

# IoT with python and Raspberry Pi

## **PyDelhi 2016**

# Instructor



Dr. Sandeep Nagar

M.Sc. Physics (MSU, Vadodara) & PhD in Material Science  
(Department of Material Science and Engineering, KTH, Sweden)

contact e-mail: [sandeep.nagar@gmail.com](mailto:sandeep.nagar@gmail.com)

# Why would I do IoT?

- Its for everybody!
- Started just for fun
- Some serious experimentation
- Making scientific instruments
- Internet control gives multi-functionality to experiments

# Outline of workshop

- 1 Introduction to IoT and Raspberry Pi (30 Minutes)
  - Intro to IoT
  - Various parts
  - Installing OS
- 2 Accessing GPIO pins (30 minutes)
  - Writing to GPIO pins
  - Reading from GPIO pins
- 3 IoT with RPi (30 minutes)
  - Running RPi headless
  - Adding sensors
  - Interacting with data generated using IoT device

# Introduction to IoT

- IoT is a connecting **things** to internet
- Two types:
  - Device computes locally and interacts on internet
  - Device does not compute locally but interacts on internet
- Interaction on internet means:
  - Write and read data
  - Write and read code to control systems

# Intro to RPi

- Microcomputer
  - Credit card sized ( $20 \times 10$  cm)
  - Weight = 68 g
- Very cost effective
  - Presently available for INR 2,875 at amazon
- Low power consumption
  - We will use mobile phone charger
- Remote access over internet
  - We will use a LAN cable for connectivity
- Runs Linux
  - Raspbian is a version of Debian optimized for RPi

# Powerful IoT platform

- Broadcom 900 MHz BCM2836 ARMv7 Quad Core Processor SoC
- Broadcom VideoCore IV GPU
- 1 GB RAM
- Expanded 40-pin GPIO Header
- 4 x USB2.0 Ports with up to 1.2A output
- 4 pole Stereo output and Composite video port
- Full size HDMI
- CSI camera port for connecting the Raspberry Pi camera
- DSI display port for connecting the Raspberry Pi touch screen display
- Micro SD port for loading your operating system and storing data
- Micro USB power source

Ref: [https:](https://www.raspberrypi.org/products/raspberry-pi-2-model-b/)

[//www.raspberrypi.org/products/raspberry-pi-2-model-b/](https://www.raspberrypi.org/products/raspberry-pi-2-model-b/)

## RPi

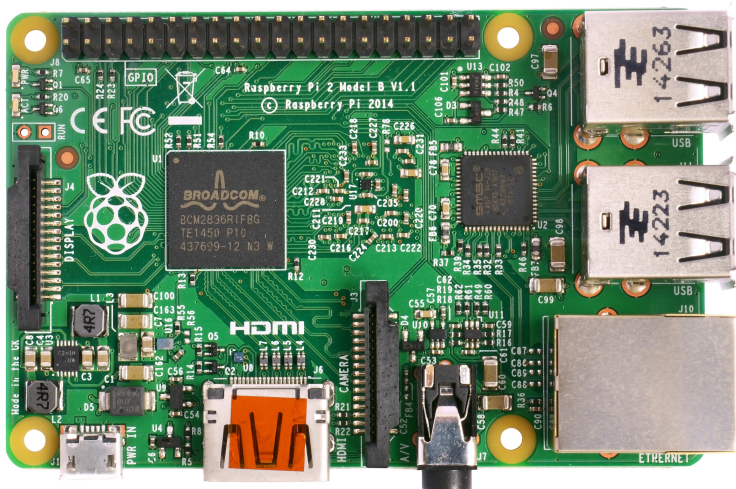


Figure: Top portion of Raspberry Pi 2 Model B



# OS

- OS is installed on a micro SD card
- Raspbian is optimized OS for RPi
- Available at <https://www.raspbian.org/>
- Micro SD cards with pre-installed OS are also available
- Installation
  - Format the card
  - Install NOOBS
  - Choose Raspbian
  - Install