IoT and IDE Introduction

[Short Bootcamp]

IoT?

IoT merupakan singkatan dari "**Internet of Things"**. IoT merujuk pada **konsep di mana berbagai jenis perangkat** fisik, seperti sensor, perangkat elektronik, kendaraan, peralatan rumah tangga, dan lain sebagainya, **dapat saling terhubung** melalui jaringan **internet dan berkomunikasi satu sama lain**. Tujuan utama dari IoT adalah **menghubungkan dunia fisik dengan dunia digital**, sehingga objek-objek tersebut dapat mengumpulkan, mengirimkan, dan menerima data serta berinteraksi secara otomatis.

The physical world meets the digital world

Sejarah IoT

1982	Researcher dari Carnegie Mellon University menghubungkan vending machine dengan internet
1990	John Romkey mendemokan toaster yang dikontrol via internet
1999	Terminologi “Internet of Things” pertama kali digunakan oleh **Kevin Aston** di MIT
2008	Konferensi IoT pertama diselenggarakan di Swiss
> 2017	Integrasi IoT dengan Sistem Cerdas (AI, BigData)

Penerapan [IoT]

- Smart Home/City
- Smart Farming
- Manufacturing
- Power Grid
- Logistics / Supply Chain

Energi dan SDA

Telekomunikasi

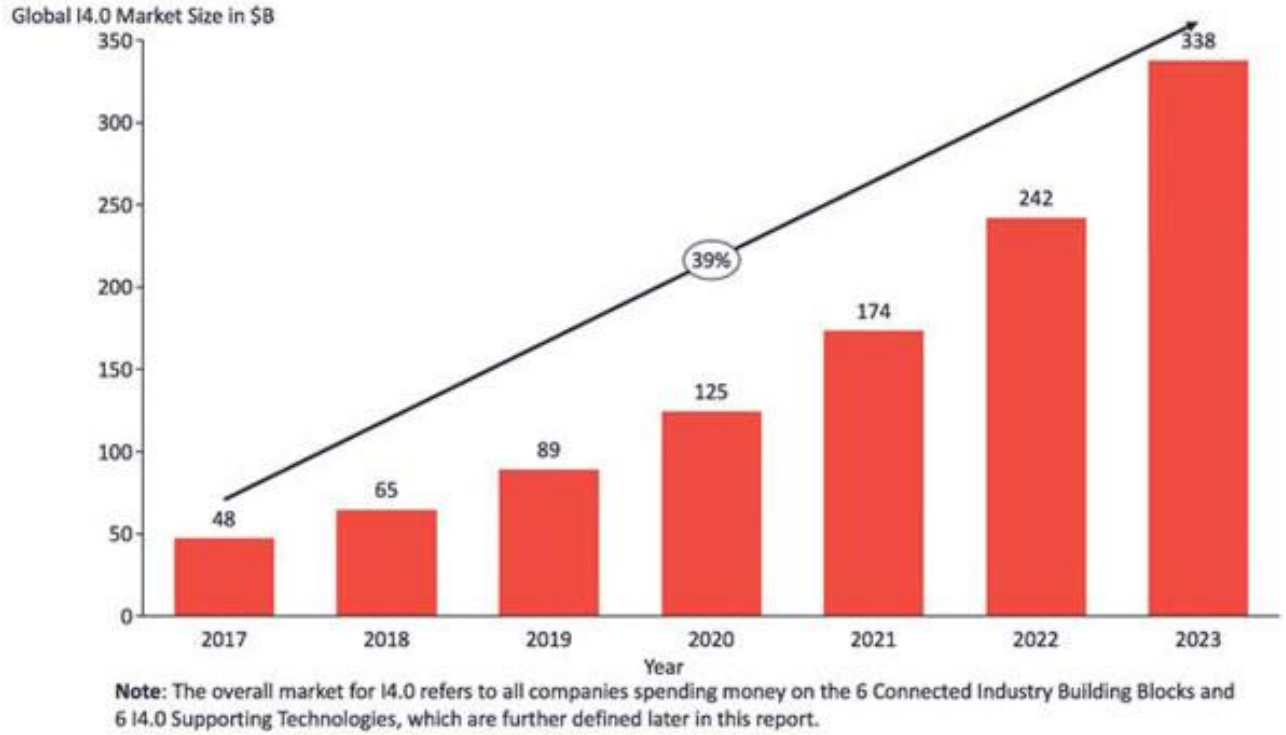
Pertanian & Perikanan

Smart City

Lingkungan Hidup

Pertahanan

Market Potential



Keseluruhan pasar diperkirakan akan mencapai US$338 miliar pada tahun 2023

Source: https://www.iot-now.com/

Komponen Dasar [IoT]

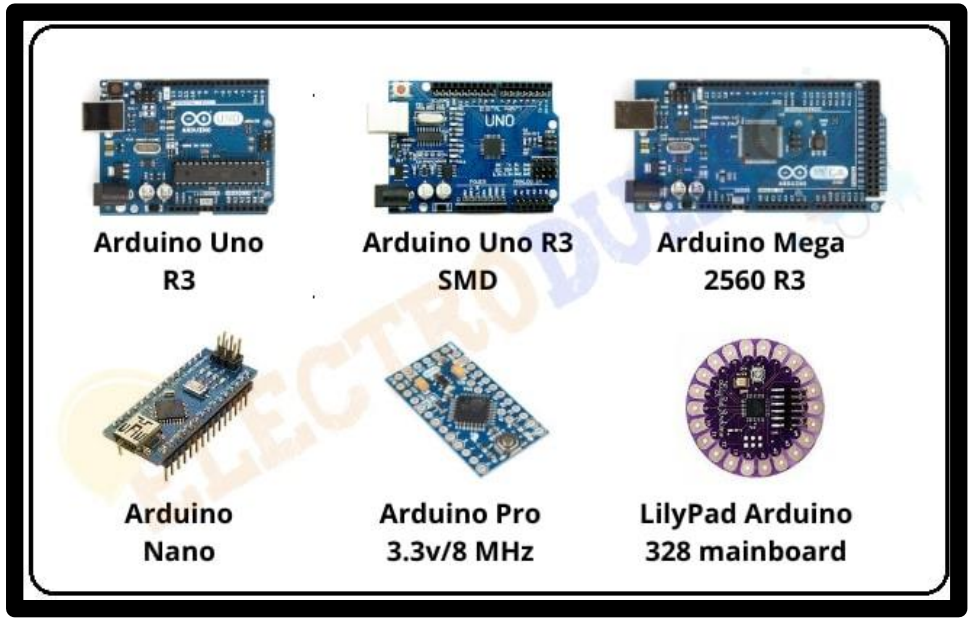
Microcontroller

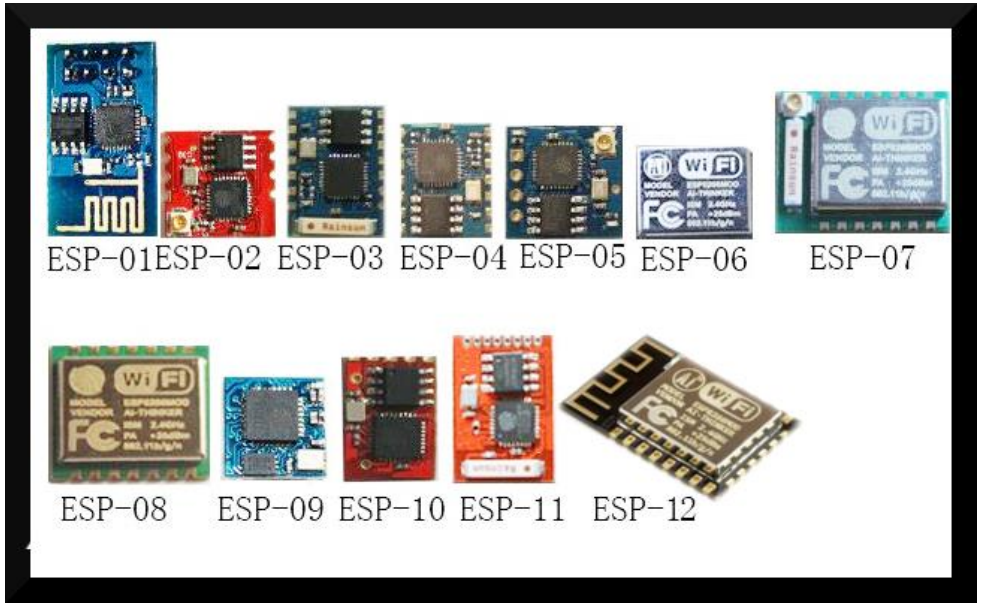
Sensor & Actuator

Communication Module

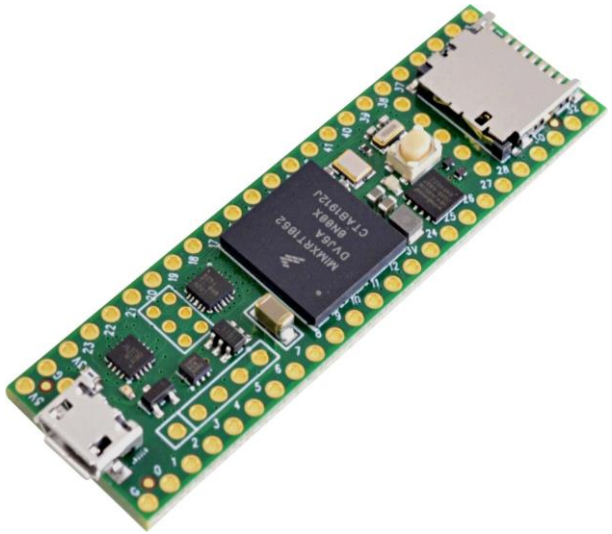
Power source

Microcontrollers

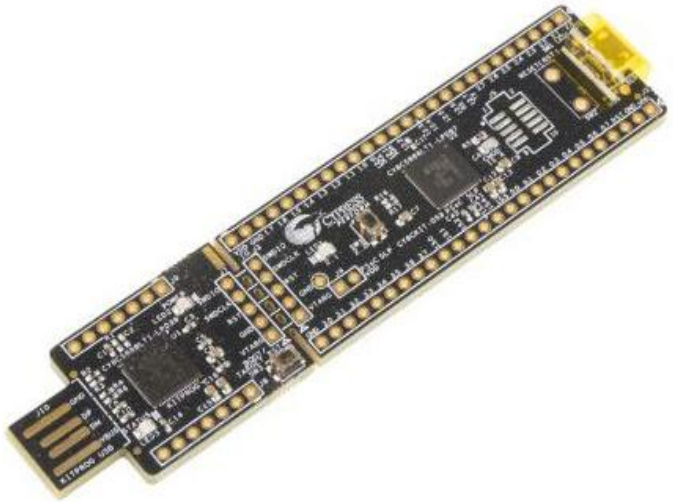




Development Boards



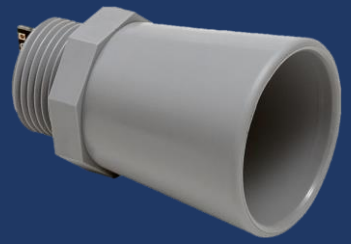
Teensy



PSoC

STM32

Sensors



Water Level Sensor

Wind Direction Sensor

Soil Moisture & Temperature

Current Sensor

Voltage Sensor

Temperature &
Humidity Sensor

Rain Gauge Sensor

Wind Speed &
Direction Sensor

Debit Sensor

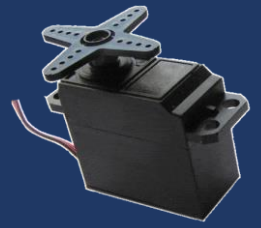
Water Quality Sensor

Actuators

Relay

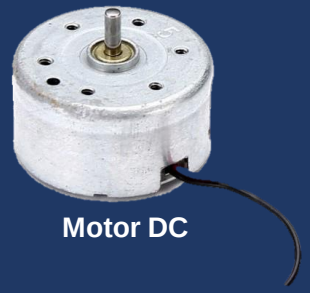
Fan

Pump



Stepper

Pump



Motor DC

LED

Communication Module

Short Range	Long Range	
E.g. Bluetooth, ZigBee, NFC, WiFi, RFID,	**Non cellular LPWAN**	**Cellular LPWAN**
	LoRaWAN, SigFox, Ingenue, Nwave, Weightless	Cat-1, Cat-0, Cat-M1, Cat-M2, **GSM, NB-IoT**

Power Source

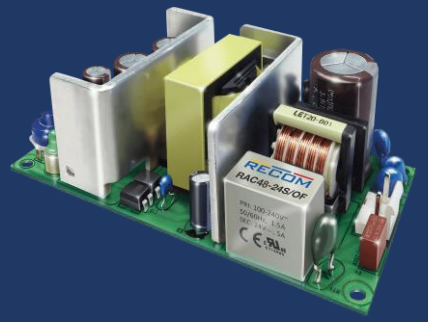
PLN

Aki

Solar Panel

Battery

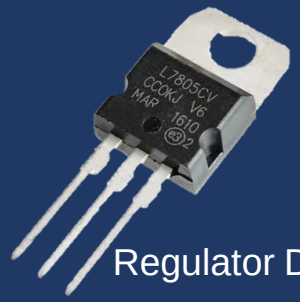
Content



AC to DC Converter

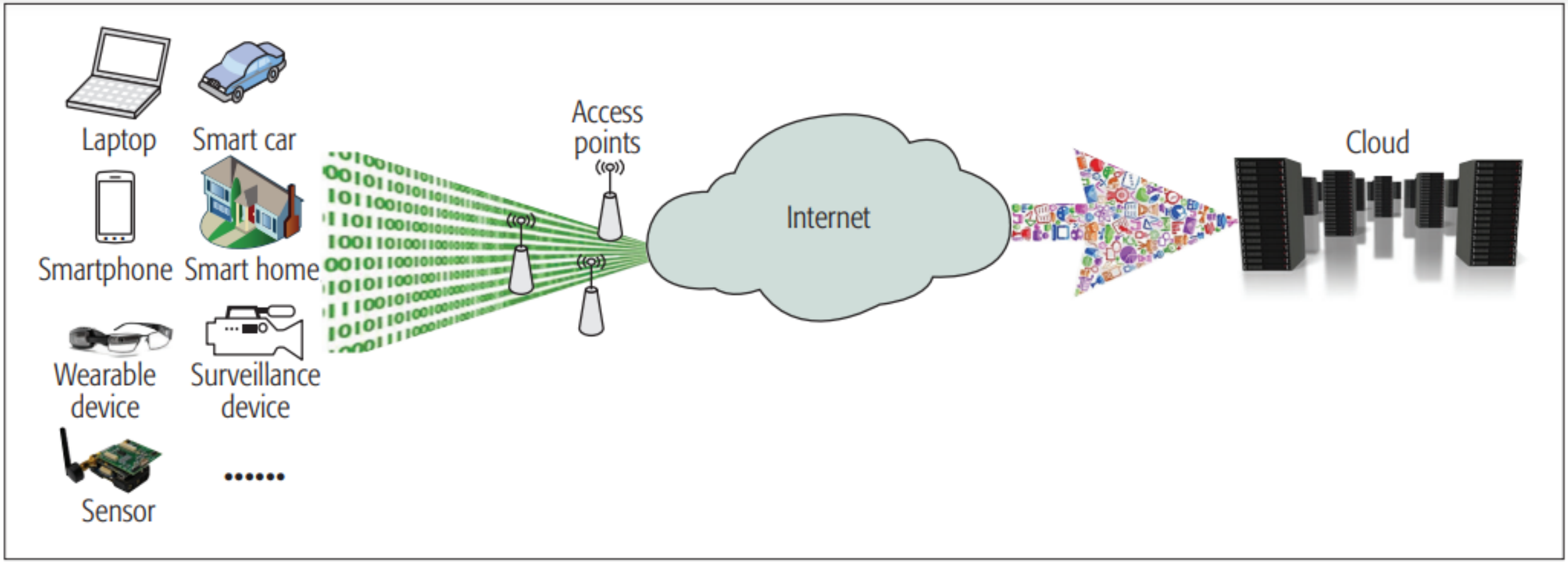
Step Down DC

Step Up DC

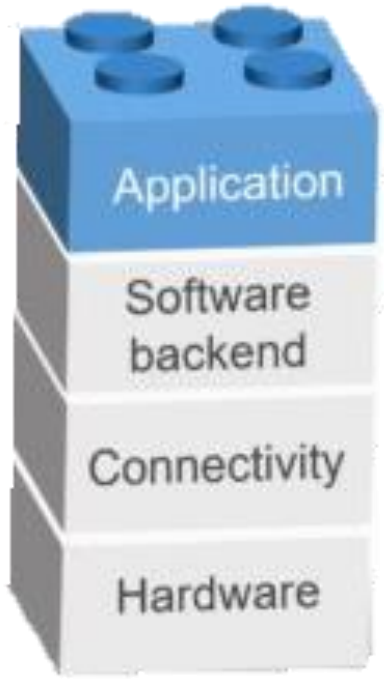


Regulator DC

Traditional IoT Architecture



IoT Tech Stack



Sensor


Temperature & humidity


Water Level Sensor


Rain Gauge

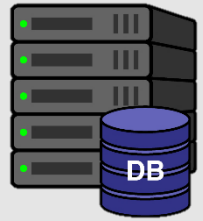

PH Sensor


Soil Moisture


Wind Speed & Direction

Hardware

Connectivity



On Premise

Cloud Server

Backend

Dashboard

APPs

Application

Hardware programming Language



Challenges in IoT devices development

Challenges in IoT devices development

Durability

Cost effectiveness

Flexibility

Latency

Connectivity

network security

Power consumption

Arduino IDE

Arduino IDE 2.0.4

The new major release of the Arduino IDE is faster and even more powerful! In addition to a more modern editor and a more responsive interface it features autocompletion, code navigation, and even a live debugger.

For more details, please refer to the **Arduino IDE 2.0 documentation**.

Nightly builds with the latest bugfixes are available through the section below.

SOURCE CODE

The Arduino IDE 2.0 is open source and its source code is hosted on **GitHub**.

DOWNLOAD OPTIONS

Windows Win 10 and newer, 64 bits
Windows MSI installer
Windows ZIP file

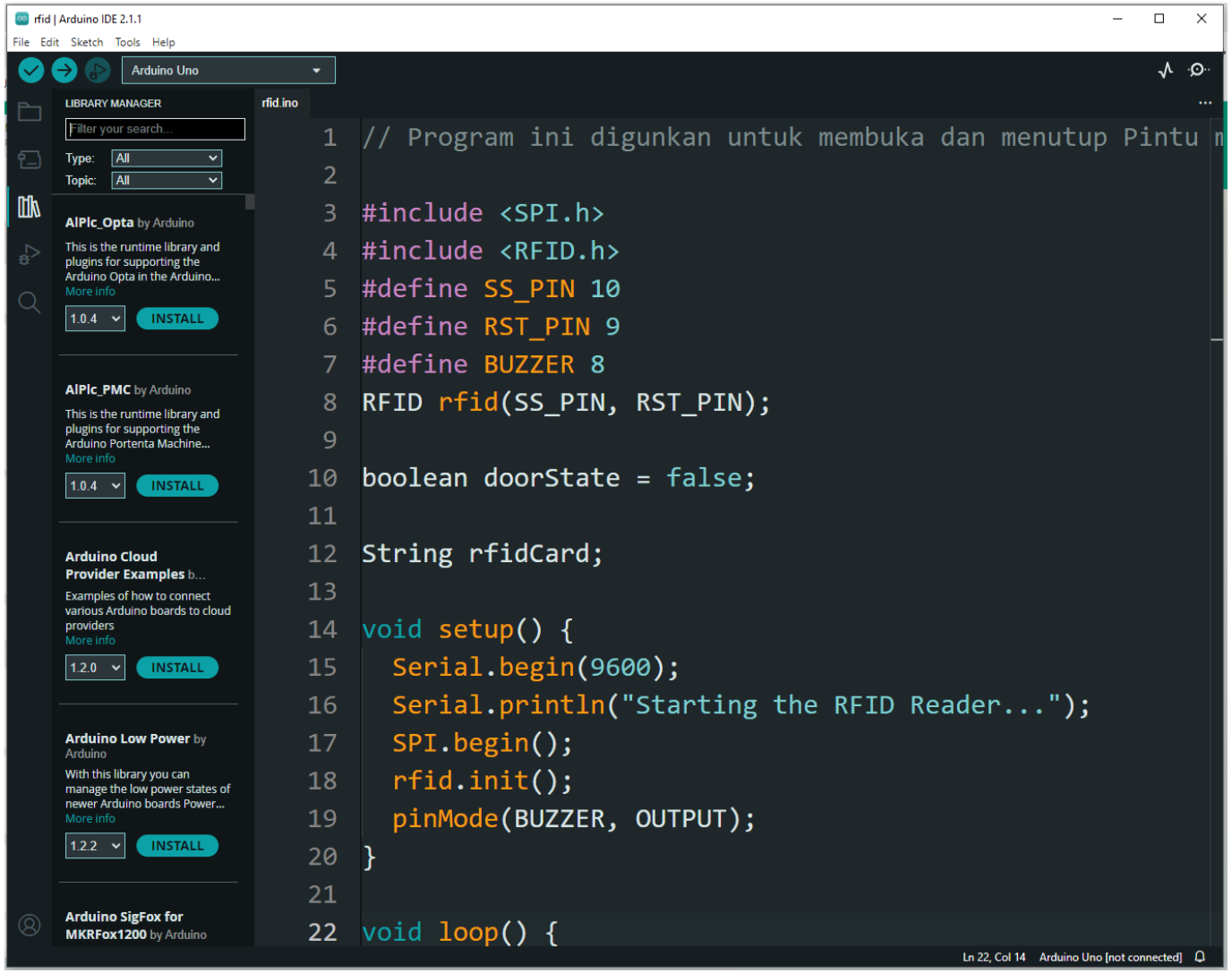
Linux AppImage 64 bits (X86-64)
Linux ZIP file 64 bits (X86-64)

macOS Intel, 10.14: "Mojave" or newer, 64 bits
macOS Apple Silicon, 11: "Big Sur" or newer, 64 bits

Release Notes

Arduino IDE Software

Arduino IDE


rfid | Arduino IDE 2.1.1
File Edit Sketch Tools Help
Arduino Uno
LIBRARY MANAGER
Filter your search...
Type: All
Topic: All
AIPlc_Opta by Arduino
This is the runtime library and plugins for supporting the Arduino Opta in the Arduino...
More info
1.0.4 INSTALL
AIPlc_PMC by Arduino
This is the runtime library and plugins for supporting the Arduino Portenta Machine...
More info
1.0.4 INSTALL
Arduino Cloud Provider Examples b...
Examples of how to connect various Arduino boards to cloud providers
More info
1.2.0 INSTALL
Arduino Low Power by Arduino
With this library you can manage the low power states of newer Arduino boards Power...
More info
1.2.2 INSTALL
Arduino SigFox for MKRFox1200 by Arduino
rfid.ino
1 // Program ini digunkan untuk membuka dan menutup Pintu m
2
3 #include <SPI.h>
4 #include <RFID.h>
5 #define SS_PIN 10
6 #define RST_PIN 9
7 #define BUZZER 8
8 RFID rfid(SS_PIN, RST_PIN);
9
10 boolean doorState = false;
11
12 String rfidCard;
13
14 void setup() {
15 Serial.begin(9600);
16 Serial.println("Starting the RFID Reader...");
17 SPI.begin();
18 rfid.init();
19 pinMode(BUZZER, OUTPUT);
20 }
21
22 void loop() {
Ln 22, Col 14 Arduino Uno [not connected]

ESP32 Development Board

	ESP32
MCU	Xtensa Dual-Core 32-bit LX6 with 600 DMIPS
802.11 b/g/n Wi-Fi	HT40
Bluetooth	Bluetooth 4.2 and BLE
Typical Frequency	160 MHz
SRAM	**Yes**
Flash	**Yes**
GPIO	36
Hardware /Software PWM	None / 16 channels
SPI/I2C/I2S/UART	4/2/2/2
ADC	12-bit
CAN	**Yes**
Ethernet MAC Interface	**Yes**
Touch Sensor	**Yes**
Temperature Sensor	**Yes**
Hall effect sensor	**Yes**
Working Temperature	-40°C to 125°C

Simulator

[Wokwi Simulator]

THANK **YOU**