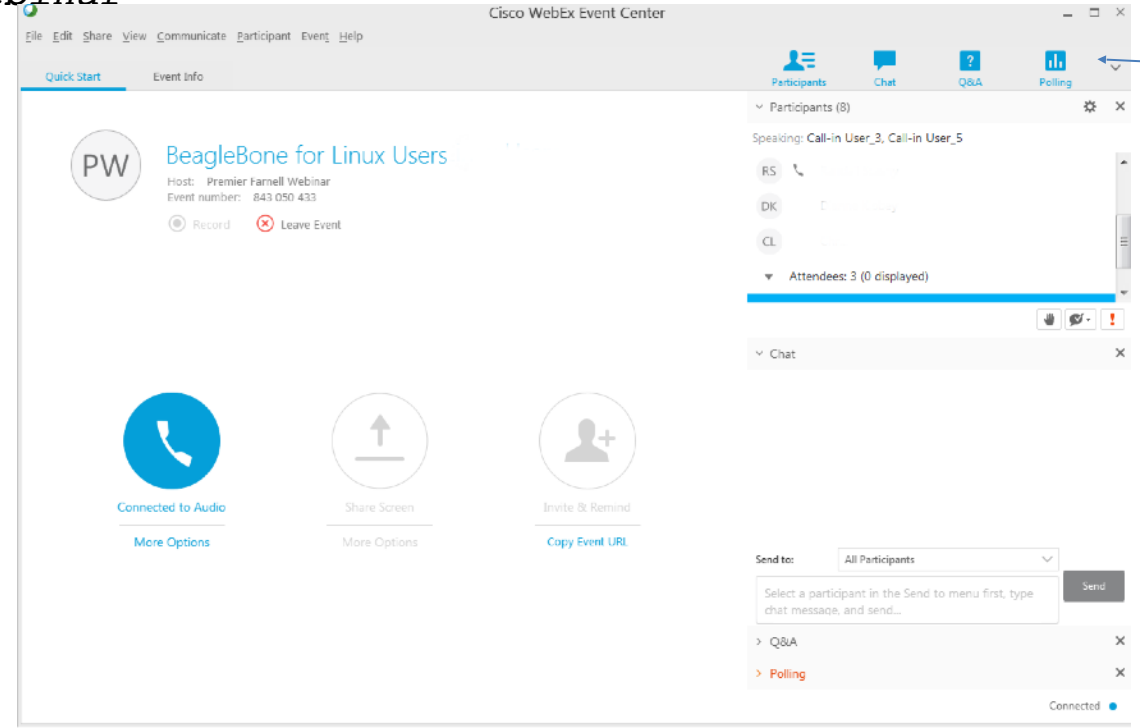
Welcome to “BeagleBone in The Classroom”

This webinar will begin on the hour.

- We invite you to join in the Chat, Q&A and Polls during this live webinar -



Join the Chat, Q&A and Polls Here

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Training BeagleBoards

with Jason Kridner

Webinar 06 -
BeagleBone in the Classroom

Jason Kridner

Co-founder and board member at
BeagleBoard.org Foundation

Your DEVELOPMENT DISTRIBUTOR

Webinar Series

BeagleBone Webinar Series

Date	Time (UTC)	Topic
~~10th May~~	~~11:00 (CT) / 17:00 (UK)~~	~~Introduction to BeagleBoard.org and BeagleBone~~
~~24th May~~	~~11:00 (CT) / 17:00 (UK)~~	~~BeagleBone for Linux Users~~
~~6th June~~	~~11:00 (CT) / 17:00 (UK)~~	~~BeagleBone for Embedded Developers~~
~~21th June~~	~~11:00 (CT) / 17:00 (UK)~~	~~BeagleBone for Web Developers~~
~~9th August~~	~~11:00 (CT) / 17:00 (UK)~~	~~BeagleBone Blue for Robotics~~
23rd August	11:00 (CT) / 17:00 (UK)	BeagleBone in the Classroom

Today's Topics

- Topics
  - BeagleBoard.org Foundation is a non-profit
  - What is PocketBeagle and how is it special?
  - Why use PocketBeagle in STEM education?
  - How to start teaching with PocketBeagle
  - How to introduce Physical Computing
  - Example Lesson Plans
  - Call for PocketBeagles-for-your-classroom participation
  - University-level interprocessor training with PRUs
- Q&A
  - Questions from chat

BeagleBoard.org Foundation is a non-profit

beagleboard.org®

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- US-based (Michigan) 501c3 tax-exempt non-profit
  - Will accept donations
- Educational mission - Kindergarten to Kickstarter
  - Design and use of open source hardware and software
  - Foster collaboration within our community

What is PocketBeagle and how is it special?

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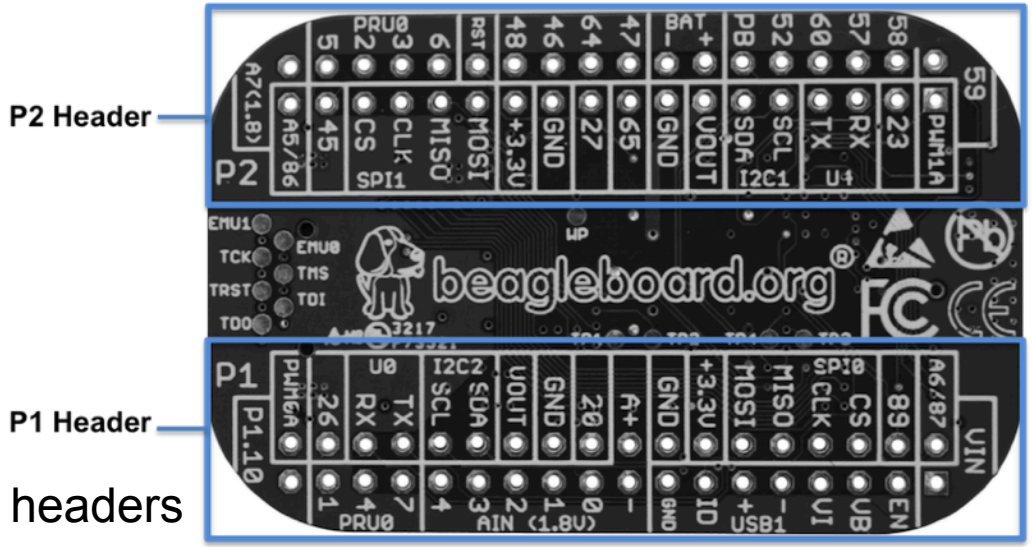

$25 1GHz tiny Linux computer
USB powered with host/client and on headers
Lots of expansion
Same processor as BeagleBone Black including PRUs

OSHW
US0083

Why use PocketBeagle in STEM education?

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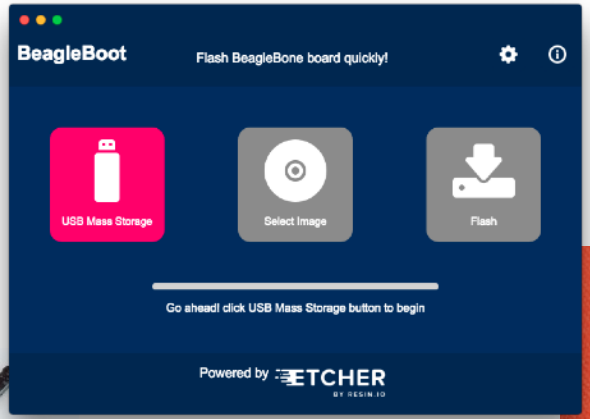
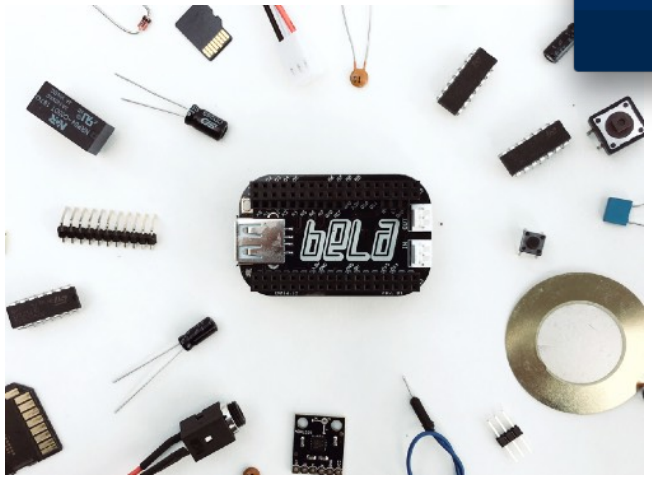
git

Programming is a human endeavor where we learn from history

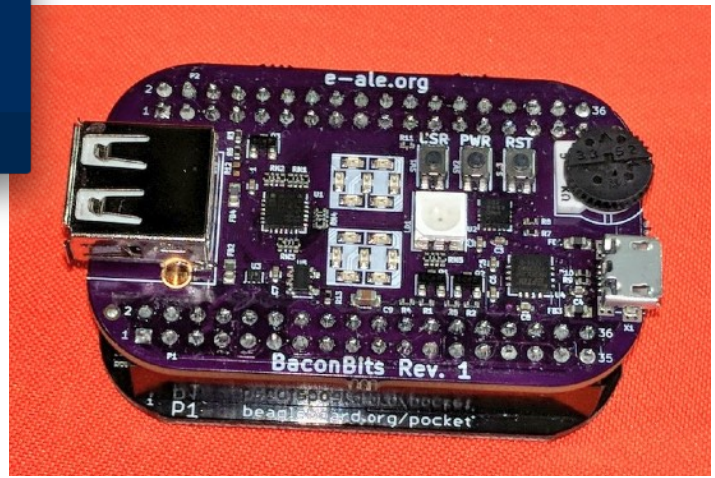


Predictable and low-cost



Unique real-time capabilities

Collaboration, not cut-and-paste



Same tools as the pros

How to start teaching with PocketBeagle

1) Boot the board

bbb.io/pb-start

How to start teaching with PocketBeagle

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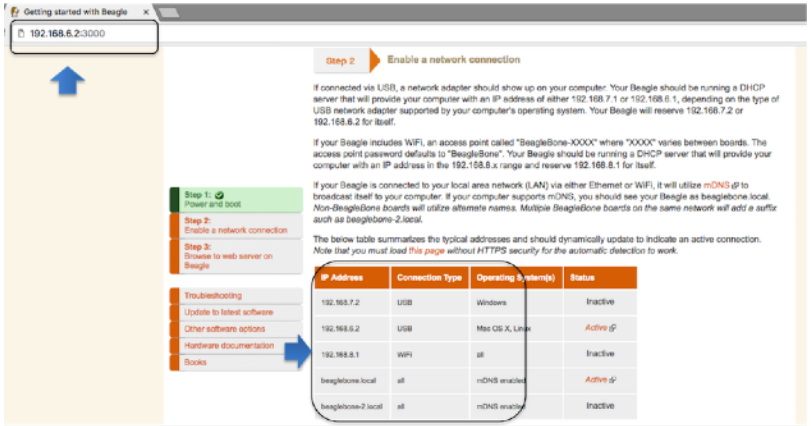
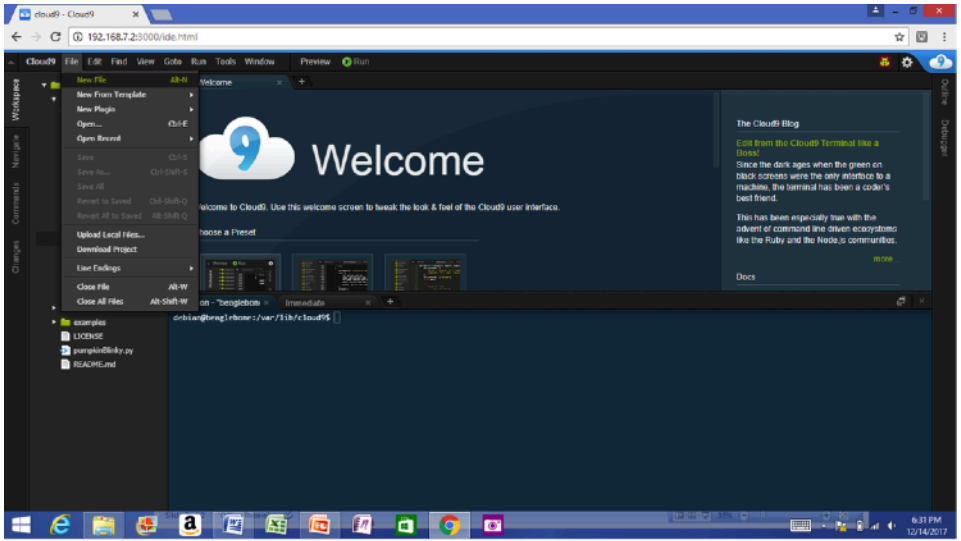
2) Get to the editor and command line





http://192.168.7.2

linuxcommand.org

How to start teaching with PocketBeagle

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3) Blink an LED

```
1. var b = require('bonescript');
2. var state = b.LOW;
3. b.pinMode("USR3", b.OUTPUT);
4. setInterval(toggle, 250);  // toggle 4 times a second, every 250ms
5. function toggle() {
6.     if(state == b.LOW) state = b.HIGH;
7.     else state = b.LOW;
8.     b.digitalWrite("USR3", state);
9. }
```

How to start teaching with PocketBeagle

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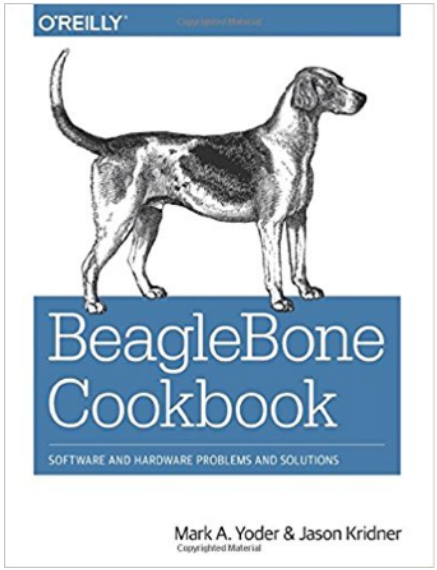
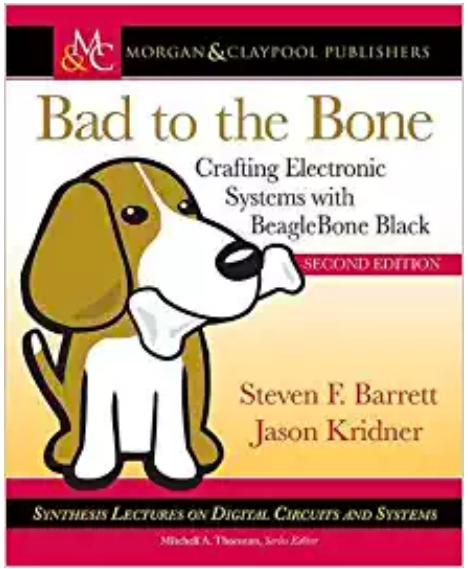
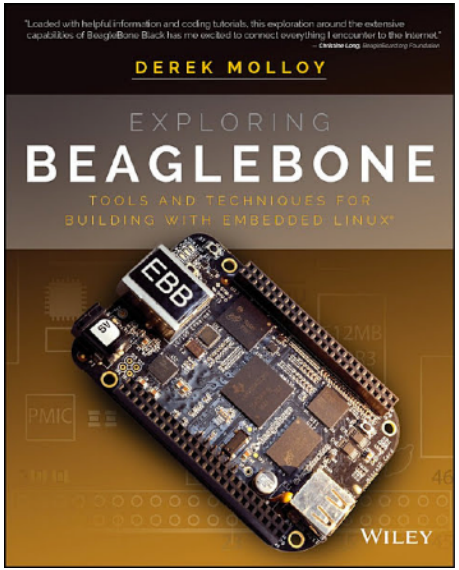
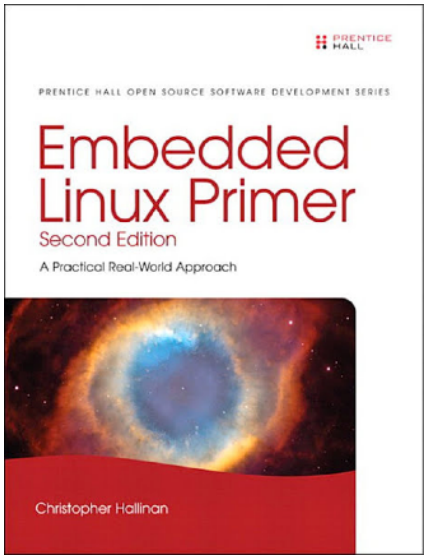
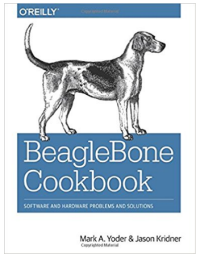
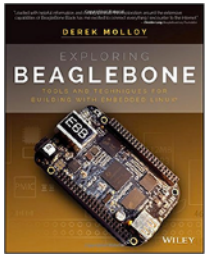
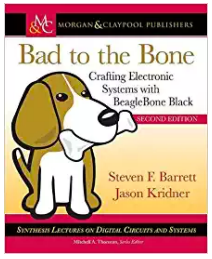
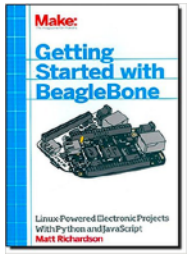
4) Explore some books





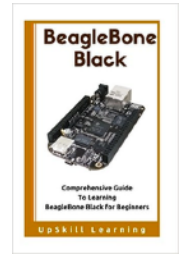





BeagleBone Robotic Projects
Second Edition
Packt

O'REILLY
BeagleBone Cookbook
Mark A. Yoder & Jason Kridner

DEREK MOLLOY
EXPLORING
BEAGLEBONE
WILEY

MORGAN & CLAYPOOL PUBLISHERS
Bad to the Bone
Crafting Electronic Systems with BeagleBone Black
SECOND EDITION
Steven F. Barrett
Jason Kridner
SYNTHESIS LECTURES ON DIGITAL CIRCUITS AND SYSTEMS

Make:
Getting Started with BeagleBone
Linux Powered Electronic Projects with Python and JavaScript
Matt Richardson

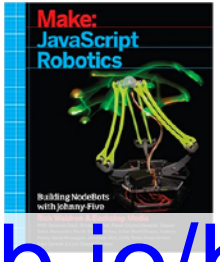
BeagleBone
FOR DUMMIES
A Wiley Brand
Learn to:
Rik Smiers
Luis Peñalvo

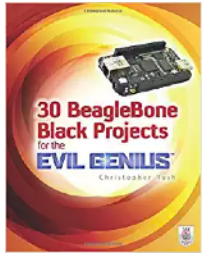
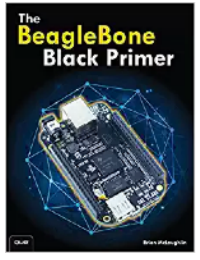
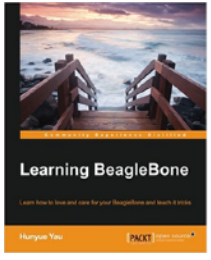
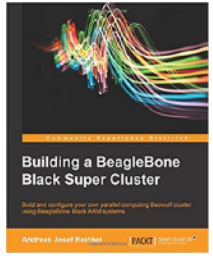
Programming the BeagleBone Black
Getting Started with JavaScript and BoneScript
Simon Monk

RASPBERRY PI 3
AND
BEAGLEBONE BLACK
FOR ENGINEERS
Pocket Reference For Beginners
UPSKILL LEARNING

BeagleBone Black
Comprehensive Guide To Learning BeagleBone Black For Beginners
Upskill Learning

Learning BeagleBone Python Programming
Alexander Hiam
PACKT

BeagleBone Home Automation
Juha Lumme
PACKT

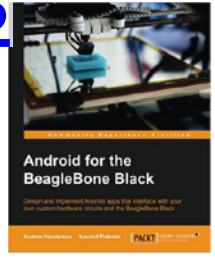
Building a Home Security System with BeagleBone
Bill Pretty
PACKT

Make:
JavaScript Robotics
Building NodeBots with Johnny-Five

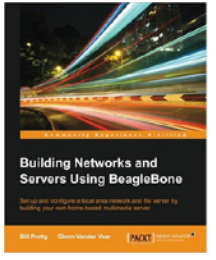
BeagleBone for Secret Agents

30 BeagleBone Black Projects for the EVIL GENIUS
Christopher Hush

The BeagleBone Black Primer

Learning BeagleBone
Hunyue Yau
PACKT

Building a BeagleBone Black Super Cluster
Andreas Josef Reichel
PACKT

Yury Magda
BeagleBone Black Interfacing
hardware and software

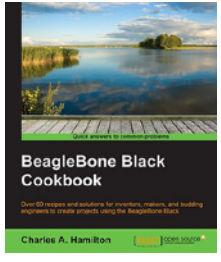
Mastering BeagleBone Robotics
Richard Grimmett
PACKT

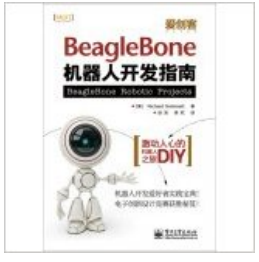
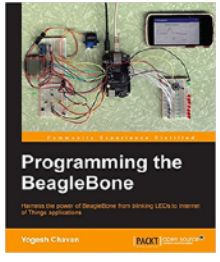
Agus Kurniawan

BeagleBone Media Center
David Lawin
PACKT

Android for the BeagleBone Black
PACKT

BeagleBone Essentials
Rodolfo Giometti
PACKT

Building Networks and Servers Using BeagleBone
Bill Pretty
Glenn Vander Wier
PACKT

Using Yocto Project with BeagleBone Black
H M Irfan Sadiq
PACKT

BeagleBone Black
Programming
using
MATLAB
Agus Kurniawan

BeagleBone Black Cookbook
Charles A. Hamilton
PACKT

ボクのBeagle Bone Black工作ノート

BeagleBone
机器人开发指南
BeagleBone Robotic Projects
DIY

Programming the BeagleBone
Yogesh Chavan
PACKT

BeagleBone Home Automation Blueprints
Rodolfo Giometti
PACKT

BeagleBone By Example
Jayakarthigeyan Prabakar
PACKT

bbb.io/books

How to start teaching with PocketBeagle

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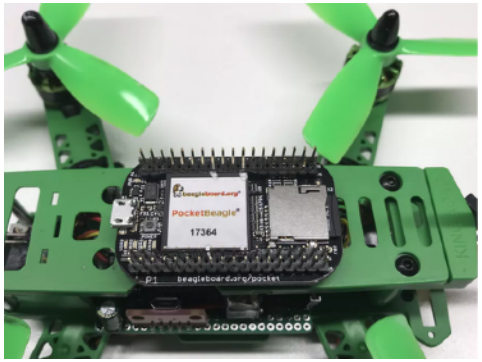
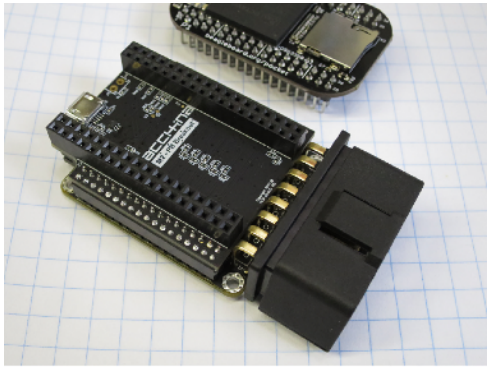
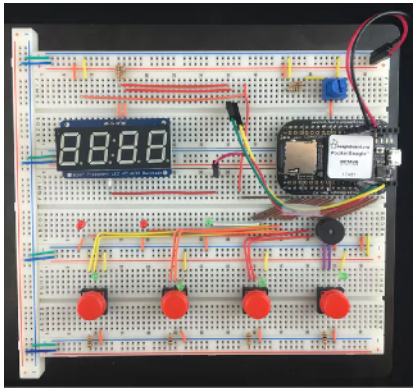
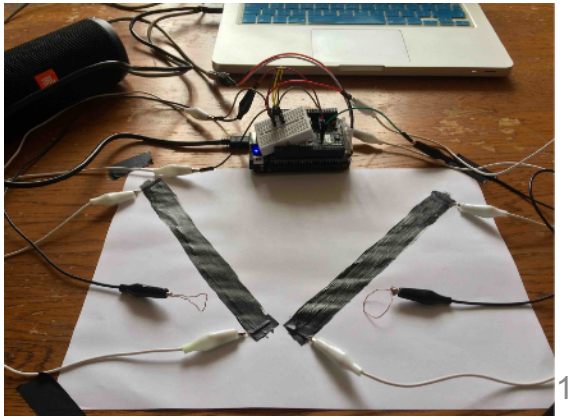
5) Build a project

bbb.io/p-pocket



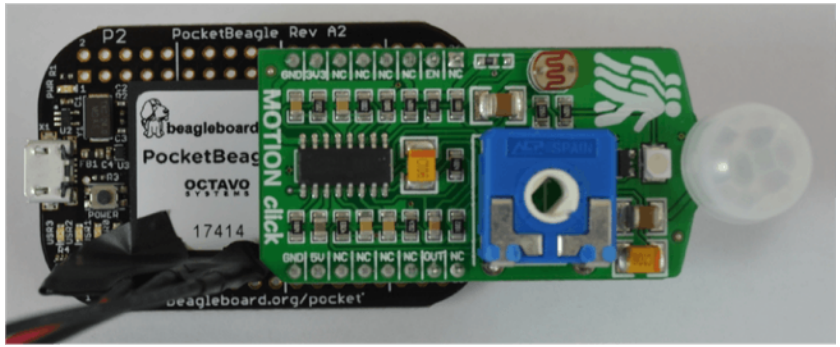






How to introduce Physical Computing

- Breadboarding an LED or a button can build a good intuition
- mikroElectronica Click Boards™ boards can connect directly to PocketBeagle and provide hundreds of sensors and actuators
- Getting to more interesting sensors quickly builds motivation
- Linux drivers provide a better opportunity to learn the “right” way to do things from the community
- Abstractions make the software easy



bbb.io/click

Example Lesson Plans

https://elinux.org/ECE497_Instructor%27s_Guide

Embedded Electronics
General purpose I/O
Analog sensors (V = IR, series/parallel)
Pulse width modulation
Standard busses (I2C, SPI, USB)

Software Applications
Languages (Python, JavaScript, C)
Revision control (git)
Debugging (gdb)
Project development (make)
Graphical Interfaces (qt, electron)

Signal Processing
Audio (alsa, bela.io, gstreamer)
Video (opencv, v4l2, frame buffer)
Threads

Networking
Configuration
Sockets
Transports and services

Device Drivers
Device abstraction
Kernel configuration
Subsystem APIs

System Integration
Boot sequence and boot-loaders
Package management

Call for PocketBeagles-for-your-classroom participation

beagleboard.org®

Apply for up to 30 PocketBeagle boards for your classroom or makerspace by contributing a project

- Must submit a repeatable project for your students on beagleboard.org/p
- Document your procedures, learning outcomes & advice on how to integrate into a bigger classroom/course experience
- Projects must be well-documented, open source and available for reuse by the BeagleBoard.org Foundation
- Projects evaluated on:
  - Documentation quality in both appearance and understanding
  - Personal and educational value of lessons learned by students
  - Applicability across broad age range and skill levels
- Planned evaluation dates: Nov 29, 2018 & Feb 28, 2019

Get started today! Contact us at bbb.io/classroom

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bbb.io/prucookbook

PRU Cookbook

Mark A. Yoder

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Questions from the Webinar Chat.

Other Resources

www.beagleboard.org

www.element14.com/beagleboard