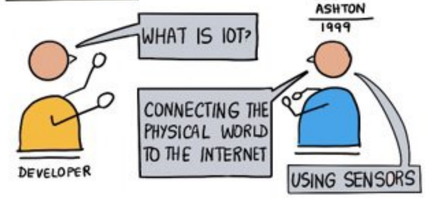
GETTING STARTED | INTRODUCTION TO IOT

- WHAT IS "IOT"?
- IOT DEVICES AROUND US
- SETUP YOUR IOT DEVICE
- APPLICATIONS OF IOT

DEFINING "IOT"



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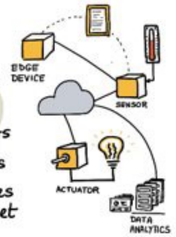

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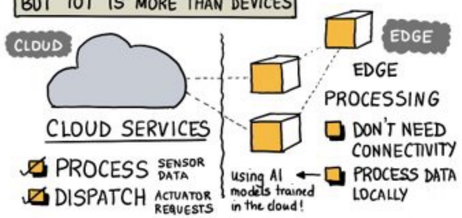

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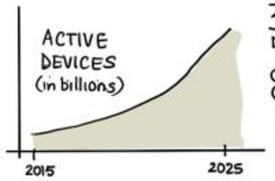

30B DEVICES CONNECTED BY 2020

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IOT "Things" > THINGS REFERS TO THE DEVICES THAT INTERACT WITH THE PHYSICAL WORLD

FOR DEVELOPMENT: DEV-KIT

START WITH 'DEVELOPER KITS' = GENERAL PURPOSE DEVICES TAILORED FOR DEV USE (NOT PRODUCTION!)

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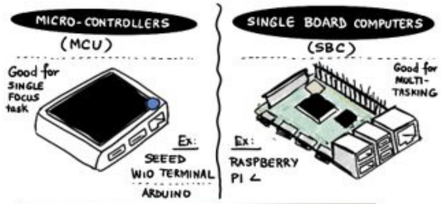
MICRO-CONTROLLERS (MCU) / SINGLE BOARD COMPUTERS (SBC)



DEV KITS FALL INTO TWO CATEGORIES

WHAT IS A MICRO CONTROLLER? (Special Purpose)

DEV KITS CAN BE REALLY CHEAP (< $4) FOR CORE

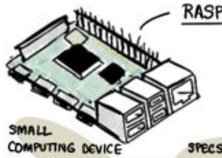
COSTS RISE WITH FEATURES

WIO TERMINAL ($30)

- SENSORS + ACTUATORS
- DISPLAY SCREEN
- BLUETOOTH + WI-FI
- ARDUINO COMPATIBLE

LOW COST COMPUTING DEVICE WITH BASIC SENSORS & ACTUATORS

WHAT IS A SINGLE BOARD COMPUTER? (General Purpose)



SMALL COMPUTING DEVICE WITH ALL ELEMENTS OF A COMPLETE COMPUTER

SPECS CLOSE TO DESKTOP (MAC/PC) BUT CHEAPER, SMALLER, LESS POWER USAGE

PROGRAMMABLE IN ANY LANGUAGE

Python used typically for IOT

YOUR HARDWARE CHOICES (FOR CURRICULUM)

3 DEVICE CHOICES FOR YOUR DEVELOPMENT

PHYSICAL DEVICE

1. MICRO CONTROLLER — ARDUINO WIO TERMINAL (Seeed Studios)
2. SINGLE BOARD COMPUTER — RASPBERRY PI

VIRTUAL DEVICE

3. VIRTUAL SINGLE BOARD COMPUTER — CounterFit Project (MAC/PC)

PHYSICAL OPTIONS USE SAME SENSOR ECOSYSTEM - YOU CAN SWITCH PATHS IF NEEDED

ARDUINO DEVELOPER KIT

USE THIS APPROACH TO GET FAMILIAR WITH MICROCONTROLLER BASED DEVELOPMENT

YOU MUST KNOW TO PROGRAM IN C/C++

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1. ARDUINO IDE — IF YOU HAVE PRIOR DEV EXPERIENCE OR TRY SELF-STUDY
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PREFERRED APPROACH USED IN LESSONS

SINGLE BOARD COMPUTER DEV KIT

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PROGRAM IN PYTHON!

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- OPTION 1: USE DESKTOP VERSION OF R-Pi — CODE DIRECTLY ON R-Pi USING VS CODE FOR R-Pi
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- ✓ WALK THROUGH INSTRUCTIONS
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- ✓ VALIDATED SETUP!

LET'S TALK ABOUT APPLICATIONS!

HUGE RANGE OF USE CASES FOR IOT APPS

4 BROAD GROUPS

- CONSUMER IOT (home)
- COMMERCIAL IOT (work)
- INDUSTRIAL IOT (machinery)
- INFRASTRUCTURE IOT (city)

DO THE RESEARCH

DO YOU HAVE ANY IOT APPS YOU USE?

- STUDY THE FOUR AREAS FOR IOT APPLICATIONS
- FOR EACH AREA, FIND ONE CONCRETE EXAMPLE NOT LISTED

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DEVICES THAT CONSUMERS USE AROUND THEIR HOME

EMPOWER MORE USERS ESPECIALLY PERSONS WITH A DISABILITY...

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CONTROL AND MANAGE MACHINERY ON A LARGE SCALE. EX: FACTORIES, DIGITAL AGRICULTURE

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BETTER ANALYTICS | SENSING ENVIRONMENTS

SMART GRIDS — MONITOR & CONTROL GLOBAL INFRASTRUCTURE PEOPLE USE DAILY!

SMART CITIES

- TRANSPORTATION
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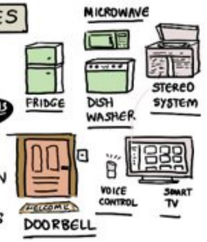
EXAMPLES OF IOT DEVICES

INCREASING NUMBER OF INTERNET-CONNECTED OR EDGE-BASED DEVICES AROUND US



- SENSORS
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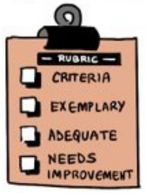

MANY LARGE SCALE IOT PROJECTS DEPLOYED TODAY

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NEXT UP: A DEEPER DIVE...

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CREATED BY @ SKETCHTHEDOCS

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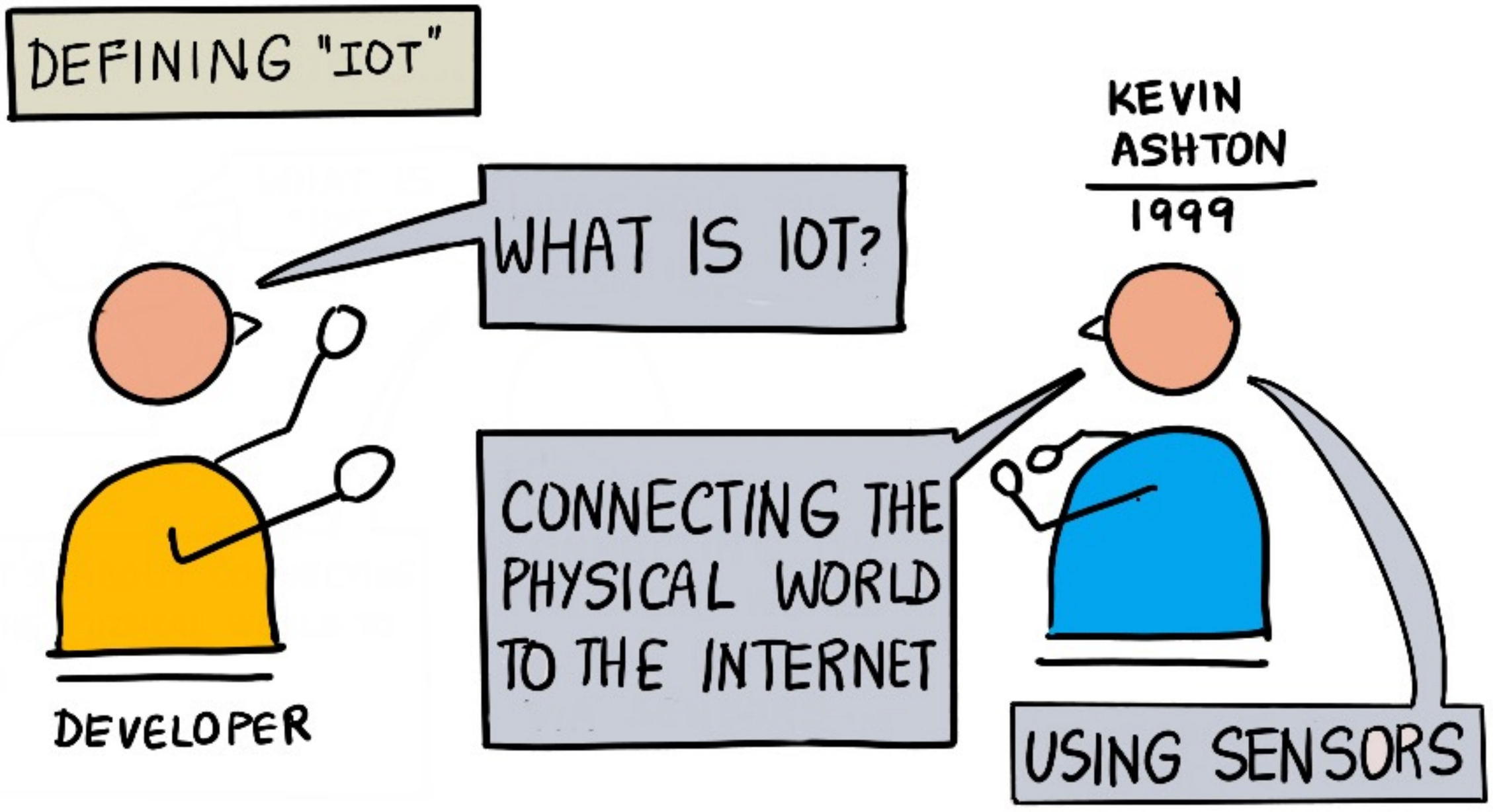
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KEVIN ASHTON
1999
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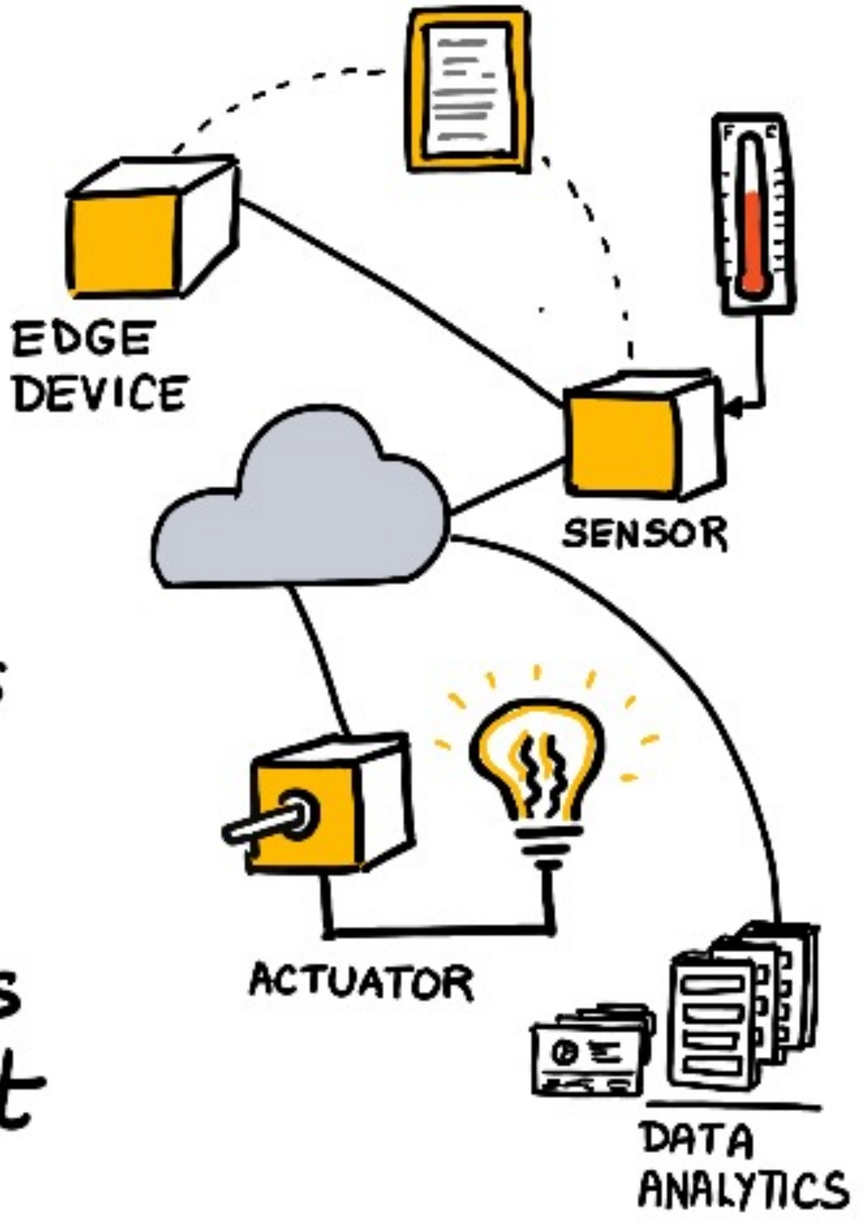

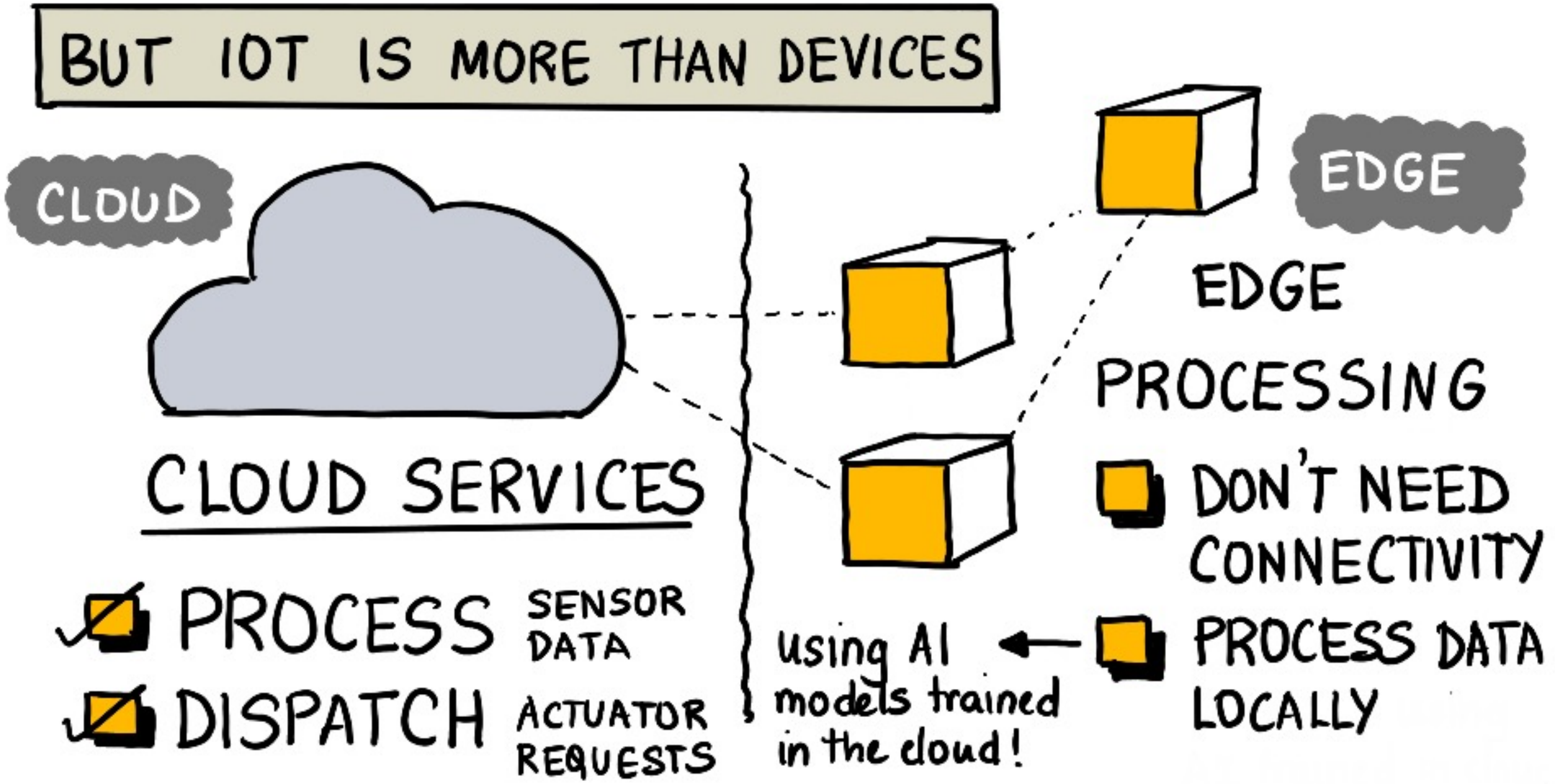
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CLOUD SERVICES
PROCESS SENSOR DATA
DISPATCH ACTUATOR REQUESTS
using AI models trained in the cloud!
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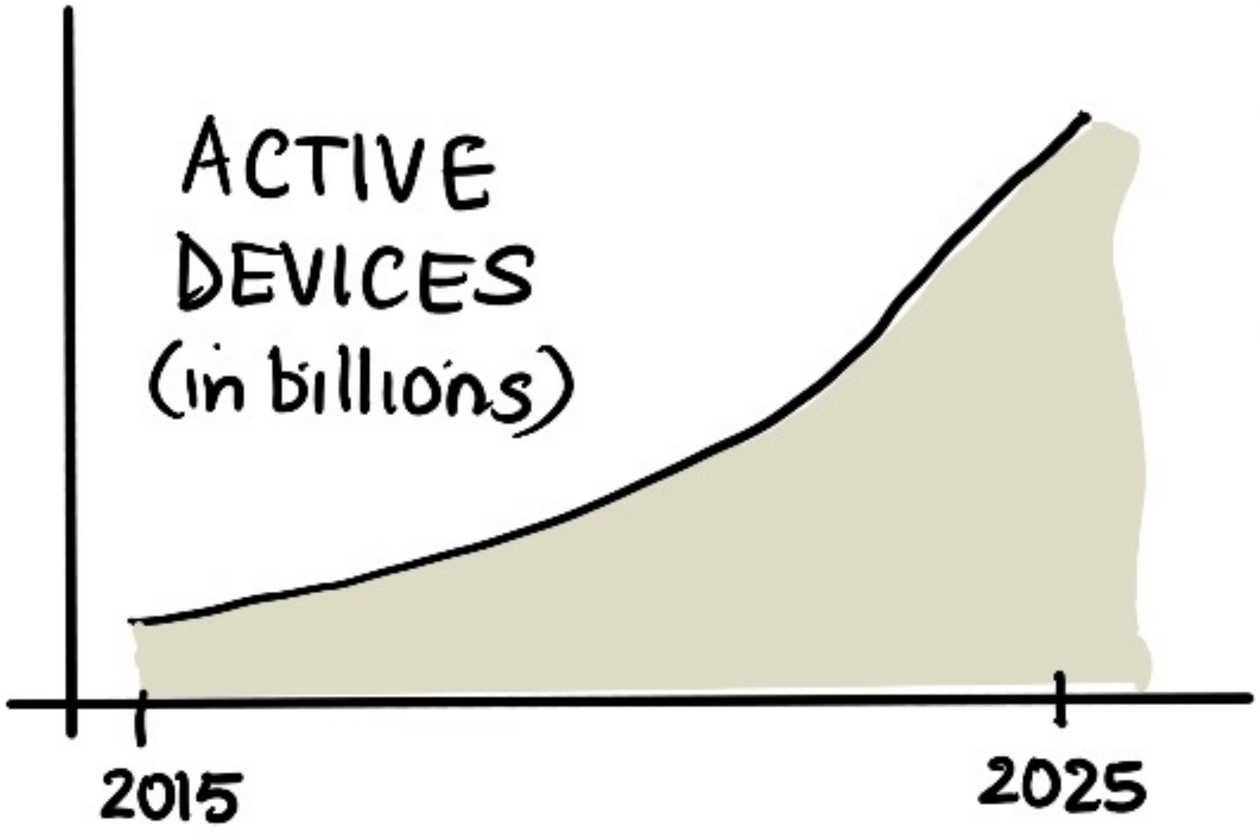

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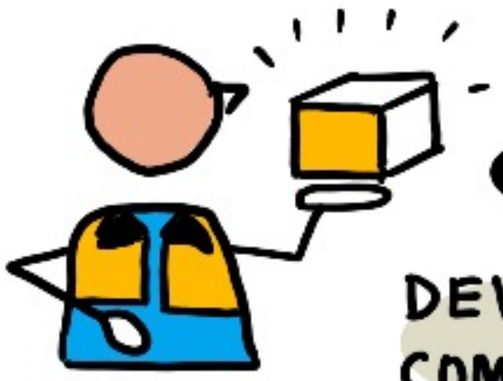

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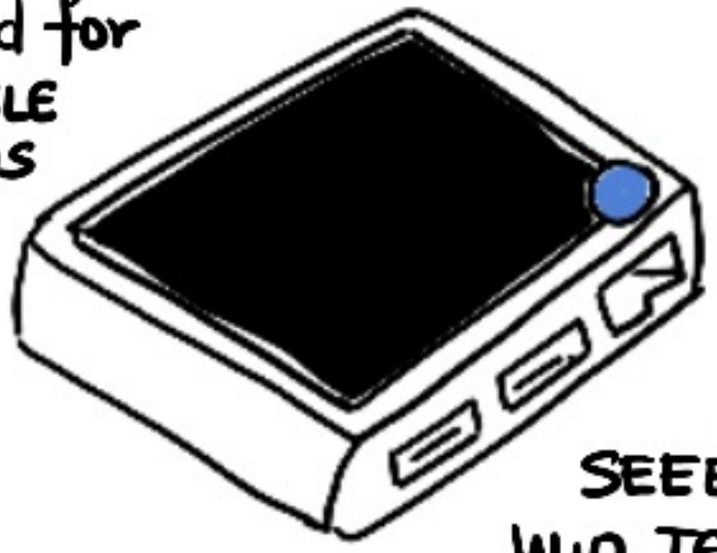
(MCU)

Good for SINGLE FOCUS task



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ARDUINO

SINGLE BOARD COMPUTERS

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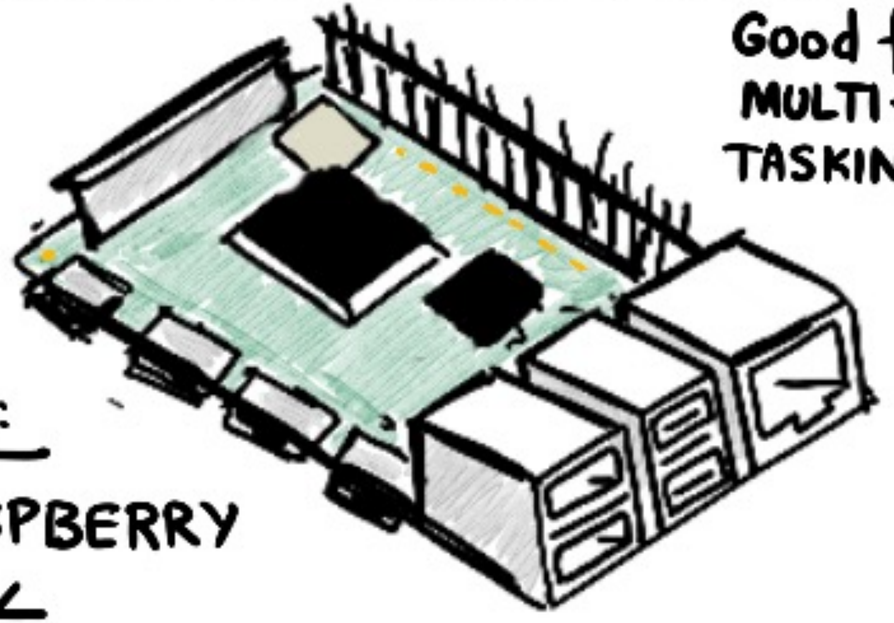

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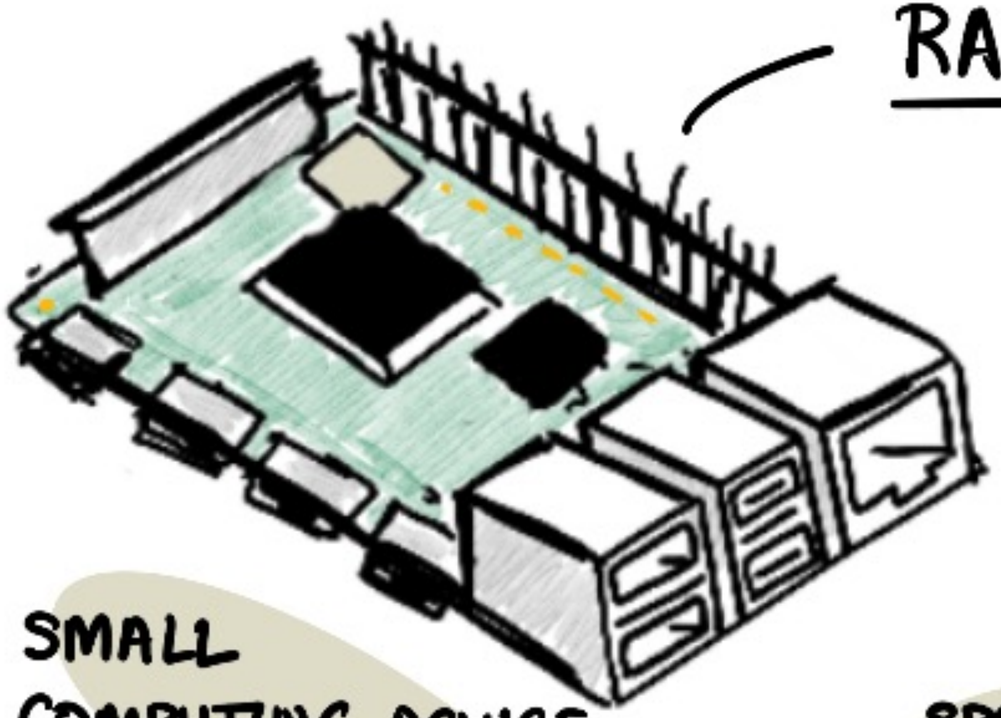

RASPBERRY PI

* CPU, MEMORY, I/O (like MCU)
* PLUS GRAPHICS CHIP (drive display)
* PLUS USB PORTS (add peripherals)
* PLUS SD CARD (store code, data ..)

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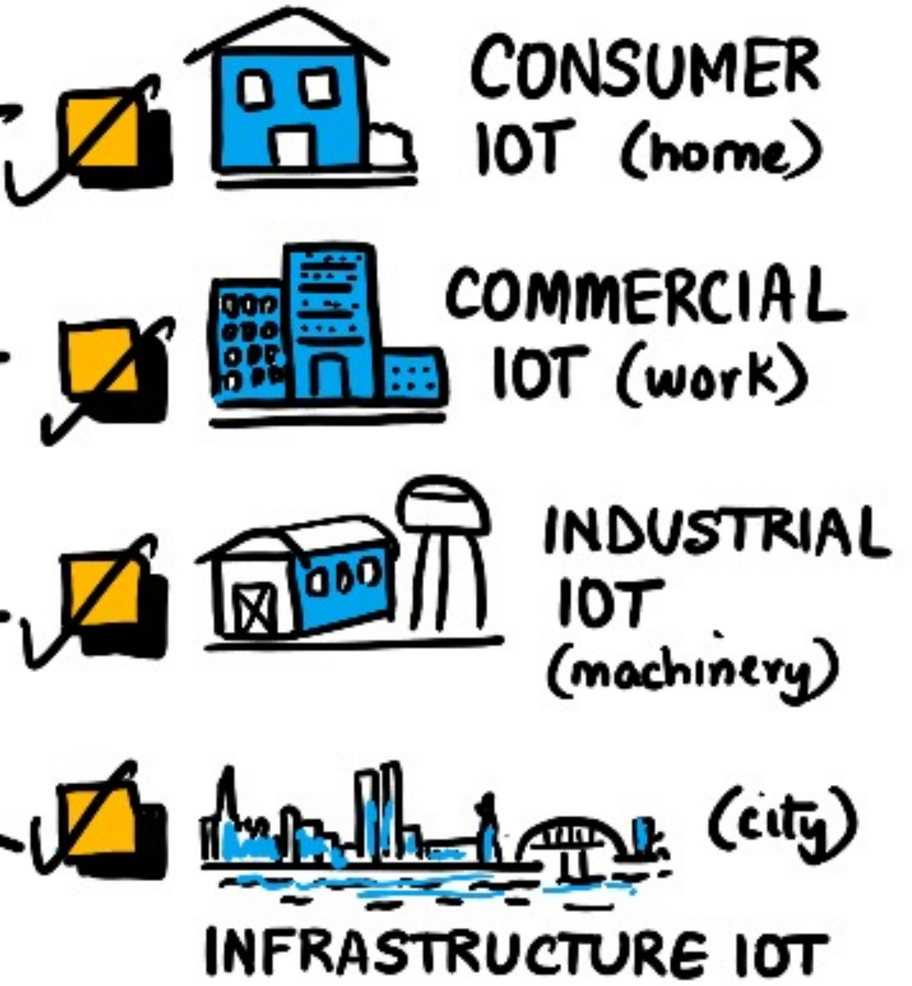

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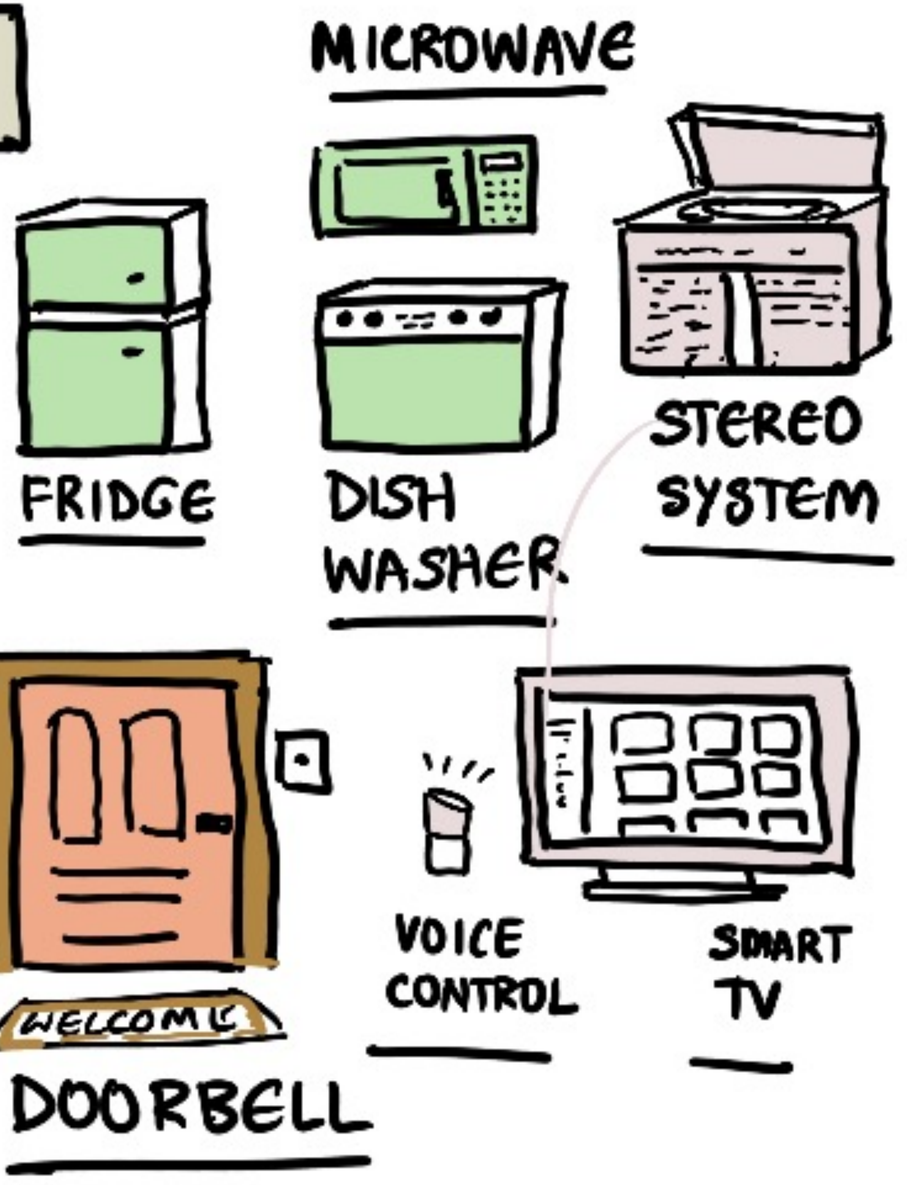

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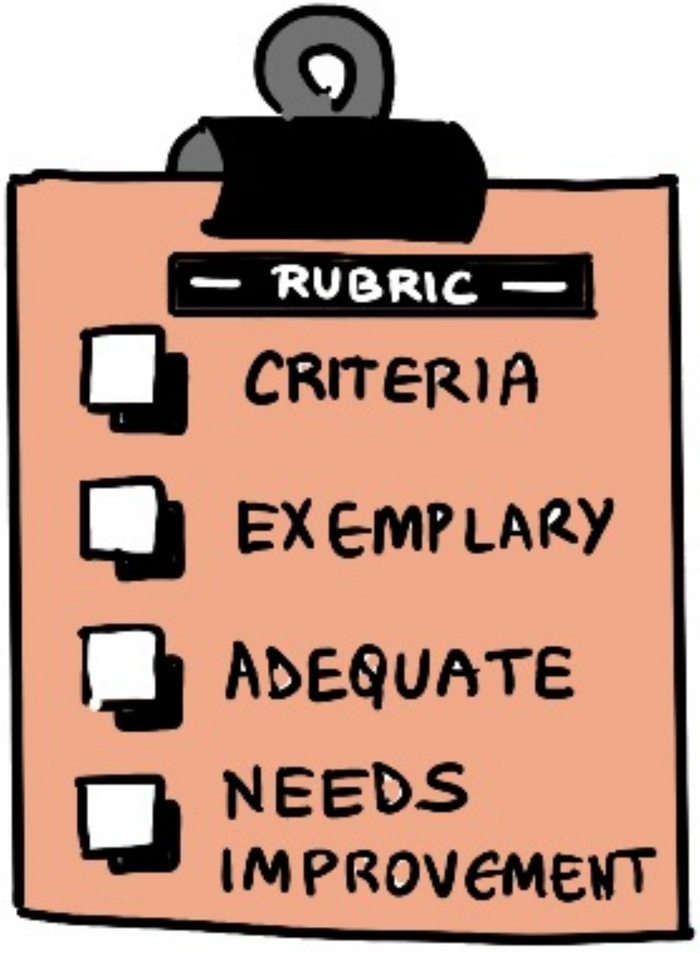

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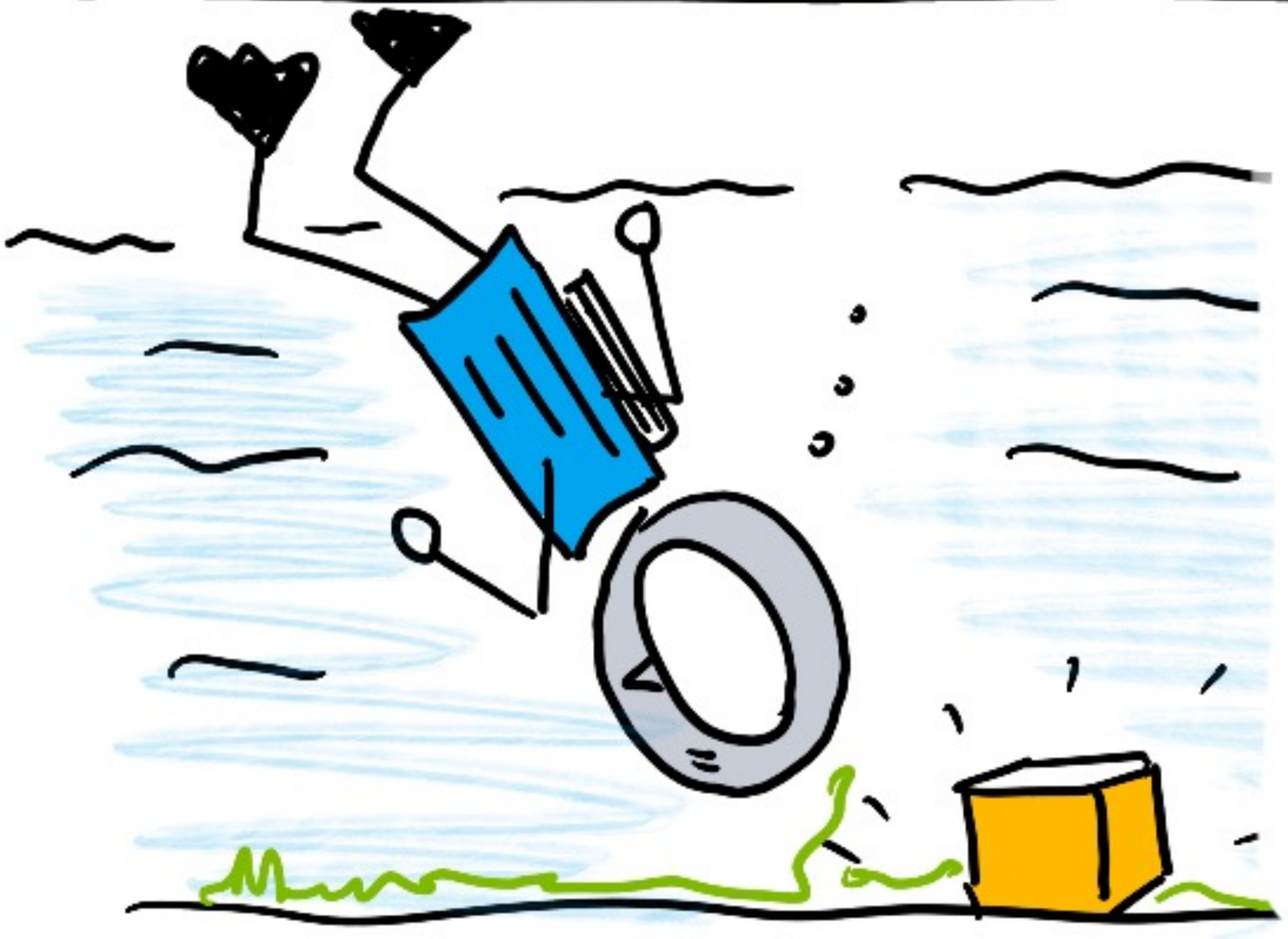

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CONGRATULATIONS
YOU JUST FINISHED GETTING AN INTRO TO IOT !!