

SUMMER

SCHOOL 2019

<https://OpenIoT.in>

<https://iot.icfoss.org>

INTERNET OF THINGS

DAY 1

Basics of Internet and Protocols

Day 1 shall introduce participants to the fundamentals of Internet, its history and underlying technologies.

- 2 Hour Talk by an Expert.
- 2 Hour Networking Workshop
- 3 Hour Games and Team Building



OBJECTIVES

Day Goals

Immersive learning experience for participants to learn the core fundamentals of internet. The sessions shall also include group assignments to help participants understand the core ideas.

Key Points

- OSI Model
- Web Technologies
- IT, ICT to IoT Transition

OUTCOME

Deliverables

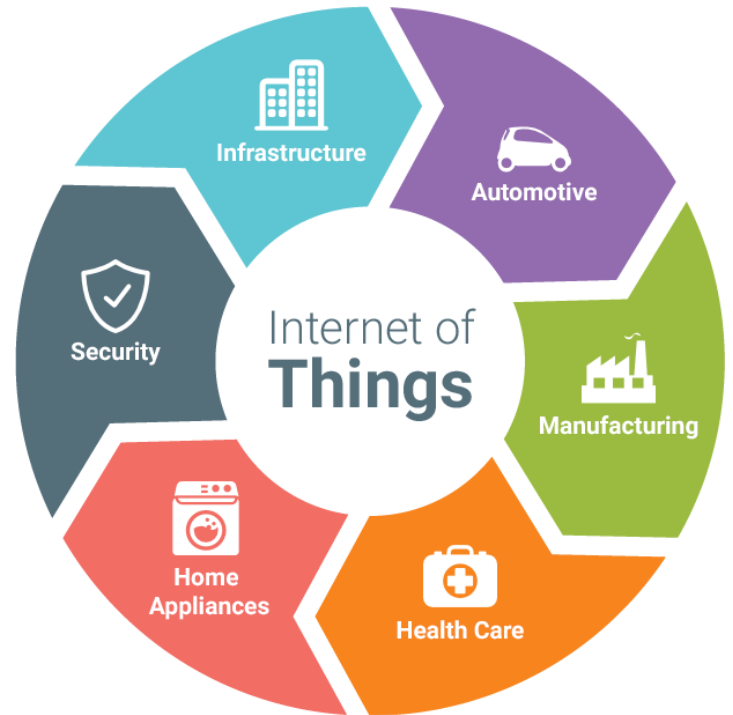
Ability to create, test and debug IP Network
Knowledge of OSI layer and standard Internet Protocols
Teaming Up / Get to know each other

DAY 2

Introduction to Internet of Things

Day 2 shall introduce participants to the fundamentals of Internet of Things, its applications, security risks and opportunities

- 2 Hour Talk by an Expert.
- 2 Hour Awareness Workshop/Talk
- 2 Hour Assignments
- 1 Hour Brainstorming Session



OBJECTIVES

Day Goals

An engaging experience for participants to learn the applications, technology and security risks associated with IoT. The sessions shall also include group assignments and workshops to help participants understand the core ideas.

Key Points

- Building Blocks of IoT
- Communication Models
- Risks and Security Practices

OUTCOME

Deliverables

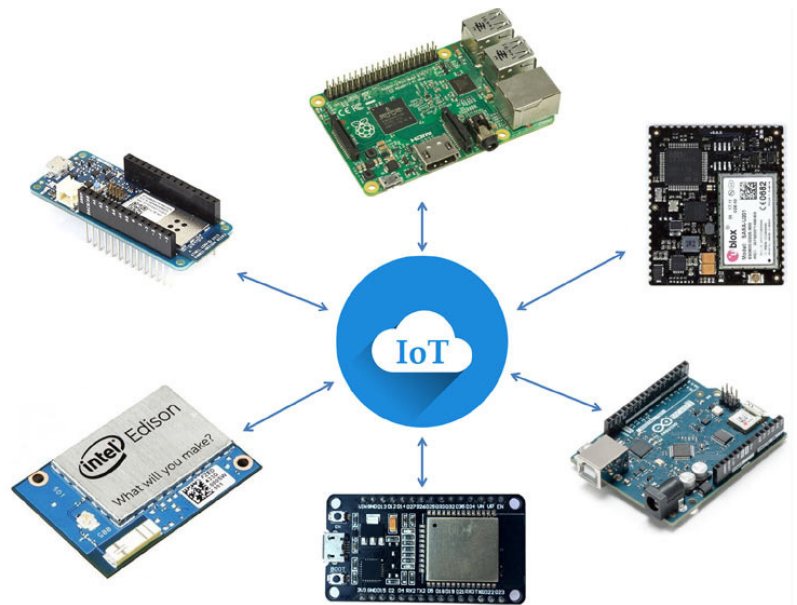
Ability to identify potential IoT use cases
Define Technology stack used in IoT

DAY 3

Hardware for IoT

Day 3 shall introduce participants to hardware prototyping for IoT

- 1 Hour Talk by an Expert.
- 3 Hour Generic Workshop on RPi
- 3 Hour Generic Workshop on Arduino



OBJECTIVES

Day Goals

Hands on experience for participants to create IoT applications using Single Board Computers and Controller Boards. The sessions shall mostly be based on group assignments and workshops. More practicals than theory, in summary.

Key Points

- Setting Up Raspberry Pi
- Setting up Arduino Environment
- Best practices for Open Source Projects

OUTCOME

Deliverables

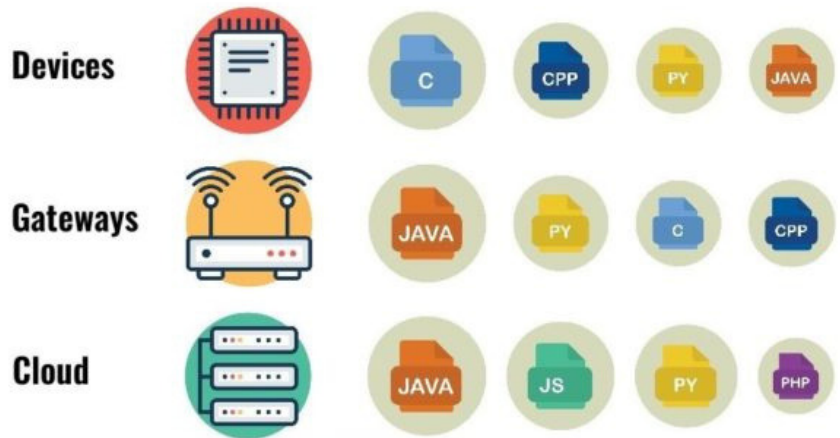
Ability to prototype using Arduino and Raspberry Pi
Ability to select the right hardware and software for Use Cases
Basic Programming Skills

DAY 4

Programming for IoT

Day 4 shall introduce participants to more of Python, Shell and Arduino (C) Programming

- 1 Hour Talk by an Expert.
- 1 Hour Shell Workshop
- 3 Hour Python Workshop
- 2 Hour Arduino Programming.



OBJECTIVES

Day Goals

Learning experience for participants, development of API's , basic applications, and Human Machine Interfaces associated with IoT. Programming samples are delivered during the workshop to bootstrap.

Key Points

- Standard programming methods for nodes and gateways
- Basic Dashboards and Hardware Software Interconnects
- Rules Engine, Actuation and Feedback

OUTCOME

Deliverables

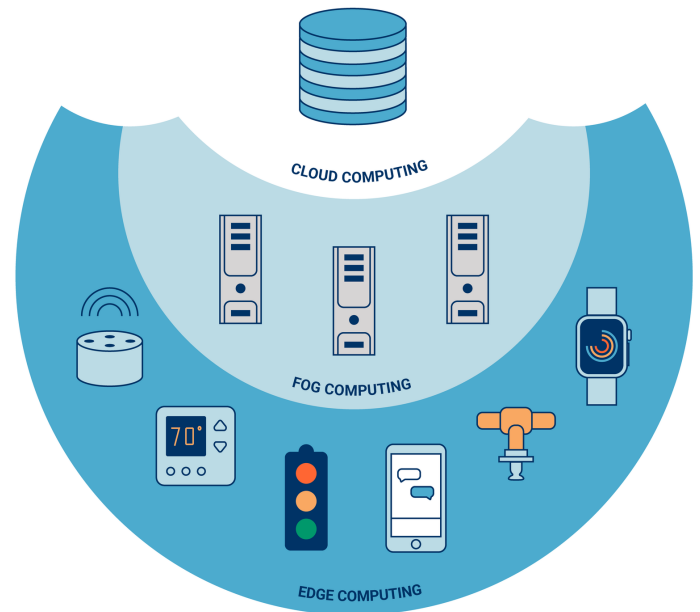
Ability to prototype an IoT solution (non-cloud)
Ability to define Software Architecture for Vertical Integration
Ability to program nodes and gateways for IoT

DAY 5

Computing for IoT

Day 5 shall introduce participants to the idea of Cloud and Fog/Edge Computing.

- 1 Hour Talk by an Expert.
- 2 Hour Workshop on Cloud Computing.
- 2 Hour Workshop on Dashboards
- 2 Hour Project Session on full stack development



OBJECTIVES

Day Goals

Industrial exposure for participants to develop applications based on distributed computing. The sessions shall also include group assignments and workshops to help participants understand the core ideas.

Key Points

- Fog/Edge Computing Models in Action
- Cloud IoT ; rules engine, dashboards and analytics
- Scalability and Deployability

OUTCOME

Deliverables

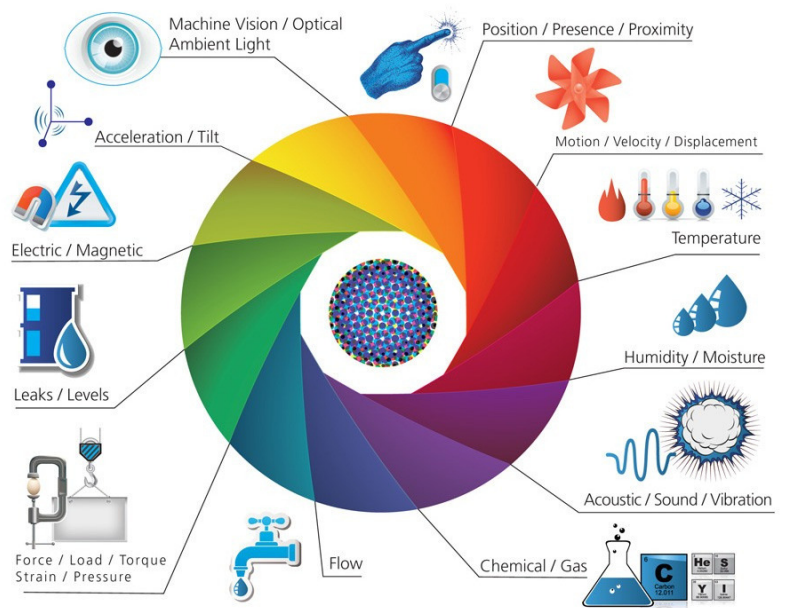
Ability to prototype an end-end Industrial Grade IoT solution
Design applications which are massively scalable and deployable

DAY 6

Sensors for IoT

Day 6 shall introduce participants to the world of Sensors.

- 1 Hour Talk by an Expert.
- 2 Hour Workshop on Interfaces
- 2 Hour Workshop on μ C Integration
- 2 Hour Workshop on System Integration



OBJECTIVES

Day Goals

An exciting day on exploring various transducers used for sensing real time information from environment. The sessions shall also include group assignments and workshops to help participants understand the core ideas.

Key Points

- ADC, PWM and DAC
- I2C, SPI, USART and CAN interfaces
- Design for Low Power Consumption

OUTCOME

Deliverables

Ability to identify sensor IoT use cases
Ability to integrate standard sensors to projects

DAY 7

Comms for IoT

Day 7 shall introduce participants to LoW Power Communication Technologies such as LoRaWAN, BTLE and NB IoT



- 2 Hour Talk by an Expert.
- 3 Hour Workshop on LoRaWAN
- 2 Hour Workshop on System Integration.
- 1 Hour Brainstorming Session

OBJECTIVES

Day Goals

Hands on experience for participants to learn LoRaWAN, System integration and Network architecture. The sessions shall also include group assignments and workshops to help participants understand the core ideas.

Key Points

- LoRaWAN Node Development
- LoRaWAN Network Architecture
- Communication Technologies Compared
- System Integration

OUTCOME

Deliverables

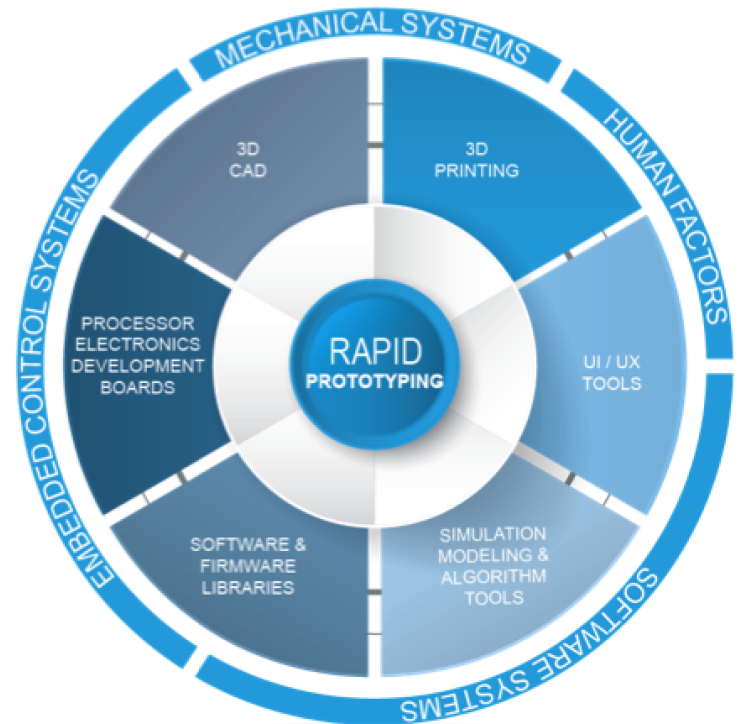
Ability to create IoT applications using LoRaWAN
Ability to create Ultra Low Power Nodes

DAY 8

Hardware Prototyping

Day 8 shall introduce participants to Rapid Prototyping using 3D Printers, CNC Milling and PCB Designing.

- 1 Hour Talk on Design for Manufacturing
- 2 Hour Workshop on CAD
- 2 Hour Workshop on PCB
- 2 Hour Workshop at Fab Lab



OBJECTIVES

Day Goals

A quick learning experience for participants to start working on 3D Printers and Milling Machines. The sessions shall also include group assignments and workshops to help participants understand the core ideas.

Key Points

- CAD Design Fundamentals
- 3D Printing using Ultimaker
- PCB Design using KiCAD

OUTCOME

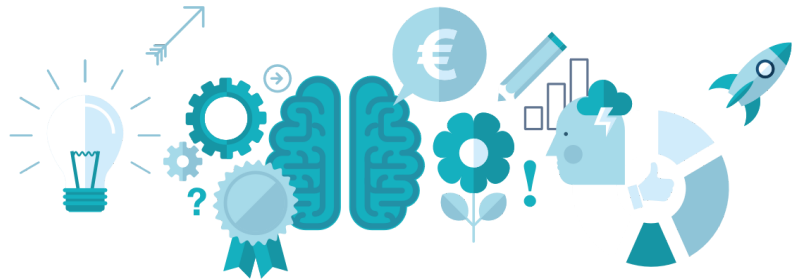
Deliverables

Ability to build PoC Hardware
Fundamental Know How on Design for Manufacturing

DAY 9-10

Projects Day

24 x 7 Makethon to Build IoT
Projects to solve Real World
Problems.



- All Day Event with mentor support
- Team Event with tight timelines
- Deliverables evaluated every Hour and Sprint adjusted in real time

AWARDS

Best Projects to be awarded with Certificates and Cash Prizes.