IoT with python and Raspberry Pi

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Instructor

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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 (20×10 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://www.raspberrypi.org/products/raspberry-pi-2-model-b/`

RPi

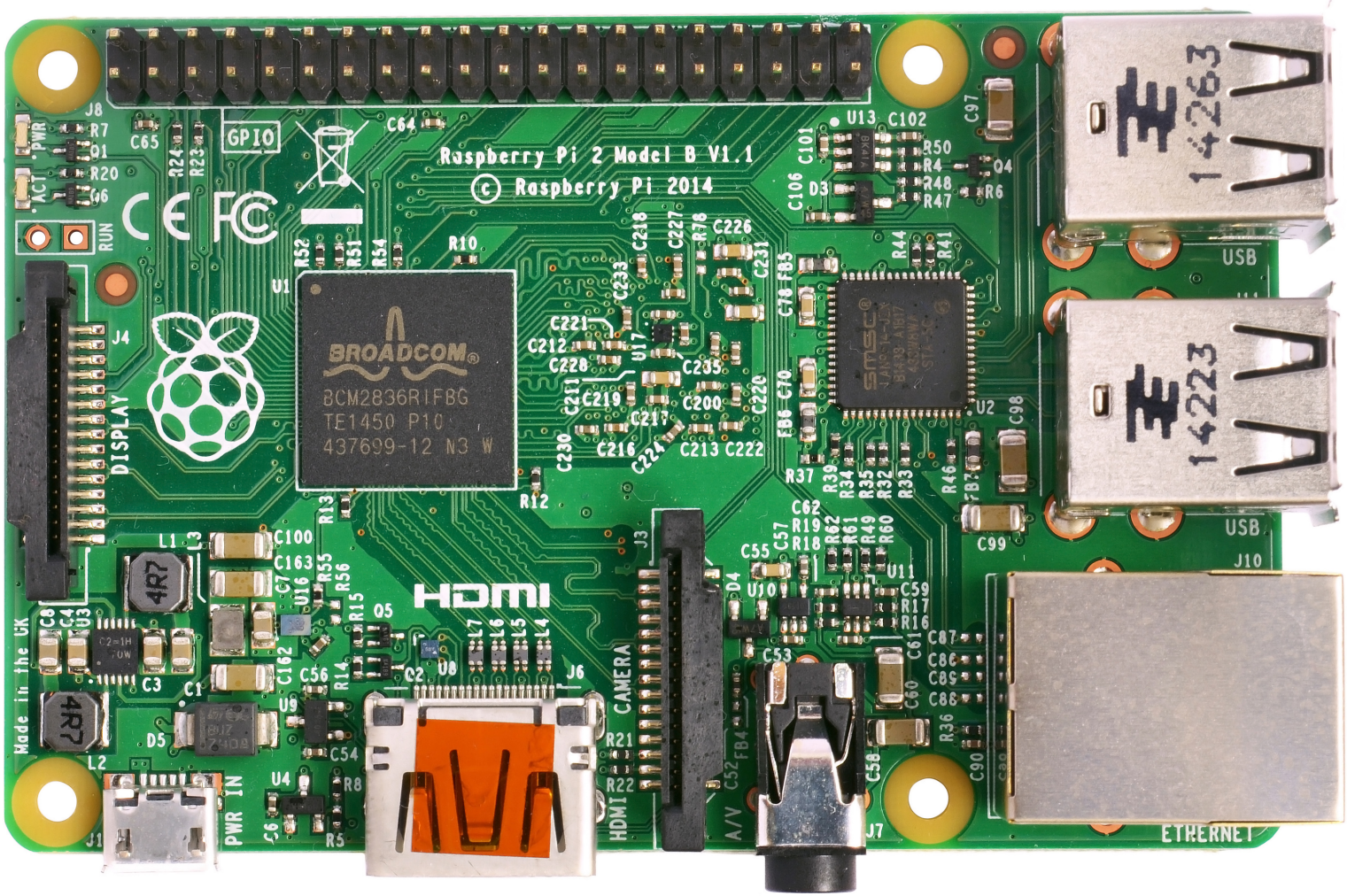

Figure: Top portion of Raspberry Pi 2 Model B

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