What the heck is a Raspberry Pi?

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Agenda

- Background
- Hardware
- Getting started
- What can you do with it?
- Some demos
- Giveaway!

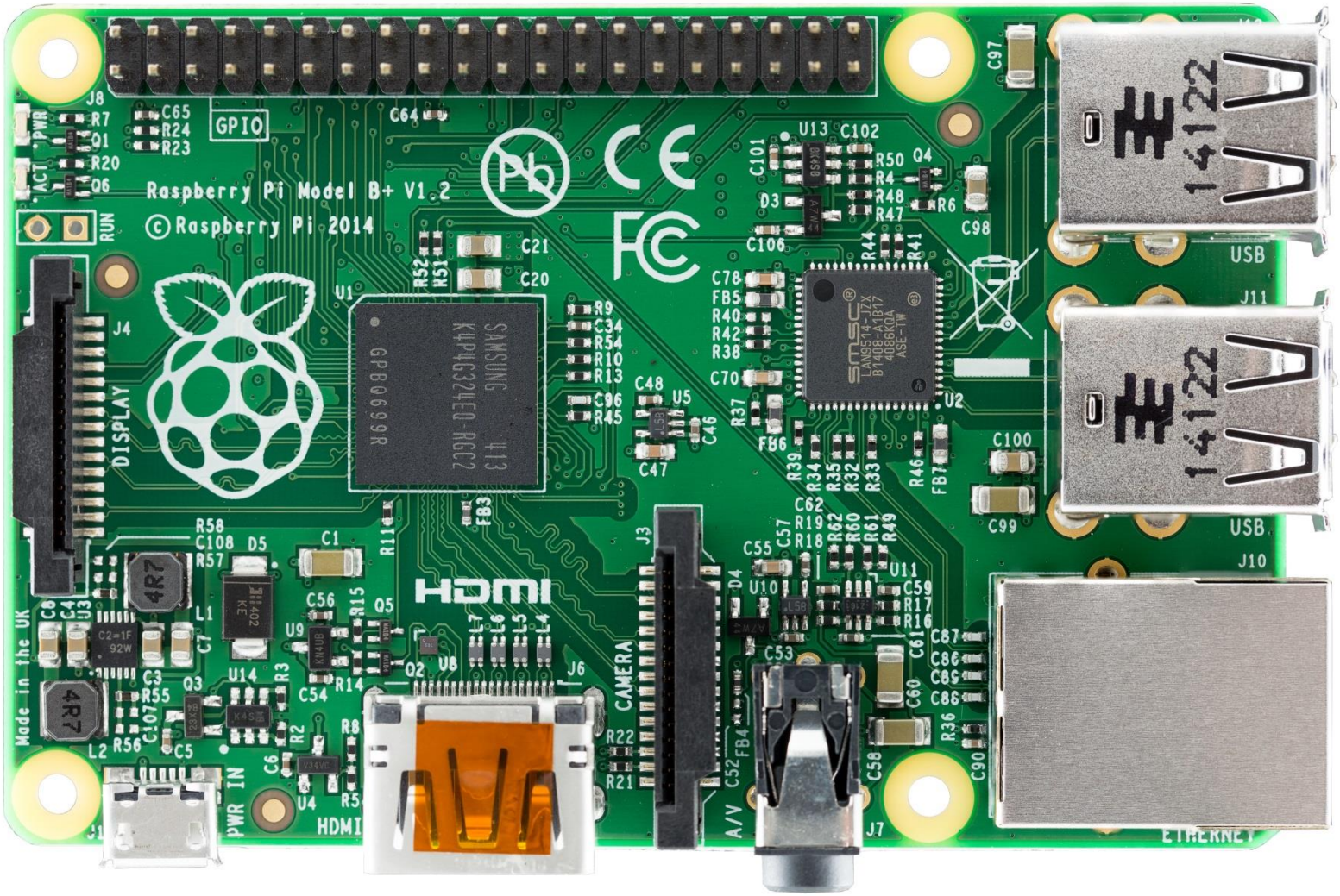
Overview

- Credit-card sized computer
- Created to promote basic computer science in schools, inspired by Acorn BBC Micro (c. 1981)
- Low cost ($20-35)
- Designed by Eben Upton, a Broadcom employee
- Managed by Raspberry Pi Foundation - not for profit
- First released Feb 2012
- Extremely popular (current sales of 3.8 million in < 3 years)

Hardware

- Broadcom BCM2835 SoC
  - ARM1176 700MHz 32-bit CPU
  - VideoCore iV GPU
  - 256-512MB RAM
- Optional 10/100 ethernet port
- 1-4 USB 2.0 ports
- SD / microSD slot
- HDMI and/or composite video out
- Analogue audio out, HDMI out, I2S in/out
- GPIO pins including: UART, I2S, I2C, SPI, power
- MIPI camera connector

Hardware



Hardware

- Comparison
  - CPU ~ 300MHz Pentium II (1997-99 vintage)
  - GPU ~ 2001 XBox
- Models
  - Model A+ - 256MB RAM, 1 USB, 200mA - $23
  - Model B+ - 512MB RAM, 4 USB, 1 10.100 ethernet, 600mA, more GPIO - $38
  - Model A - obsolete version of A
  - Model B - obsolete version of B
  - Compute module - less dedicated I/O, more GPIO, SO-DIMM format

What does it run?

- Linux:
  - Raspbian (Debian), Pidora (Fedora), Arch, Gentoo, openSUSE
- Other OSs:
  - RISC OS, FreeBSD, NetBSD, Plan 9, Inferno
- Application-specific:
  - OpenWrt, Xbian, XBMC, Instant WebKiosk
- Not Windows ☹
- Applications:
  - Mathematica, Minecraft

- Linux development tools
  - gcc compiler (C, C++)
  - Python, perl
  - Scratch
  - of course you can download and install many more

Getting started

- What you typically need:
  - USB keyboard + mouse
  - Monitor with HDMI video in
  - 5V power supply via micro USB
  - Network connection (ethernet or wifi dongle)
  - micro SD card with bootable OS (or install image)

- Typical install image is "NOOBS"
  - contains install images for Arch, Pidora (Fedora), Raspbian (Debian), XBMC
  - you can choose which image[s] to install
  - Takes around 20 minutes
  - System runs entirely from the SD card

Installation process

- Initial install process
  - insert SD card and apply power
  - choose install OS[s]
  - reboot
  - set up some initial config (keyboard, hostname, locale, sshd server etc.)
  - reboot
  - You're done
- There are a *huge* number of resources on the Internet to get you started

Now what?

- What can you do with it?
  - Learn some Linux sysadmin
  - Use it as a low-power network server (e.g. DHCP, DNS, NTP, print server, ...)
  - Run a dedicated application on it (e.g. kiosk, XBMC media centre, security camera)
  - Use it as an experimental Linux platform
  - Home automation
  - Programmable camera
  - Hook it up to some hardware to make it more widely accessible
  - Christmas light controller
  - Robot controller
  - Add extra HAT boards on to it
  - Build a radio-astronomy interferometer

Fingers crossed…

- Demos
  - Sensor network receiver
  - Smart still / video camera
  - Software-defined radio receiver