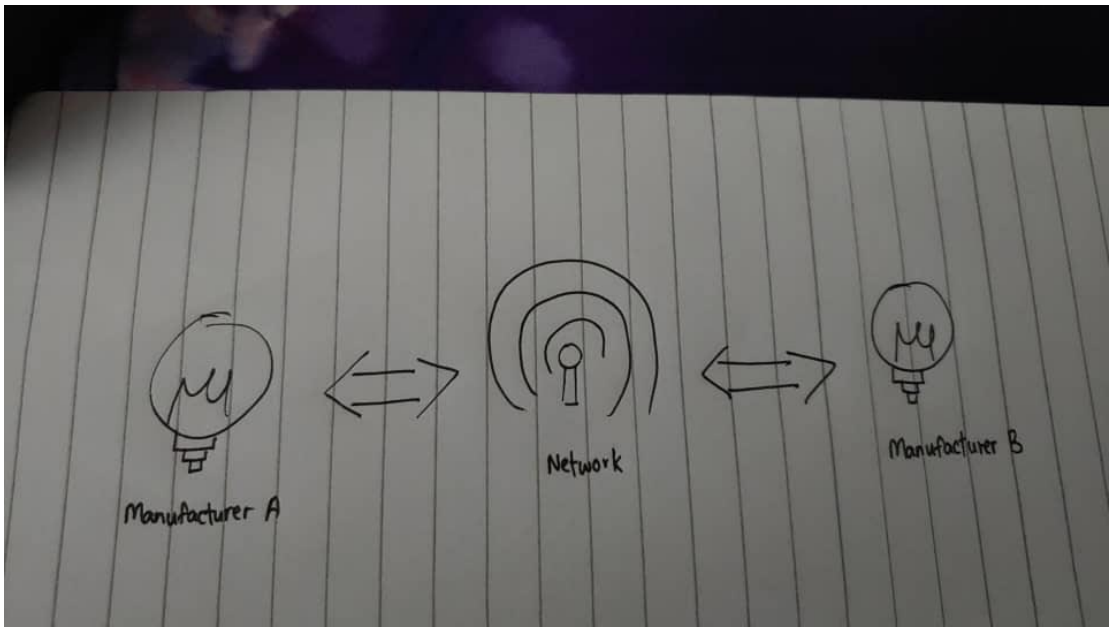
(b) Differentiate the communication model between device to cloud and device-to-device based on the (hand drawn) diagrams and examples of IoT application. (6 marks)

Device-to-cloud communication model



Examples: Wi-fi, Ethernet

Device-to-device communication model



Examples: Bluetooth, Z-wave

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(c) In today's modernized IoT platform, several architecture components are important to support end-to-end connection. Describe **THREE (3)** components with their features. (6 marks)

1. Device management

This component is responsible to ensure the connected objects and things are working without any problem and continuing providing new patch with updates for the software and applications.

2. Database

This component is a scalable storage of the device data. This can bring the requirements for hybrid cloud base database to a whole new level in terms of data volume, variety, velocity and veracity.

3. Connectivity and normalization

This component brings different protocols and different data formats into one software interface. This component also ensures the data are accurate for streaming and interaction with other devices.

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[Total: 15 marks]

Q2. (a) Home Automation System has the capability to control several home IoT devices. List **THREE (3)** components with their features and applications. (6 marks)

1. Fire and smoke detection would let out an alarm if the detector sensed smoke or abnormal heat in the room.

2. The lighting in the house can set its intensity depending on the lighting outside. For example, if the light was on in the afternoon, the lighting will not be as strong as it was when it was nighttime outside.

3. The motion detection can be used to enhance the main entrance's security. For example, if a burglar tries to break in the house, the motion detector will sound an alarm if the force on the door was unusually high.

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(b) Smart Campus leverages advanced IoT architecture and enables seamless integration of smart applications into campus life. Describe **THREE (3)** faced challenges for implementing an IoT solution in a campus. (6 marks)

- Some campus's video surveillance system had past their prime time and does not support incident warnings, causing slow emergency responses resulting in threatening the campuses' safety

- The resources of the outdated campuses are not in sequence and the existing classrooms had lower efficiency as well as flexibility

- The cost of the IoT devices will without a doubt increase dramatically as the lack of energy consumption monitoring will cause unnecessary power to go to waste.

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(c) Stockholm focuses on smart city development through its citizens, government, and other constituent parts together. It enables simple, effective communication and an open flow of information. Describe the importance of "flow of information" in IoT application. (3 marks)

The flow of information in IoT means that devices need to be able to analyze large trends of data to improve the features of the current device of city. For example, in Stockholm, without the flow of information, energy and transport efficiency could not be executed with a number of initiatives hence it would result in house without electricity in the city because without the flow of information, smart grid is not enabled and a city without CO2 will be proved to be difficult.

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[Total: 15 marks]