

AICTE Training and Learning (ATAL) online FDP

Internet of Things and Its Applications

Organised by **Amity University Gwalior**

Amity University, Madhya Pradesh (AUMP) offers UG and PG programs in Engineering, Management, Biotechnology, Law, Pharmacy.

AUMP has been awarded as **Best Private University of Madhya Pradesh** by CMAI in 2014 and by Dialogue India in 2017, 2018, 2019. AUMP was also awarded **Excellent Higher Education University in India** in 2017 by CMAI and has been accredited as **Premier University** by the Accreditation Service for International Colleges (ASIC). AUMP has also been ranked among the **Top 200 Universities** in India by NIRF 2020.

Thanks to Organising Committee

CHIEF PATRON

Lt Gen VK Sharma, AVSM (Retd) Vice Chancellor, AUMP

PATRON

Prof (Dr) MP Kaushik Pro-Vice Chancellor, AUMP

ORGANIZING SECRETARY

Maj Gen (Dr) S C Jain, VSM (Retd), Director, ASET, AUMP

COORDINATOR

Dr. Dinesh Sharma, Asst Prof, CSE, AUMP

CO ORGANIZERS

Dr. Venkatadari M., Professor, CSE, AUMP

Dr. H. K. Shakya, Asst. Prof., CSE, AUMP

Mr. D. K. Mishra, Asst. Prof., CSE, AUMP

About Hackveda

Hackveda is a workforce development company established in 2011 by Mr V. K. Shukla, Wing Commander, IAF (Retd.) and Mr Devanshu Shukla, Director, Hackveda.

What we do at Hackveda

Workforce Development, Software Development, Research and Development, AWS Consultancy, IoT Development, Digital Ads Network, Affiliate Marketing, Recruitment and Talent Acquisition

Profile Mr Devanshu: [<https://bit.ly/2RTlrrA>]

Profile Hackveda: [<https://bit.ly/3uAT26S>]

Connecting to a cloud IoT platform and creating an end-to-end application (edge to cloud)

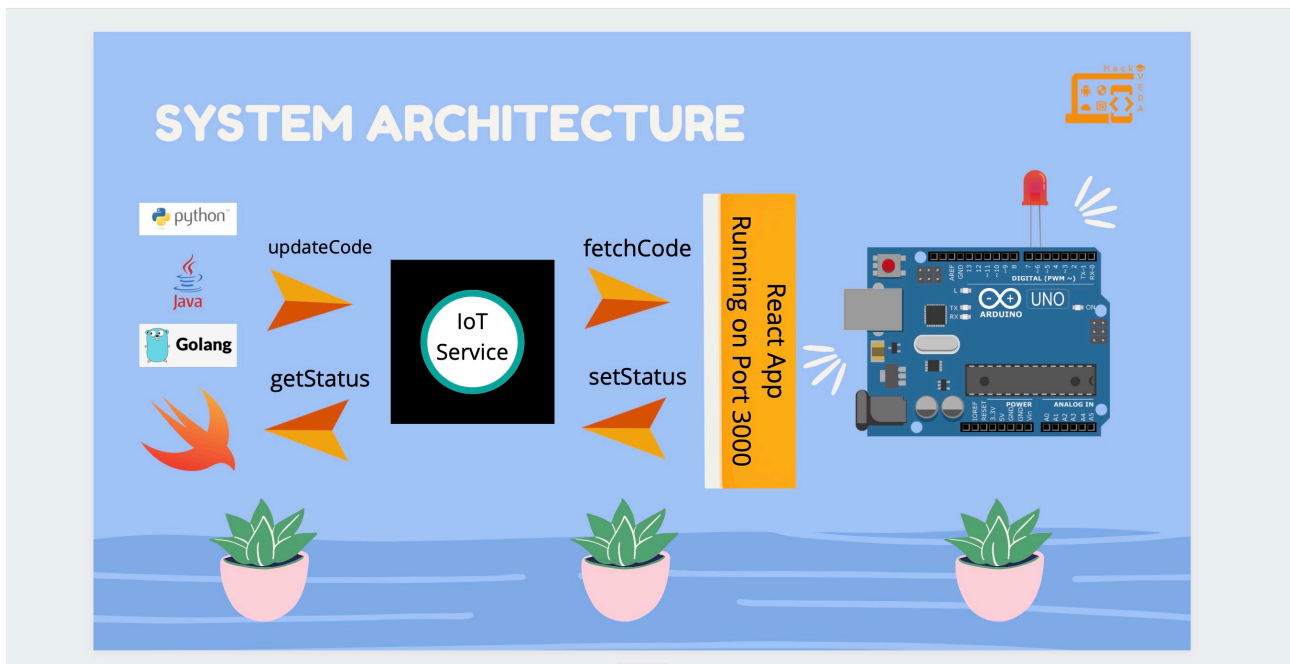
Difficulty: **Beginner** | Duration: **45 Minutes**

Register here for Lab Access: [<https://bit.ly/3uvFf1v>]

Overview of the Talk

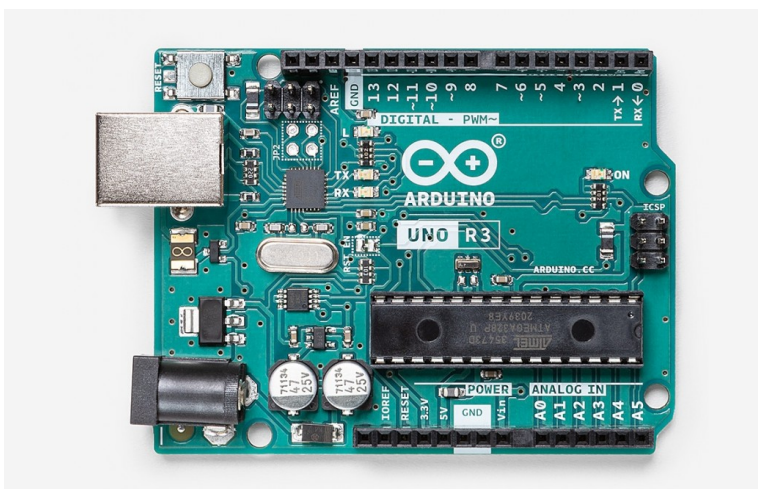
1. Understand System Architecture
2. Overview of Arduino, LED and Programming
3. Design an IoT Publisher App
4. Understand MQTT and JSON for Communication
5. Explore IOTService API and Source Code
6. Design an IoT Subscriber App

System Architecture [<https://bit.ly/3wEwkfC>]



Arduino UNO

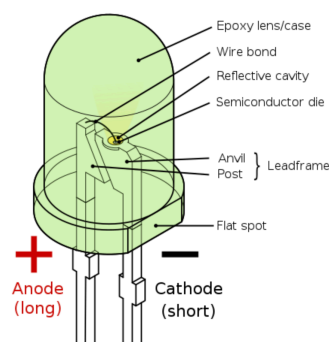
is a microcontroller board based on the ATmega328P. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator (CSTCE16M0V53-R0), a USB connection, a power jack, an ICSP header and a reset button.



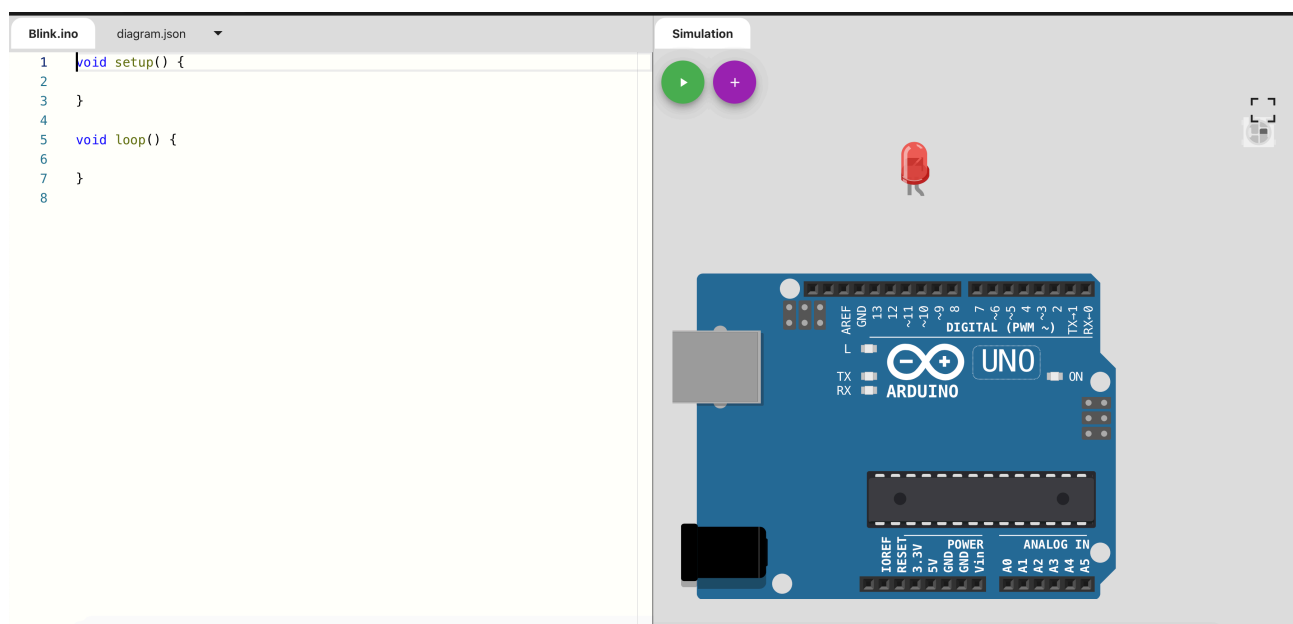
A **light-emitting diode (LED)** is a semiconductor light source that emits light when current flows through it. Electrons in the semiconductor recombine with electron holes, releasing energy in the form of photons.

The color of the light (corresponding to the energy of the photons) is determined by the energy required for electrons to cross the band gap of the semiconductor. [https://en.wikipedia.org/wiki/Light-emitting_diode]

Bot attached:



Programming an Arduino Device [<https://wokwi.com/arduino/projects/299911145837298186>]



Design IoT Publisher App

Source Code: [<https://codesandbox.io/s/arduino-simulator-hackveda-j7vfr?file=/src/App.js>]

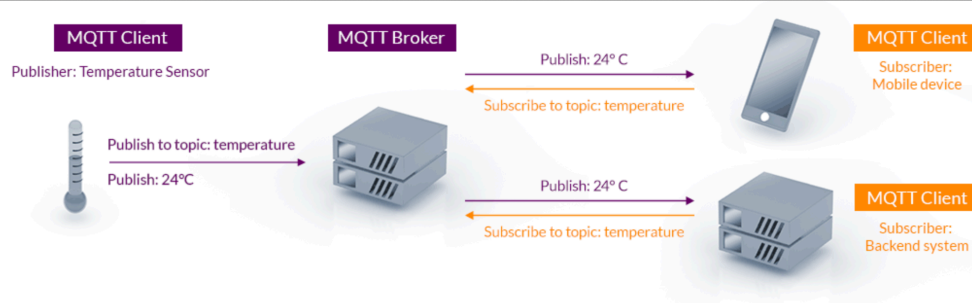
1. Compile the source code on air
2. Setup CPU to process machine code
3. Attach a device communication port
4. Setup clock and excute]
5. Setup an interface for client use

MQTT - The Standard for IoT Messaging

The Message Queuing Telemetry Transport (MQTT) is a lightweight, publish-subscribe network protocol that transports messages between devices.

The protocol usually runs over TCP/IP; however, any network protocol that provides ordered, lossless, bi-directional connections can support MQTT. It is designed for connections with remote locations where a *small code footprint* is required or the network bandwidth is limited.

MQTT Architecture [<https://bit.ly/34txMFK>]



Explore IOTService (MQTT Broker)

Source Code: <https://github.com/Hackveda/IoT>

Refer `iotservice.php`. This file acts as a MQTT Broker. Includes the following methods:

1. Cross Origin Resource Sharing
2. Fetch Device Code
3. Update Device Code
4. Get Device Status
5. Set Device Status

Subscribe IOTService API

To setup MQTT communication between mqtt broker and subscriber we need to access subscriber API here: [<https://documenter.getpostman.com/view/11225389/TzXzCH42>]

Develop Subscriber App

Start the integration of Subscriber API with Python in Jupyter Notebook : https://github.com/Hackveda/IoT/blob/main/Devanshu_IOTClient.py

Access your Certificates Here: <https://www.hackveda.in/one2one/certificates.php>