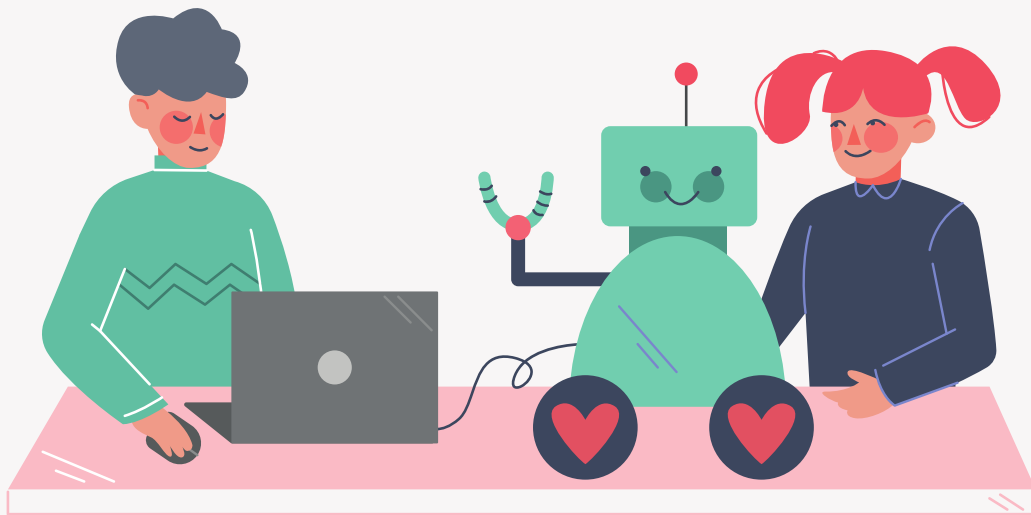# THE RISE OF THE MACHINES: HOW THE INTERNET OF THINGS IS TRANSFORMING OUR WORLD

"The Power of Things: Inspiring Innovation in the IoT Age"

NAME:

GRADE:

CLASS:

EDITORS

NUR SUHAILI MANSOR
HAPINI AWANG

TABLE OF CONTENT
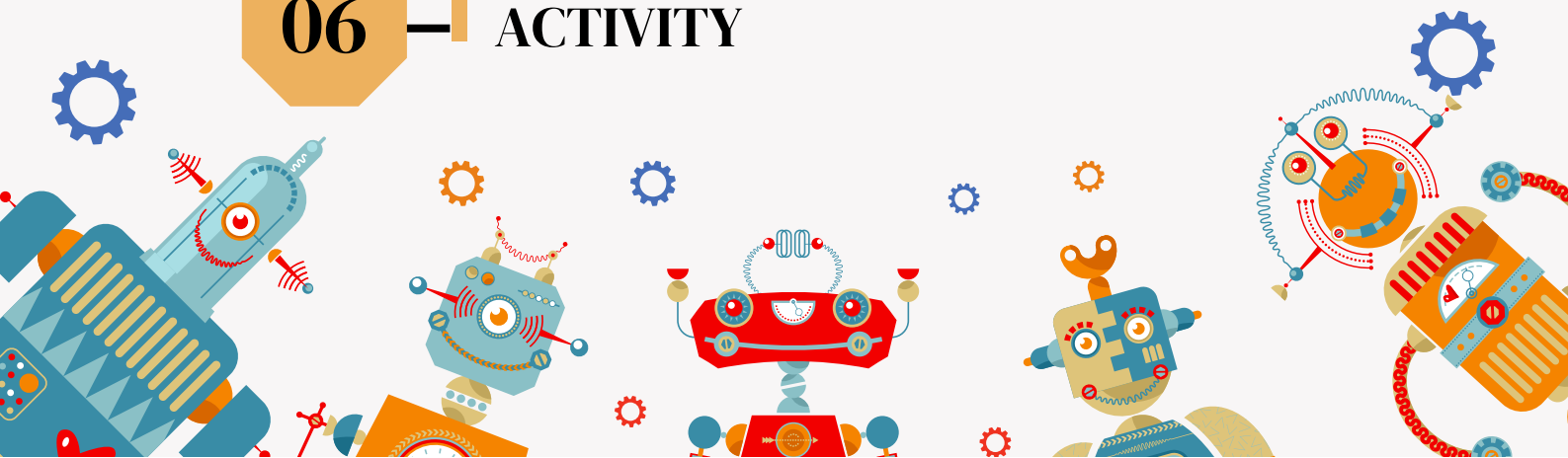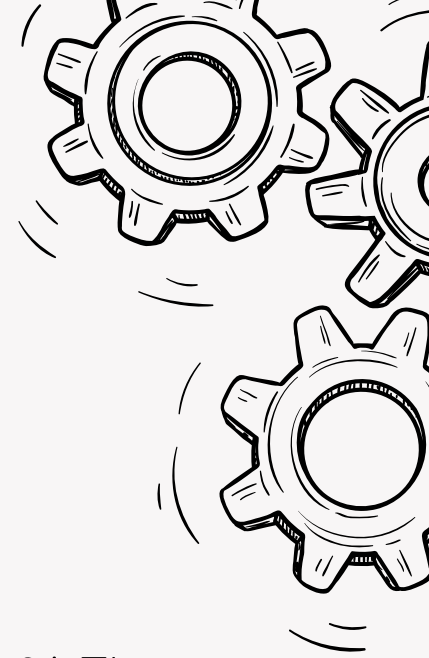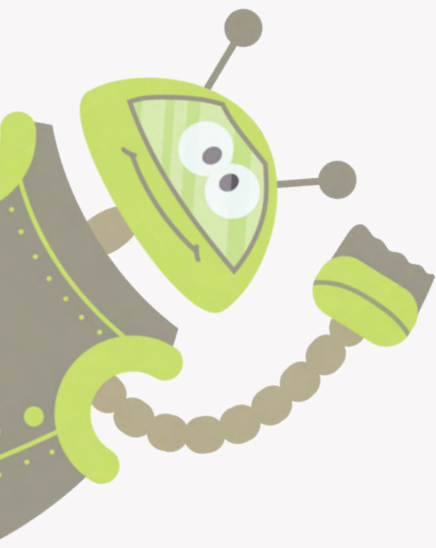
PREFACE

Get ready to dive into the exciting world of IoT!
The Institute for Advanced and Smart Digital Opportunities (IASDO) at the School of Computing, UUM, knows how important it is for kids to stay up-to-date with the latest technology. That's why we've created a fun and informative module that will teach children about the basics of IoT and show them what the future of technology holds. With easy-to-understand concepts, colorful visuals, and real-life examples, our module will help your kids master the world of IoT. So come on in and explore the limitless possibilities of IoT!
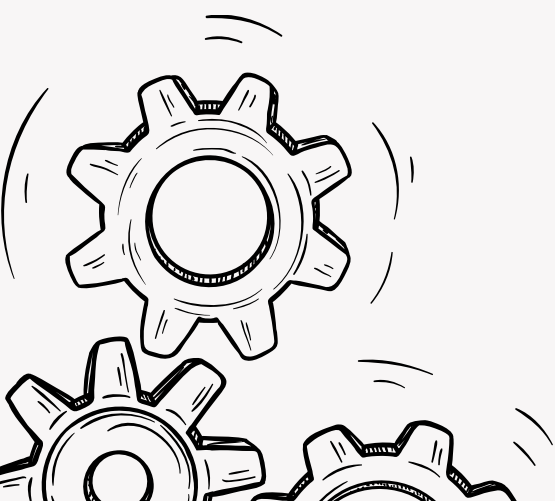
CHAPTER 1: WHAT IS IOT?
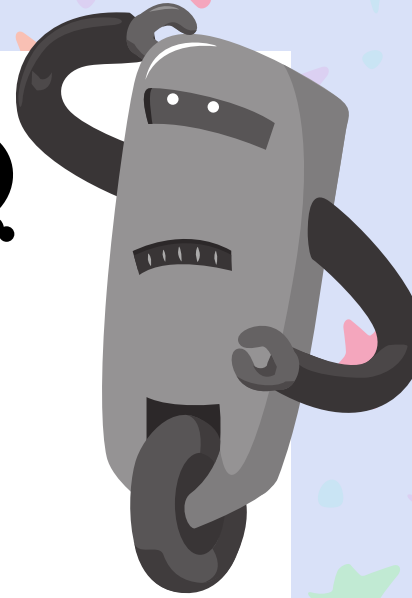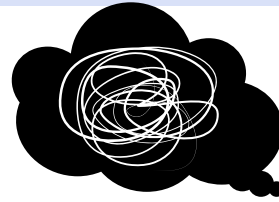
Are you ready to join the IoT revolution?

This buzzword is taking the tech world by storm, but what exactly is it? From smart homes to wearable tech, IoT is changing the way we live, work, and play. So don't be left behind - discover the power of IoT today!
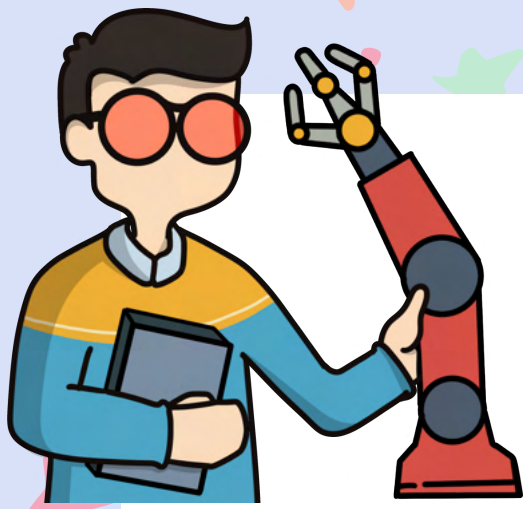
BACKGROUND

Invented by Kevin Ashton in 1999, IoT — short for Internet of Things — is a concept where computers can track and communicate with all sorts of devices and objects without human input. Ashton used the term as the title for his presentation on a new sensor he was developing at the time. However, connected devices had already been in existence before the term was coined, with the first internet-connected appliance being created in 1982 at Carnegie Mellon University.

smartwatches, and other wearable devices that track and monitor health metrics and activity levels are common examples of IoT devices.

In the current era, objects that utilize IoT are often referred to as "smart" such as smart homes, smart cars, smartwatches, and even smartphones. These objects have the capability to communicate with each other, a process commonly known as M2M (Machine-to-Machine) communication.

A basic illustration of machine-to-machine communication, which serves as the foundation for IoT device communication, is presented. In the subsequent section, we'll delve into the definitions of the two crucial components of the term "internet of things": "internet" and "things."
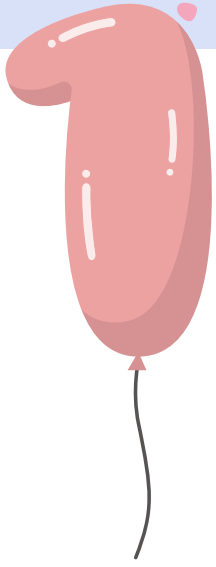
WHAT IS THE INTERNET??

By now, in this era, you must have come across the term "internet," which enables us to perform activities such as streaming videos on YouTube, playing games online, and communicating with friends on Facebook despite being far away. However, what precisely does the internet entail?
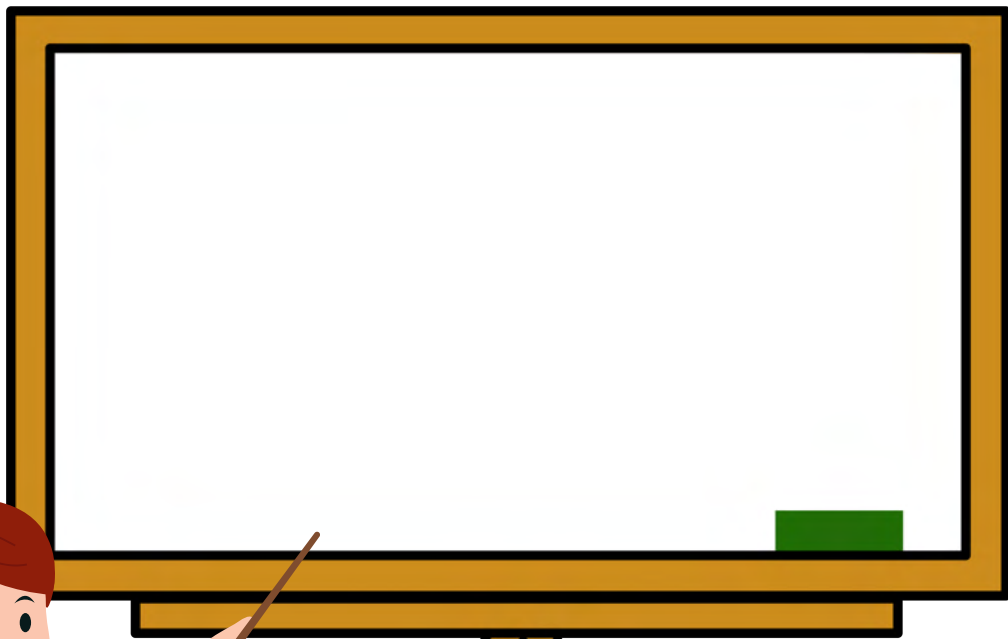
WHAT OTHER AMAZING THINGS CAN YOU ACCOMPLISH WITH THE POWER OF THE INTERNET?
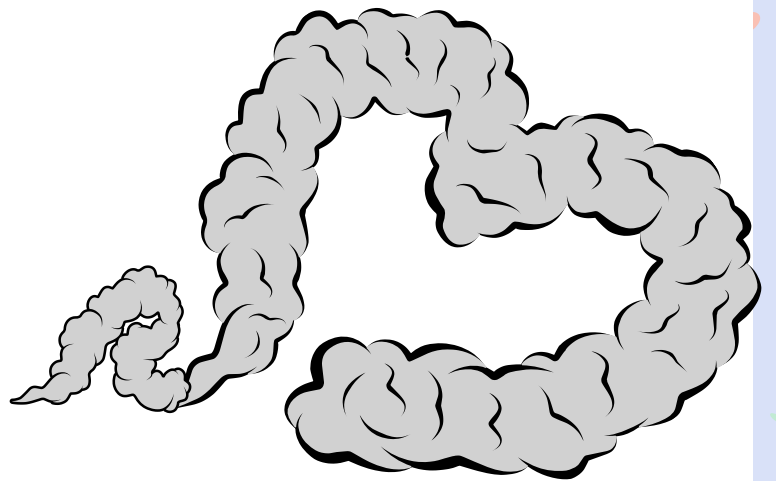
While smartphones and computers are the most common devices used to access the internet, the growing trend of internet-enabled devices has expanded to include smartwatches, printers, cameras, cars, and even glasses.
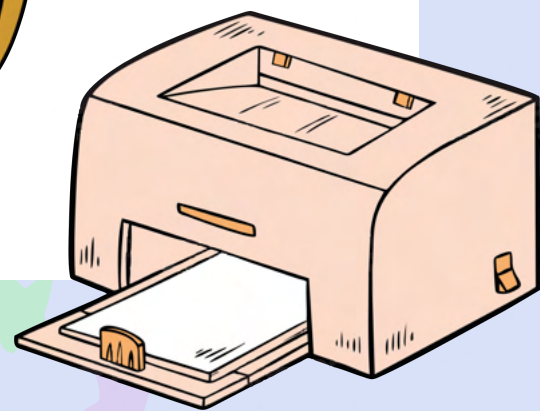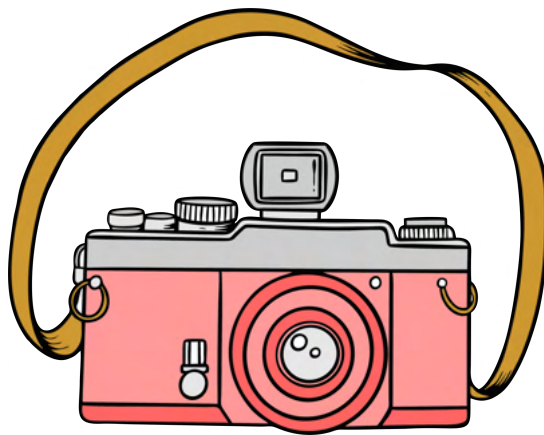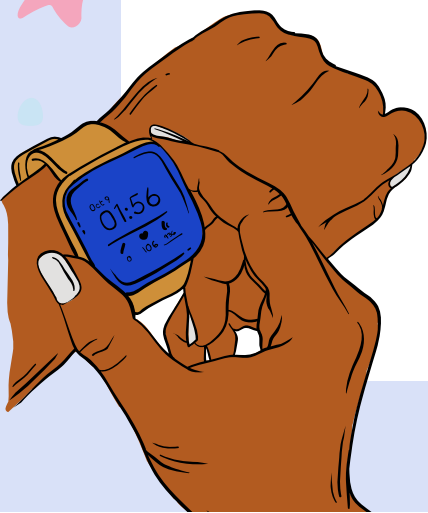
TELECOMMUNICATIONS TRANSMITTER

A telecommunications transmitter is a device where antennas and telecommunications electronics are placed to help connect mobile phones into a cellular network using electromagnetic wave technology. A set or more transmitter/receiver antennas are placed on a tall structure. The electronic devices available are such as digital signal processors, electronic control systems and GPS receivers.

FUNCTION OF TELECOMMUNICATIONS TRANSMITTER

The signal generated by the transmitter must be of sufficient power and quality to overcome any losses or distortions in the communication channel and be received by the intended receiver.

A telecommunications transmitter sends information over a communication channel such as a wire or radio frequency.
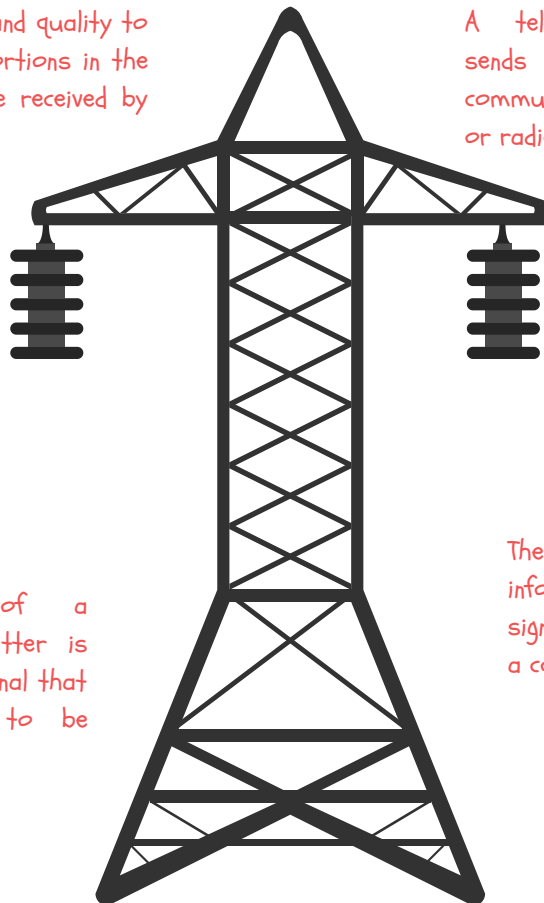
The main function of a telecommunications transmitter is to generate a modulated signal that carries the information to be transmitted.

The transmitter converts the information into an electromagnetic signal that can be transmitted over a communication medium.

WHAT IS THE THINGS??

1. Has Unique ID

In essence, an identifier assigned to each "Thing" in IoT is akin to a unique name that distinguishes it from other objects. Typically, IoT devices use numerical identifiers called IP addresses that facilitate their communication and connection within a network.
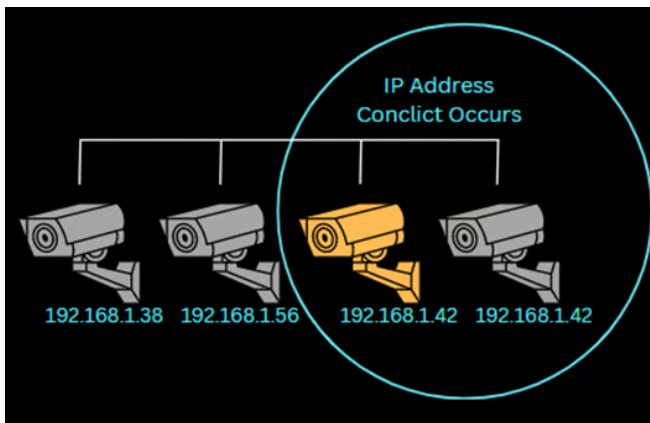
EXAMPLE: Consider the scenario where multiple security cameras are connected to a network for remote surveillance. Each camera must have a unique identifier (such as an IP address) to ensure that it can be individually addressed and accessed within the network. Without unique identifiers, the cameras would not be able to communicate with each other or with the network, rendering them effectively useless for their intended purpose.

2. Things also need to be able to do these:

a. Collect information and then send it.
b. Receive information and then act on it.
c. Do both.
d. Connect to the internet or network.

CRUCIAL CHARACTERISTICS OF IOT
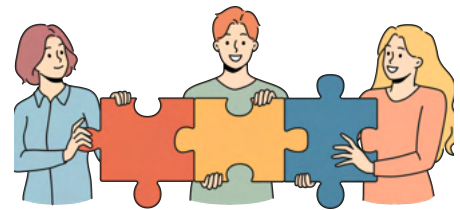
1. Connection – Everything IoT needs to be connected at some level

2. Things – Anything, any device.

3. Identity – Every IoT device has a unique identification.

4. Scalability – Should be capable of handling big increase of connected device and data.

5. Intelligence – Data from sensors needs to be properly clarified to make it useful for us.

4 TYPES OF IOT

1. PERSONAL

smartwatch that tracks their heart rate serves as an illustration

2. GROUP

a family utilizing a smart home, which is exclusively used by its members.

3. COMMUNITY
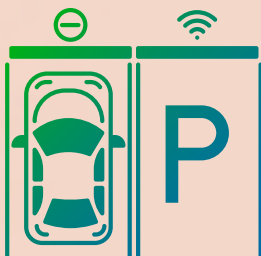
implementation of smart parking systems.
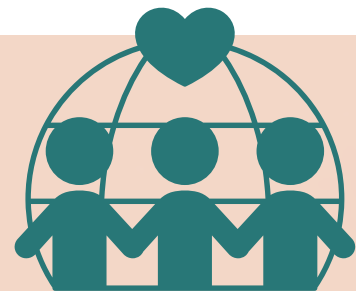
CHAPTER 2:
IIoT stands for Industrial Internet of Things.

IoT has been implemented primarily in various industries to enhance automation, healthcare, agriculture, factory operations, and other manufacturing processes.

HOW IT WORKS?

Before we know how IoT exactly works we should know the basic components they have.

COMPONENT OF IOT

1. IOT DEVICES

1.SENSORS

Assist in gathering information from the nearby surroundings, such as temperature and pressure, by utilizing various types of sensors.

2. ACTUATORS

These nifty gadgets execute a tangible response once instructed to do so! Example: in agriculture, sensors can detect the level of moisture in the soil, and then send signals to actuators which adjust the amount of water delivered to crops through irrigation systems.
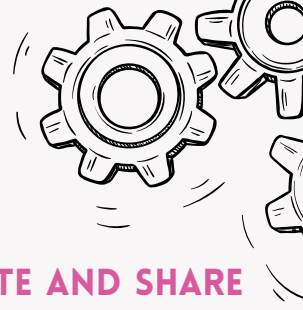
3. DEVICES

Devices are not just limited to sensing their surroundings with internal sensors. They are capable of a multitude of functions, including receiving data, transmitting instructions, and displaying notifications to users. The perfect embodiment of this versatility is the smartphone, which comes equipped with various sensors such as GPS and camera, but its capabilities go far beyond just sensing. some smartphones have fingerprint sensors that can be used not only for unlocking the device, but also for making secure payments or accessing protected files.

2. CONNECTIVITY

BY MEANS OF CONNECTIVITY, IOT DEVICES ARE ABLE TO COMMUNICATE AND SHARE DATA WITH EACH OTHER. THIS IS ACCOMPLISHED THROUGH VARIOUS NETWORKS, INCLUDING WIRELESS OPTIONS SUCH AS WI-FI AND CELLULAR, AS WELL AS WIRED NETWORKS SUCH AS ETHERNET. THE EXCHANGE OF DATA FACILITATED BY CONNECTIVITY ALLOWS FOR THE PROCESSING OF INFORMATION IN THE CLOUD.
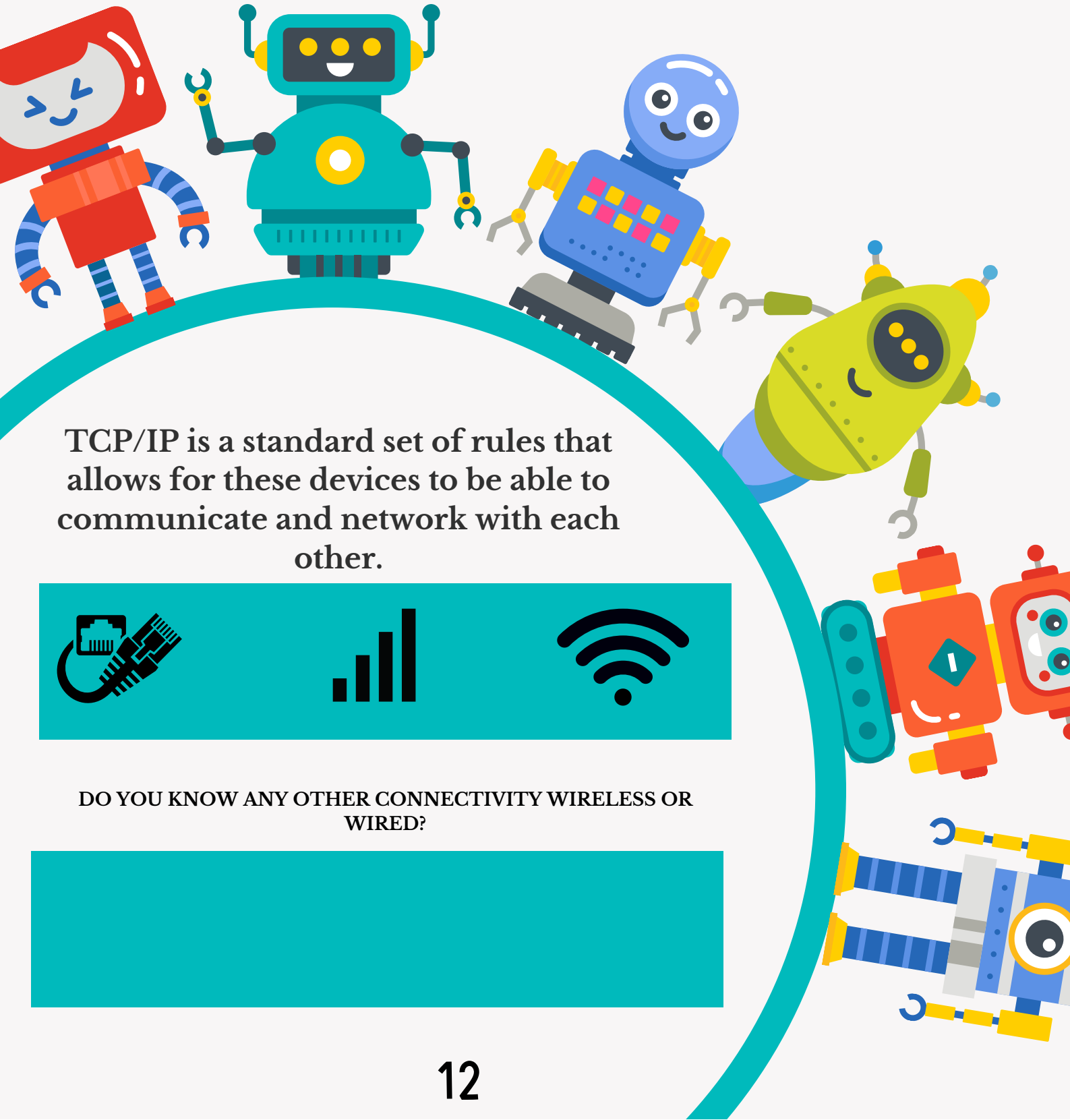
TCP/IP is a standard set of rules that allows for these devices to be able to communicate and network with each other.

DO YOU KNOW ANY OTHER CONNECTIVITY WIRELESS OR WIRED?

3. DATA PROCESSING

Data collected by sensors and other devices must undergo processing to become meaningful information. Once gathered, this data is transmitted to the cloud where it is analyzed, organized, and stored in server databases. A cloud server functions similarly to a remote computer, allowing users to access its storage, processing capabilities, and other services through an internet connection on their own devices.

4. USER INTERFACE (IU)

The user interface serves as a medium for the exchange of information between IoT devices, enabling users to send and receive instructions. It encompasses various features, such as screens, buttons, icons, and forms, and is prevalent in everyday devices such as smartphones and computers. For instance, a smart door system may utilize a user interface to notify users of the door's status and allow them to lock or unlock it remotely via a mobile application.

How it works?

2

SENSORS/DEVICE/ACTUATORS TO USER APPLICATION

1. The sensors /Devices are connected to a cloud server
2. Data is sent to the cloud and data processing is performed.
3. Once done the cloud server uses device unique ID to know which device to send the information to .The users can then view the information on their applications which can be on a phone, computer and etc.

USER SEND REQUESTS

1. The user interacts with the cloud using the user interfaces on their phones, remote or computers.
2. A request is sent and the cloud will check to see if the device is allowed to do this by checking the device's unique identifier for security purpose.
3. After the cloud confirms our device it will send our request to the sensor/actuators/device and they will perform that request.
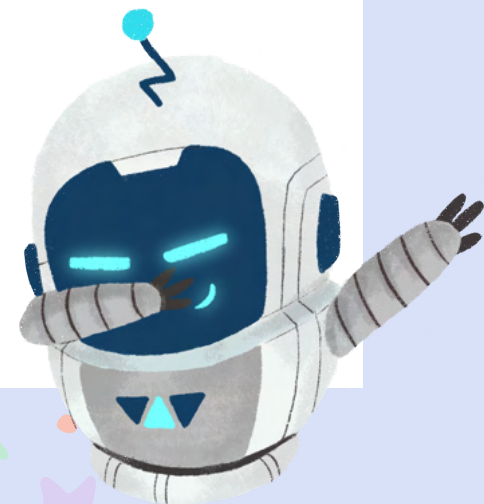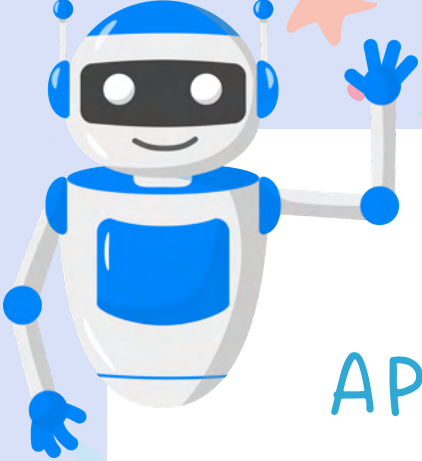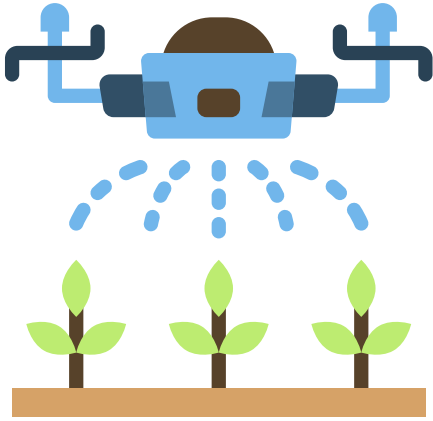
CHAPTER 3: APPLICATIONS OF IOT

3.1 real life application example

SMART DEVICE

SMART HOME

SMART CITY

SMART AGRICULTURE

SMART INDUSTRIAL
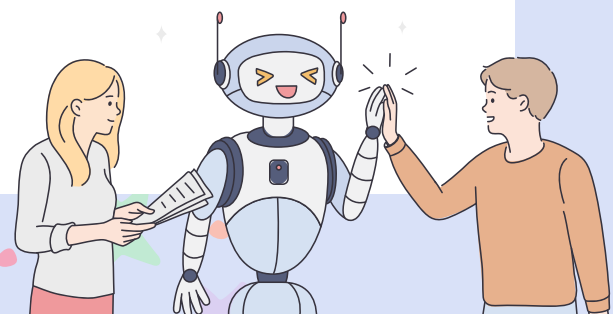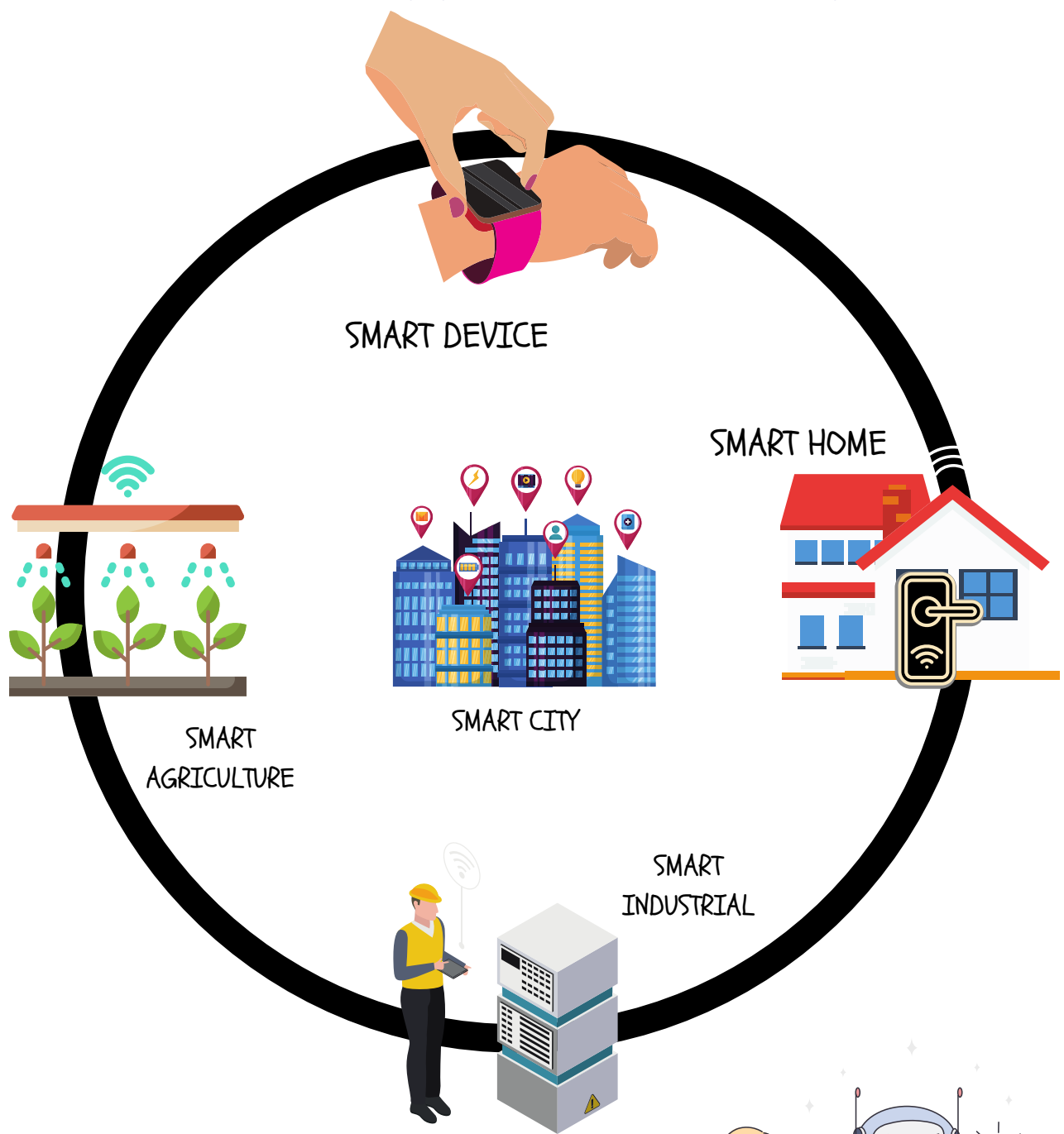
3.2 IOTAPPLICATION IN MALAYSIA

IOT AND AGRICULTURE

In rural areas of Malaysia, IoT sensors are being used to monitor soil moisture levels, temperature, and other parameters to optimize crop yield and reduce waste.

IOT AND EDUCATION

After the emergence of Covid-19 pandemic, the necessity of Smart Digital Campus for the learning and administrative processes at higher education institutions has been increasingly popular.
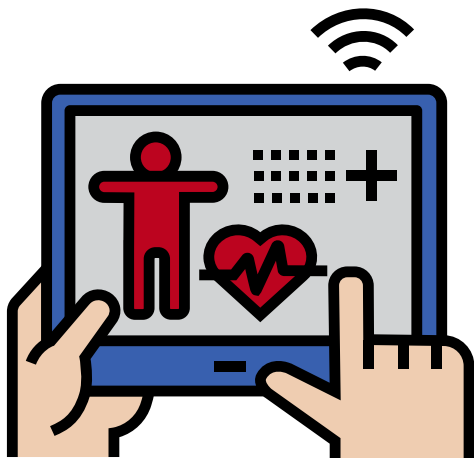
IOT AND HEALTHCARE

Smart medical sensors, for example, will be provided to every patient in order to keep tabs on vital signs like temperature, blood pressure, and even breathing.
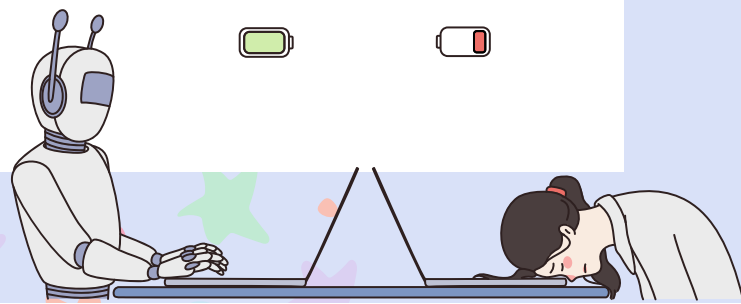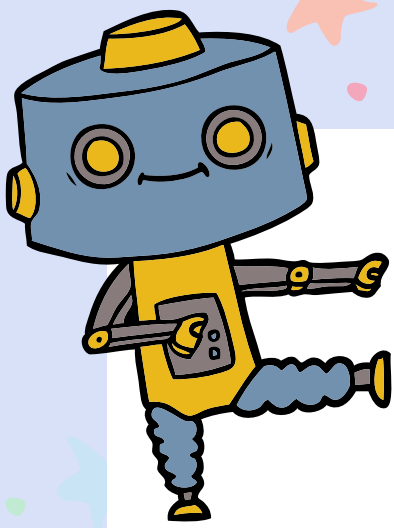
CHAPTER 4: BENEFITS&CHALLENGES

4.1 BENEFITS

EASIER MONITOR DATA

One such advantage is the ease of data monitoring. For instance, with IoT-enabled Coca-Cola vending machines, information about the number of drinks available and their temperature can be relayed directly to a computer, eliminating the need for manual checks. This ease of tracking is also beneficial for large-scale inventory management.

SAVES TIMES AND EFFORT

Another benefit of IoT is the ability to perform tasks quickly, such as notifying us of pressing issues without the need for manual checks. This efficiency saves us valuable time and effort, as seen in the vending machine example where we can avoid the hassle of physically checking the availability of drinks.

EASE OF ACCESS

IoT technology has the potential to enhance people's quality of life, as seen in the example of a smartwatch with a blood pressure monitor that enables patients and doctors to monitor vital signs, potentially saving lives. Additionally, IoT is highly accessible, requiring only a smart device and internet connection, as demonstrated by the use of Google Maps to determine location.

AUTOMATION AND CONTROL

Automation and control are also possible through IoT, enabling physical objects to be connected and digitally controlled, leading to faster processing and output.

IMPROVED HOME SECURITY

Furthermore, IoT devices can be utilized for improved home security, providing the ability to monitor and control security systems through a mobile phone, offering personal protection.
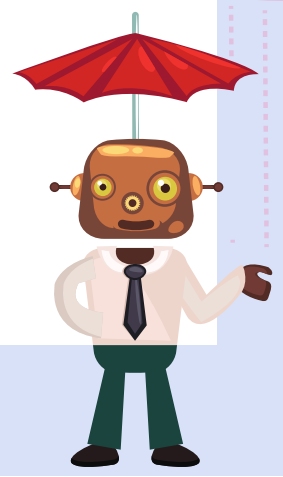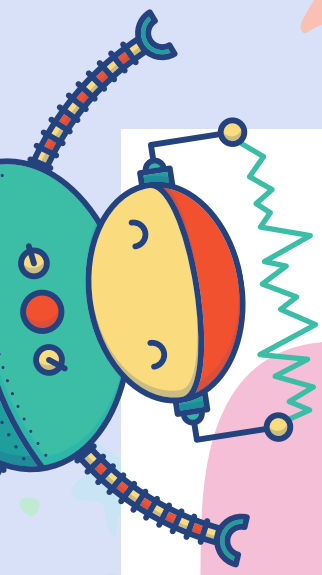
4.2 CHALLENGES

SECURITY RISK

With the increasing number of interconnected devices in IoT, there is a higher risk of privacy breaches and cyber attacks. Additionally, there is a lack of industry-wide security standards.

SAFETY&PRIVACY CONCERNS

As IoT devices gather a lot of personal information, there is a risk of misuse or unauthorized access by hackers, which can jeopardize safety. Consumers have to ensure that all automation processes are secure.
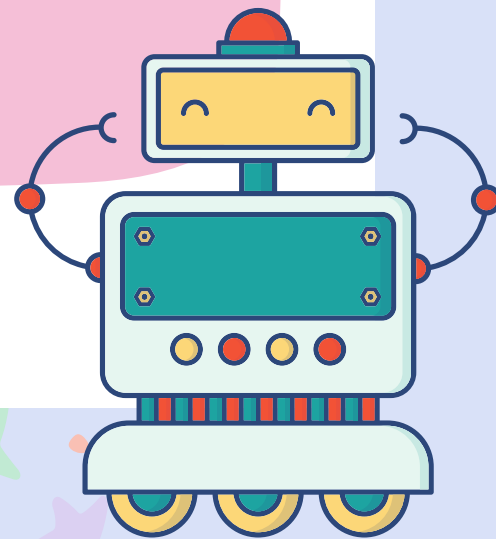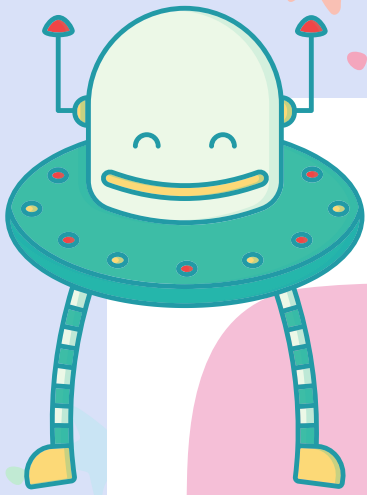
DEPENDENCE ON INTERNET

As IoT systems rely on the internet, an unstable or non-existent internet connection can make the IoT ecosystem unreliable.

COMPLEXITY

IoT systems are complex and require specialized skills to design, deploy, and maintain. Any technical bugs can lead to serious consequences, and even minor issues such as a power failure can cause problems.
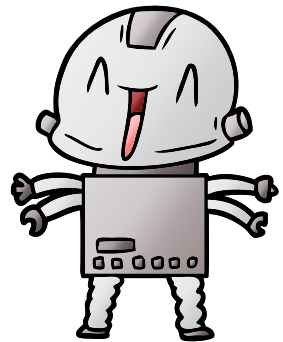
CHAPTER 5:
IOT TRENDS & FUTUTRE
1. IOT & AI

IoT can leverage AI's abilities to analyze and interpret the data it collects, thereby enhancing the intelligence of the system

self driving car

## SIMPLIFIED WAY OF HOW IOT AND AI WORK IN SELF DRIVING CARS.

IoT devices gather environmental data, while AI processes and interprets it to enhance performance and efficiency, enabling the prediction of other cars' movements and recommendation of appropriate actions.
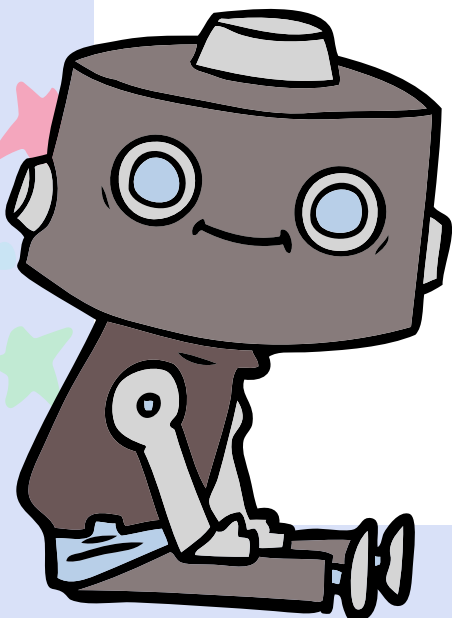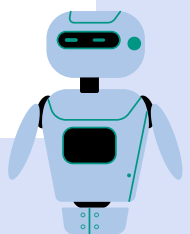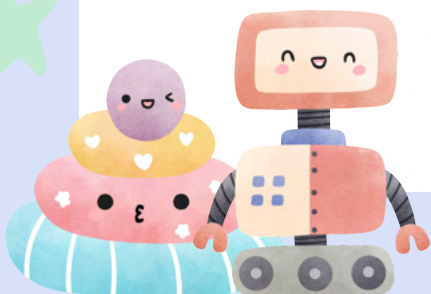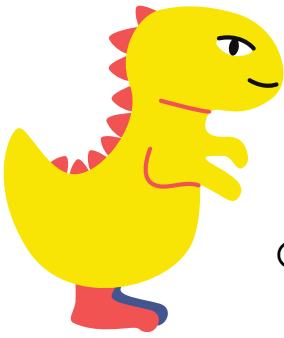
2. SENSOR INNOVATION

Innovation in sensors will introduce cost-effective and high-performing options to detect a broad spectrum of situations and actions.
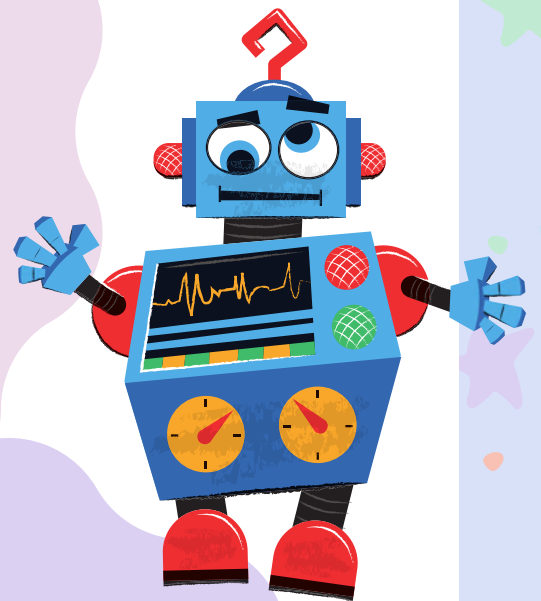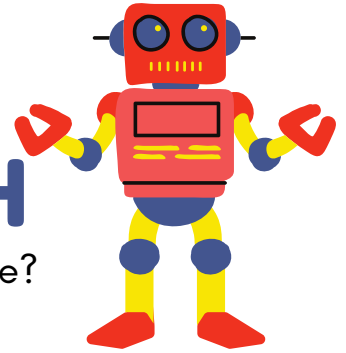
3. BETTER IOT SECURITY

Many companies are working to develop improved security solutions for IoT, which has faced significant challenges and remains vulnerable to attacks.

WORD SEARCH

Can you find the words hidden in the puzzle?

A	R	T	I	F	I	C	I	A	L	P	C	V	K
U	U	P	T	H	I	N	G	S	S	Q	L	R	D
T	S	G	T	D	M	C	R	U	D	C	O	I	Q
M	E	F	K	G	S	Y	K	P	G	O	U	N	W
I	R	Z	S	V	B	L	V	E	P	N	D	T	M
T	I	K	I	T	I	A	R	H	F	N	S	E	I
B	N	F	M	I	J	Z	Q	Q	D	E	E	L	P
P	T	R	O	W	D	R	M	K	I	C	R	L	A
S	E	N	S	O	R	I	N	X	T	T	V	I	D
B	R	H	P	Z	W	A	T	N	A	I	E	G	D
O	F	X	K	O	D	X	M	F	R	V	R	E	R
P	A	I	N	T	E	R	N	E	T	I	L	N	E
X	C	A	C	T	U	A	T	O	R	T	R	C	S
F	E	Y	D	A	C	V	P	N	W	Y	R	E	S

SENSOR
INTERNET
THINGS
IPADDRESS
ACTUATOR
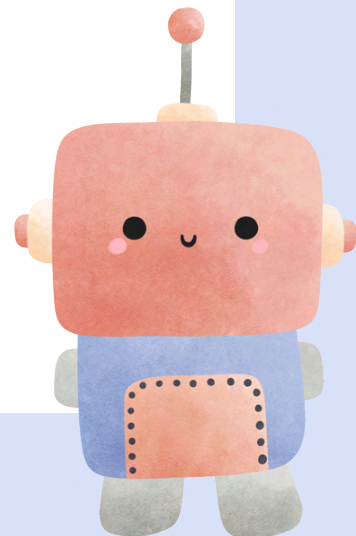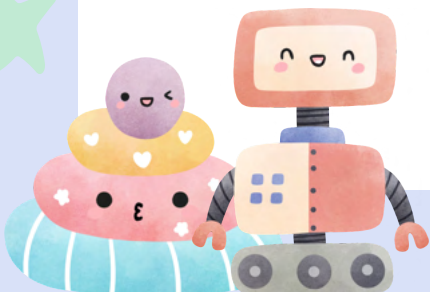CONNECTIVITY
CLOUDSERVER
USERINTERFACE
ARTIFICIAL
INTELLIGENCE
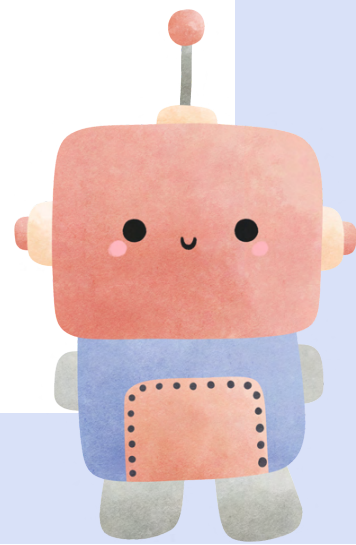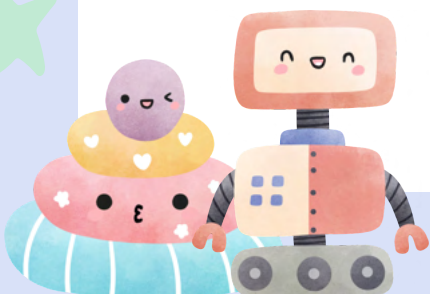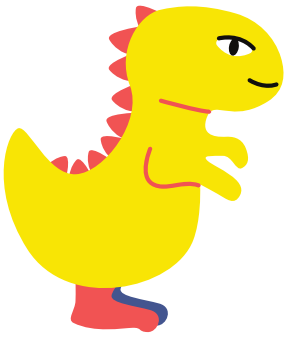
ACTIVITY
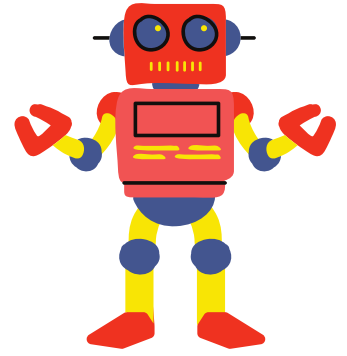
HOW DOES IOT SUPPORT
THE PROGRESS OF
ABORIGINE PEOPLE??

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My Notes :

My Notes :
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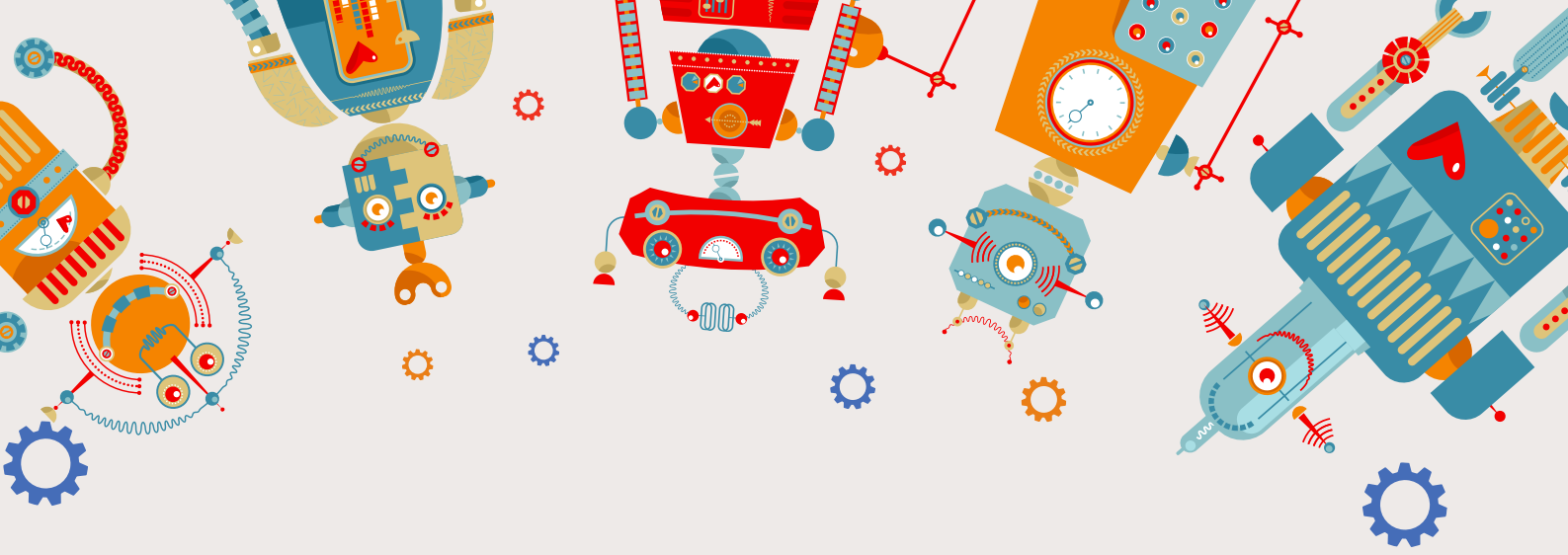
My Notes :

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