



Raspberry Pi

Beginner session

By

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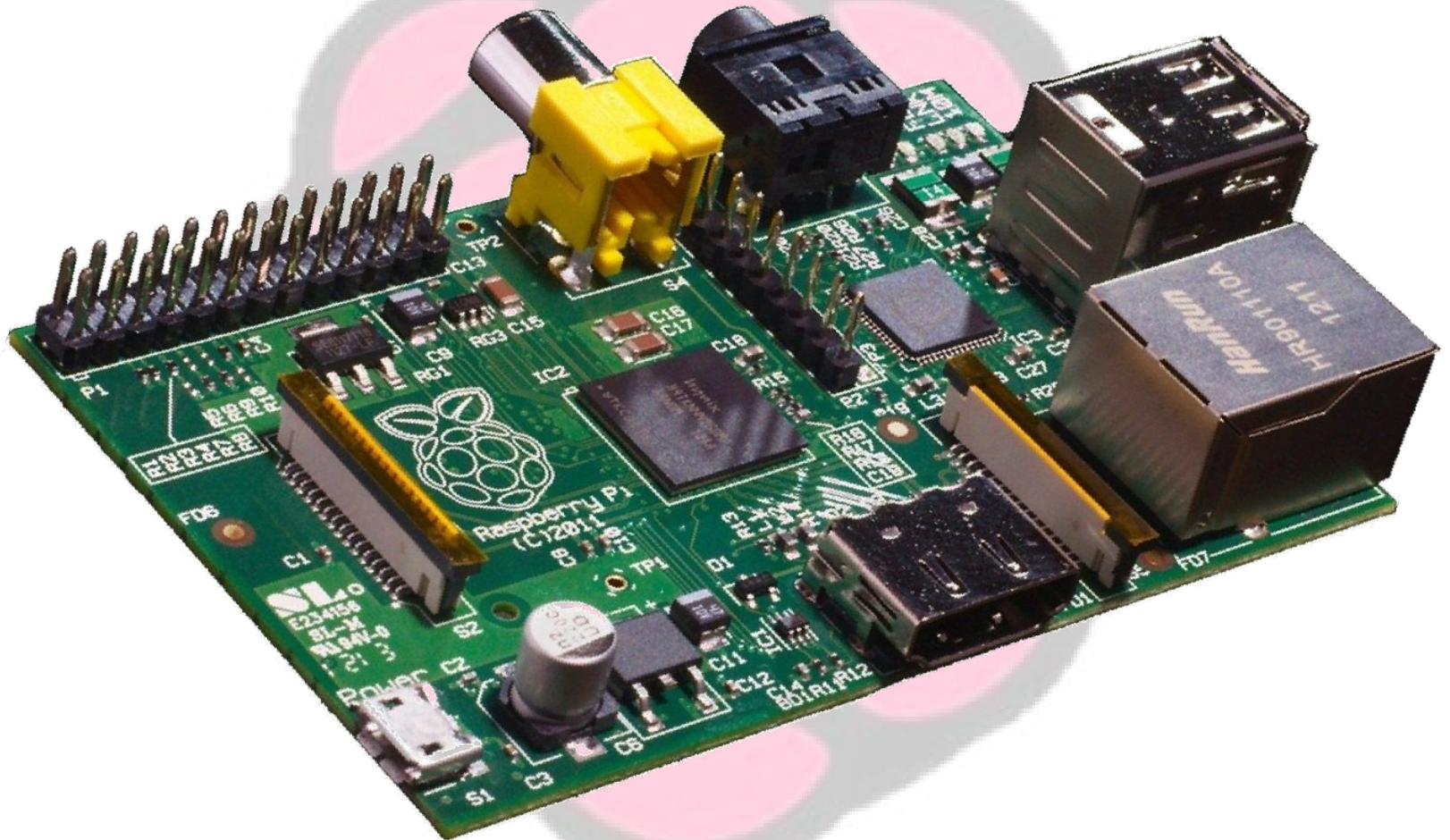
The background of the slide features a large, stylized Raspberry Pi logo. It consists of a dark grey outline of a raspberry with two light green leaves at the top and several pink oval shapes representing the raspberries on the main body. The word "Agenda" is centered over the top part of the logo.

Agenda

- What is Raspberry Pi
- Features
- Architecture
- Why it is needed
- What can we run on it
- GPIO
- How to set it up.
- Minimal setup cost and tools requirements.
- Practical Usage
- Advance Session

What is Raspberry Pi

- ▮ A credit-card-sized single-board computer



Features

Developer :Raspberry Pi Foundation

Type :Single-board computer

Operating system :

RISC OS, FreeBSD, NetBSD, Plan 9 Linux (Raspbian, Debian GNU/Linux, Fedora, and Arch Linux ARM)

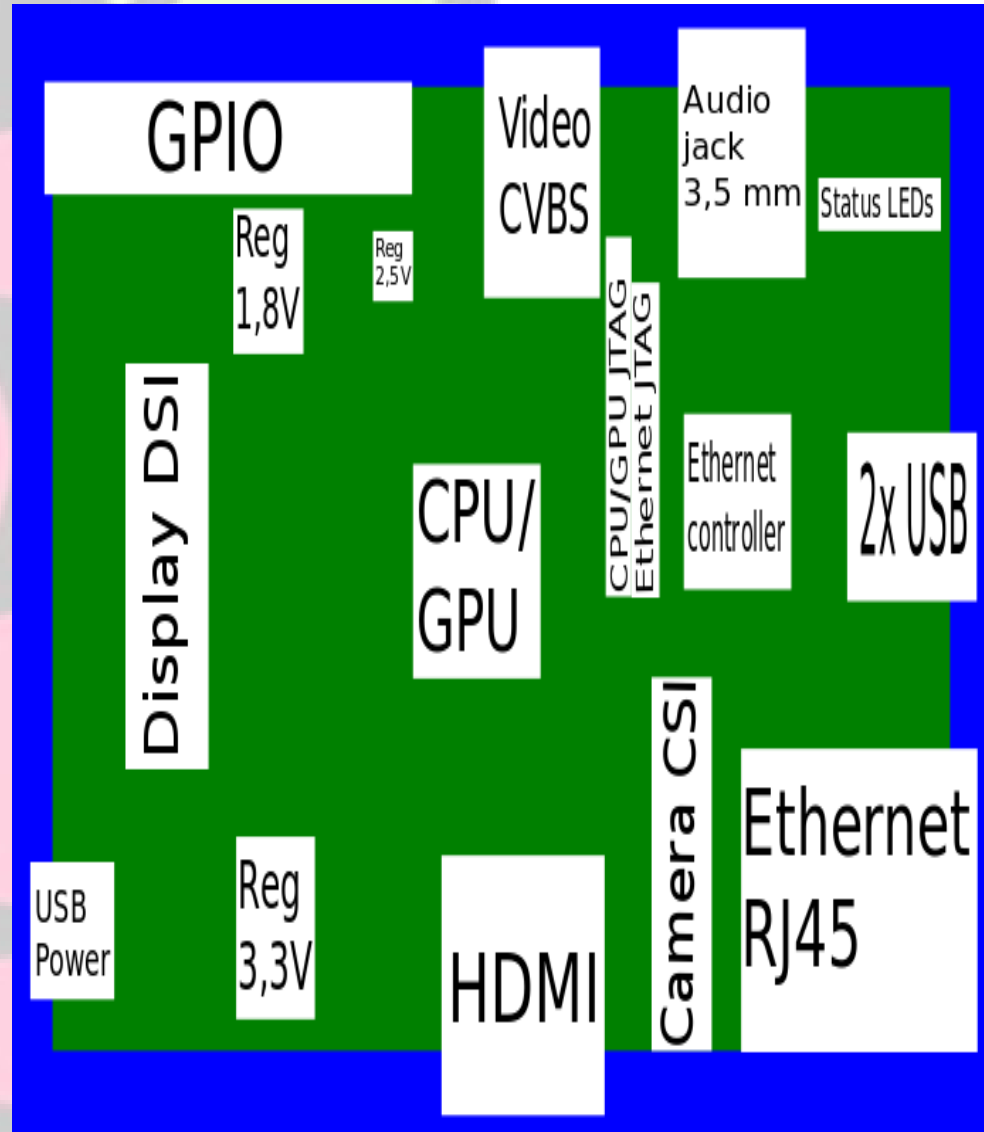
Power :2.5 W (model A), 3.5 W (model B)

CPU: ARM1176JZF-S (armv6k) 700 MHz

Storage capacity :SD card slot (SD or SDHC card)

Memory :256 MByte (Model A)
512 MByte (Model B rev 2)
256 MByte (Model B rev 1)

Graphics: Broadcom VideoCore



Why is it needed



- Raspberry Pi was originally intended for underprivileged students as a means to introduce them to computing in lowest cost possible.
- However Being an *Awesome Product* that it is, Its now used across the globe as a mini computer which can be placed anywhere you want.

Practical Usage



Computer: To power a computer, To build more portable and all-in-one computer running Raspberry Pi

Home Automation: Internet-connected Raspberry Pi boards can be used to control the lights via a mobile device and how to automate your house

Khan Academy Lite : A lite version of whole khan academy video and tutorial in a Raspberry.

Bicycle odometer : Front mounted Odometer which projects the current speed of bicycle on the road

Animated picture frame : To hook up his Raspberry Pi to an LCD sitting behind a fancy picture and cycling through random images throughout the day. pulling artwork from art website DeviantArt

More Usage

- **Air-quality device:** [PA Consulting Group](#) showed off a unique air quality and weather surveillance device, which could take the data collected by its air quality sensors and upload it directly on the Internet, where information about the environment's temperature, humidity and contents could be viewed on a smartphone or tablet.
- **Automated pill dispenser:** [PA Consulting Group](#) created an automated pill dispenser for elderly or forgetful patients. By hooking up a Raspberry Pi to a pill dispenser, doctors can remotely manage the administration of drugs through their own protected websites. If the patient doesn't take their dosage at the appropriate time, an alert is automatically messaged to a family member or neighbour (set up in advance) to check on them.
- **BeetBox:** To make musical fruits -- well, root vegetables, To create a "simple instrument that allows users to play drum beats by touching actual beets," so a musical apparatus out of a wooden shelf to hold the Raspberry Pi, a capacitive touch sensor from SparkFun, a salvaged speaker and six beets.



How I am using it

- Automated Song Broadcast (specific timing)
- External Access point (ssh opened to world)
- News Reader : tinytinyRSS feed

2b Connect display

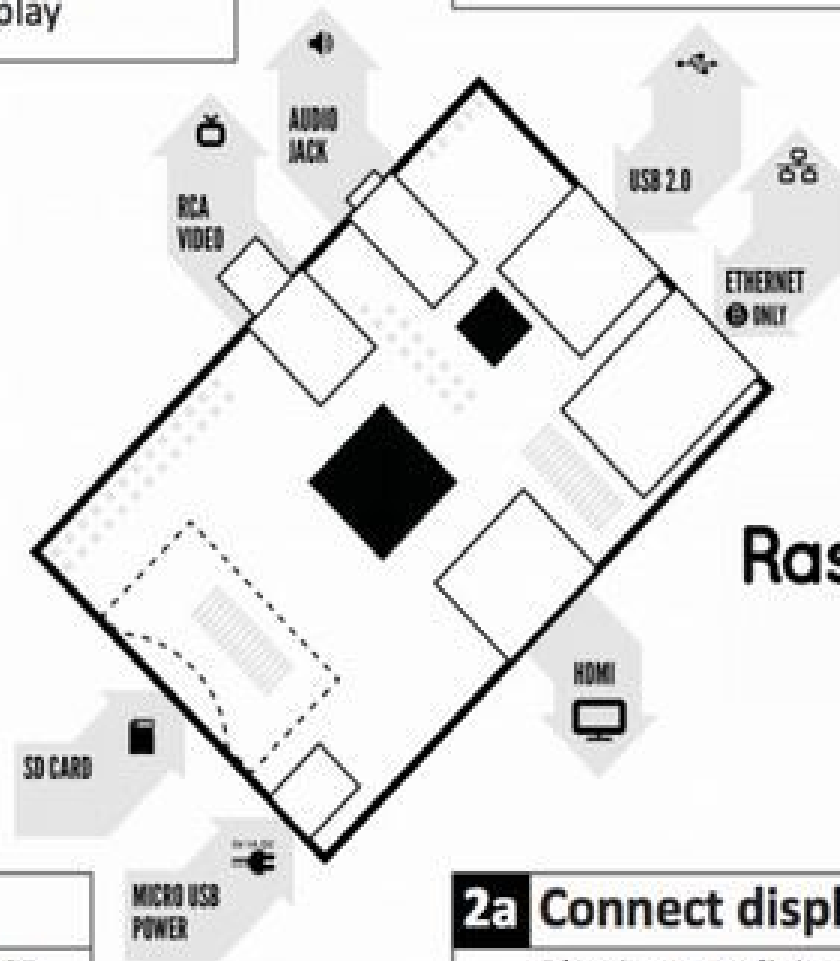
If *not* using HDMI, plug in your analogue TV or display

3 Connect input

Plug in a USB keyboard and mouse

4 Connect network

Connect to your wired network [optional]



1 Insert SD card

See page 3 for how to prepare the SD card

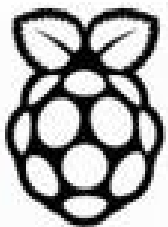
5 Power up

Plug in the micro USB power supply

2a Connect display

Plug in your digital TV or monitor

Raspberry Pi
Quick start



SD CARD and OS



- Commonly used OS on Raspberry Pi
- Raspbian : Debian Raspberrypi edition
 - Best out there
 - Multipurpose
 - Gives you base GUI as LXDE
 - Whole Debian arm repository available
- RaspBMC : XBMC for Raspberry pi
 - Best media player preconfigured
 - Password is hardcoded can't change
 - Can't use apt-get
- Kali Linux : Backtrack Reborn as a Pi Edition
 - All Pentest tools precompiled.
 - Require larger SD-Card
- Besides this we can also run RiscOS, ArchLinux, Android 2.3.3 and some other arm compatible OS.
- -

Minimal Setup

- Raspberry Pi
 - Inside a case if possible. (costs around 250 or so)
- Power Supply
 - Standard Android Phone / tablet chargers make sure then output is $5\text{ V} \geq 1\text{ A}$
 - If your Raspberry pi is behaving improperly first reason could be Power Supply
 - Battery are known to work well till they are close to exhaustion then they may cause trouble.
- RJ45 Cable
 - This can be connected to your wifi router or switch or can be directly connected to your PC (if its bought after 2006, and support port switching) (otherwise use Cross Cables)

Minimal setup

- Load OS in SD-CARD
 - Download an OS from online Source (.img file)
 - Using dd or windisk imager you need to Push the image to SDCARD.
 - Once written your Memory card might not get detected on Windows but will work seamlessly on linux as
 - It now has multiple partitions.
 - It has ext2/3 formatting done.
- Setup SSH server
 - Make Sure Your chosen distribution has ssh enabled.
 - 1): search google and ask others.
 - 2) Mount your sdcard image and check for yourself.
 - Mount followed by chroot should do the trick.
 - Windows users can use a Linux VM to do the task
- Setup LAN connectivity
 - I suggest giving it a fixed IP Address
 - If you want you can go ahead and setup a miniwifi card and make it workable on wifi too.

GPIO

- General Purpose Input/Output is a generic pin on a chip whose behavior can be controlled (programmed) through software.
- The Raspberry Pi allows peripherals and expansion boards to access the CPU by exposing the inputs and outputs.
- GPIO voltage levels are 3.3 V and are not 5 V tolerant. **There is no over-voltage protection on the board** - the intention is that people interested in serious interfacing will use an external board with buffers, level conversion and analog I/O rather than soldering directly onto the main board.

WiringPi GPIO Pins





Advance session

- What I have in mind.
 - Controlling LED with GPIO Pin.
 - Displaying data on LCD interfacing
 - Playing Games interfacing controller.
- What you guys think we should be exploring



Thank You