

Practical Assignments



Questions Set 1

- A. What are the key technologies driving the development of IoT? **Can you give 2 real-life applications of each?**
- B. List the components of an IoT ecosystem and explain them briefly.
- C. How do we define IoT protocols and what are their types? Give a brief explanation in an example for each IoT protocol.

Answers Set 1

A)

4 Key Technologies Drive IoT Development

- Cloud Computing
- Blockchain
- Sensors
- Artificial Intelligence

Answers Set 1

B) 1st IoT Devices

Devices work together in a domain such as **sensors** and **actuators**

2nd Network

Network is the component in charge of the interaction (in a ecosystem) between:

- Smart Devices
- Gateway
- Cloud

3rd Security

This component is in charge of:

- Access control in the ecosystem
- Safe information movement
- Avoidance of information leakage
- Look for dangerous software

Answers Set 1

B) 4th Gateway

A device moving data through it from sensors with destination the cloud and the way back

5th Cloud

In case of a bunch of computer link to internet, capacity of Cloud can be used for:

- Storage information
- Deep Analysis
- Management

6th Application

A connection helping user be able to managing the smart devices that are linked to the IoT ecosystem

7th Users

Anyone who interacts with IoT ecosystem e.g. Using IoT smart devices

Answers Set 1

C) IoT communication protocols are modes of communication that protect and ensure optimum security to the data being exchanged between connected devices. Types of IoT Protocols are **Network** and **Data**

IoT Network Protocols are a group of communication protocols link smart devices to the network. By applying network protocols, it is allowed the end-to-end data communication for the network scope

IoT Data Protocols link low power smart devices. They communicate with point-to-point method with no Internet connection and hardware operated by user. Communication in these protocols is feasible with wired or cellular network.

Questions Set 2

- A. How do M2M applications work? **Give 2 examples of this type of application** (Hint: An example is shown in the slides).
- B. What IoT architecture layers does the lecture propose and what are the basic IoT architecture layers? Give a brief description of the proposed layers of the IoT architecture.
- C. What is the role of IoT and WoT according to the lecture? How are these 2 connected and what example is used to represent them?

Answers Set 2

A) M2M communication normally is applied remotely e.g. in a case of a vending machine

That machine is sending a signal to the distributor network (another machine) for a refill in case of a shortage of goods

Normally industry dealing with utilities using M2M in order to:

- Avoid wasting energy
- Spot construction site factors like pressure, temperature, speed..

Answers Set 2

B) It consists of the devices, network structure, and cloud technology that allows IoT devices to communicate with each other.

A basic IoT architecture consists of three layers:

- Perception
- Network
- Application

Perception → This layer illustrates the physical IoT devices which take data needing processing e.g. robotics, autonomous cars

Transport → This part provides the cloud with the data (or for processing) taken from perception layer. Uses internet gateways to progress data to be process by technologies such: Wi-Fi, Bluetooth..

Processing → In case data move to cloud or for processing, server transform data to information

Application → Sometimes humans intervene in the process in case of rules not followed. Therefor, in this layer administrator is dealing with IoT devices synchronisation

Business → Here the information becoming intelligence which help us to take decisions

Answers Set 2

C) **Aim** of both IoT and WoT mainly is to **connect smart devices to the Internet**, although they differ in practise

In other words, **IoT** is the **medium** helping **communicate all devices** between them to transfer information (**network layer**)



BUT the **non-involvement** of **IoT** on what kind of data are or how they transfer and even the reason of moving is **important**



That is where the **role of WoT** comes quite handy!!



WoT acts as **application layer** and fills the holes that IoT left behind, by setting the rules for the path of data



WoT add group of paths for the data transfer between points and making sure of transceiver-receiver compatibility



WoT could be seen as a **subset of IoT** with **purpose to empower the IoT characteristics**

Answers Set 2

C)

A practical example

We can think the **IoT** as the medium connecting food e.g. a **dish** (the object)

Just being the vessel for the mixing of ingredients without having any kind of involvement

Now if we turn to **WoT**, it **includes everything else** for the recipe to be completed e.g. ingredients, stove..

Questions Set 3

- A. Explain briefly (according to the lecture) the layers of the WoT architecture. Based on the WoT application example give 2 examples of your own.
- B. Based on the 4 examples "Why use IoT in industry", give **2 examples of IoT in industry**. **One of the examples should be based on the water industry.**

Answers Set 3

A)

Layer 1 – Accessibility - In this layer transform anything to a web thing

Layer 2 – Findability - This layer is there to help applications understand what a data is or the purpose of its existence

Layer 3 – Sharing - Discover a safe manner to move data through services securely

Layer 4 – Composition - Discover how to create an application for WoT with the appropriate tools

If we want to create a smart house and purchase a lot of IoT devices like:

- Smart TV
- Door
- CCTV cameras
- ..

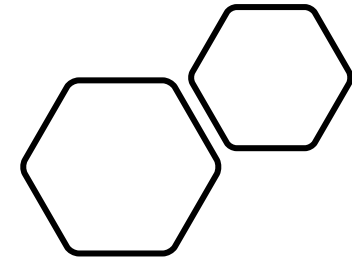
The way to connect all these together and easy manage them even through our smartphone is the WoT

WoT sets up communication protocols and standards and builds a **web of things**

Answers Set 3

B) EXAMPLES OF YOUR OWN

*Thank You
For Your
Attention*



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