

**RASPBERRY PI**

# RASPBERRY PI

## Outline

- Introduction
- CanaKIT
- Project Ideas
- Deer Deterrent
- Conclusions

# RASPBERRY PI

## Introduction

- RPi

- A credit card sized computer for \$35
- Free Linux OS
- Power from USB phone charger
- USB keyboard and mouse ports
- HDMI video port
- WiFi and Bluetooth
- Tailored for education/homebrew/lab environments
- <https://www.raspberrypi.org/>
- <https://www.raspberrypi.org/documentation/>

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## Introduction

- Specs

- A 1.2GHz 64-bit quad-core ARMv8 CPU
- 802.11n Wireless LAN
- Bluetooth 4.1
- Bluetooth Low Energy (BLE)
- 4 USB ports
- 40 GPIO pins
- Full HDMI port
- Ethernet port
- Combined 3.5mm audio jack and composite video
- Camera interface (CSI)
- Display interface (DSI)
- Micro SD card slot (now push-pull rather than push-push)
- VideoCore IV 3D graphics core
- <https://www.raspberrypi.org/documentation/hardware/raspberrypi/README.md>

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## Introduction

- Raspian Linux
  - Free linux distribution for RP
  - Based on Debian linux, modified for HW
  - 35,000 Debian applications
  - Add/Remove SW and APT
  - <http://www.raspbian.org/>

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## CanaKIT



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## Canakit

- <http://www.canakit.com/raspberry-pi-3-starter-kit.html>
  - Raspberry Pi 3 (RPi3) Model B Quad-Core 1.2 GHz 1 GB RAM
  - On-board WiFi and Bluetooth Connectivity
  - 32 GB MicroSD Card (Class 10) - Raspberry Pi Recommended MicroSD Card with NOOBS
  - Canakit 2.5A Micro USB Power Supply with Noise Filter (UL Listed) specially designed for the Raspberry Pi 3 (5-foot cable)
  - High Quality Raspberry Pi 3 Case
  - Premium Quality HDMI Cable with CEC support (6-foot cable)
  - 2 x Heat Sinks
  - GPIO Quick Reference Card
  - Canakit Full Color Quick-Start Guide

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## CanaKIT

- Assembly process:
  - Insert micro-SD chip with SW on it
  - Place RP board on case bottom
  - Fit main case over RP board
  - Attach case top
  - Attach HDMI, keyboard, mouse, power last



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## Project Ideas

- Weather station
- Amazon Echo/Alexa integration
- Manage a fleet of drones with Alexa
- Pen testing toolkit
- Home Automation Lab (HAL)
- Sources
  - <https://www.hackster.io/raspberry-pi/projects>
  - <https://www.hackster.io/fileark/alexapi-mqtt-smart-hub-984dcf>
  - <https://www.hackster.io/hobbs-squad/home-automation-laboratory-hal-part-1-overview-55d9f5>
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## Deer Deterrent

- Problem

- Sun City deer eat flowering shrubs
- Deterrents include: garlic, sprinklers, soap, hair, egg, sour milk, animal urine...
- Deer learn and adapt (2-3 weeks?)
- Deterrents fail over time and need changing
- This can be costly and time consuming

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## Deer Deterrent

- Solution requirements
  - Detect deer
  - Deter deer
  - Rotate deterrent method
  - Document by recording pictures
  - Automated
  - Inexpensive

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## Deer Deterrent

- Raspberry Pi based device
  - Motion sensors
  - Alarm circuits?
    - Sound/speaker
    - Lights
    - Motion?
  - Random selection
  - Camera (save images)

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## Deer Deterrent

- Components needed

- RP board (HAVE)
- EMY 5 X HC-SR501 Adjust Ir Pyroelectric Infrared PIR Motion Sensor Detector Modules (\$11)
- Raspberry Pi NoIR Camera Module V2 - 8MP 1080P30 (\$30)
- Smraza 120pcs Multicolored Jumper Wire 40pin Male to Female, 40pin Male to Male, 40pin Female to Female Breadboard Jumper Wires Ribbon Cables Kit for breadboard connections S02 (\$8)
- Latest Raspberry Pi Camera Case for V2 8 Megapixel (\$9)
- LED Speakers, Zhicity Outdoors Bluetooth Speakers Dynamic Visual Modes for Party

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## Deer Deterrent

- Working issues
  - Power supply
  - Programming
  - Remote access (Web server/SSH)
  - Data storage and DL

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## Conclusions

- Cheap, easy, powerful development framework
- Rich support environment
- Unlimited potential
- Sources
  - <https://www.raspberrypi.org/>
  - <http://www.raspbian.org/>
  - <http://www.canakit.com/raspberry-pi-3-starter-kit.html>
  - <https://www.hackster.io/raspberry-pi/projects>
- Updates on this project:
  - <http://www.hackingtheuniverse.com/>