Making in the HCIL
31st HCIL Symposium
May 29, 2014
@jonfroehlich
Motivating Story

Two high school interns

One aerial quadcopter robot

One professor (me)
AR Drone Gear v3.3
Made by Geoffro, uploaded Oct 20, 2013

Description
These actually work very well, thank you. I used 50 percent infil, 0.2mm abs

Comments
What’s remarkable is not just that these students did this but that they *thought of doing it* and *had the resources* around them to seamlessly support the effort.
But the story does not end there...
AR Drone Gear v3.3
by ajolivette, published Apr 14, 2012

Hey! This thing is still a Work in Progress. Files, instructions, and other stuff might change!
Built-in tool support for remixing
Built-in tool support for remixing

Explicit shout-out & nod to spirit of making / sharing
This is a BIG deal
Major shift: one example.

Apple released the laser writer. Desktop publishing.

Publishing used to be an expert: typographers, typesetters—it cost money, only some people had access to it.

Two things: printers and software composition/tools

Also standardization of formats—postscript

You are taking something that was once an industrial act that was a rarified, exclusive club for professionals and turn it into a button in your browser.

Now, we can publish with one touch of a button and can reach ~5-8 billion people with one click of a mouse.

This disrupted the media industry
How the ‘Maker’ Movement Plans to Transform the U.S. Economy

In his new book, WIRED editor-in-chief Chris Anderson writes that technology has "democratized the means of production."

By Sam Gustin @samgustin | Oct. 01, 2012 | 9 Comments

Chris Anderson was trying to fire up his kids about science and technology when he flew the family’s radio-controlled airplane into a tree on Hopkins St. near their Berkeley, Calif. home. After a lot of rock-throwing and branch-flinging, Anderson finally retrieved the wreckage. “My kids were mortified,” Anderson told me last week. “I had to bribe them with ice-cream.”

It was Anderson’s second attempt in as many days to do a science project with his children, and the experiments weren’t going well. The previous day, he had brought home a Lego robot review-model from the office. Anderson and his family spent all morning assembling the device, only to finish with a “three-wheeled rover that bounced off the walls.” His kids were unimpressed. “No lasers? No rockets? It doesn’t turn into a Transformer? Transformers are harder-to-make in real life than in
How the ‘Maker’ Movement Is Changing the U.S. Economy

In his new book, Wired magazine Editor at Large Chris Anderson discusses the rise of the maker movement and how it is changing the way we think about innovation and production. Anderson says that the ability to create and innovate is now in the hands of anyone with access to the internet and a 3D printer. He argues that the maker movement is a sign of the end of the industrial age and the beginning of a new era of innovation.

Chris Anderson was trying to print a model of a radio-controlled airplane. He had brought the parts from the office, but he had forgotten to bring any batteries. He tried to print the model without batteries, but it didn’t work. Finally, he retrieved the batteries and printed the model successfully. Anderson says that this incident was a sign of the maker movement’s ability to overcome obstacles and create new possibilities.

It was Anderson’s experiment with the 3D printer that inspired him to write his new book. He says that the maker movement is not just about creating new products, but about creating a new way of thinking about innovation. He argues that the maker movement is a sign of the end of the industrial age and the beginning of a new era of innovation.

**SINGAPORE —** For a 15-person start-up in 3-D printing — a nascent industry at best — Pirate3D has already made a splash. And no wonder, with its knapsack of new products being sold in more than 100 countries.
A Hardware Renaissance in Silicon Valley
The Maker Movement: Forming the Next Tech Tidal Wave

With a wealth of unprecedented tools and resources, it has never been easier for people to explore their own personal creativity. Technology is adding simplicity and removing barriers, allowing for a fuller range of creative expression, something particularly true in the emerging maker movement.

For the unfamiliar, the maker movement is a tech-infused subculture of do-it-yourself (DIY) culture. So where one would engage in a creative project — jewelry making, scrapbooking, fashion, etc. — a maker would leverage technology to complete it. Think using a cutting machine instead of scissors. It takes manual processes and makes them automatic, resulting in more professional-looking, high-quality work.

While perhaps best known by its use of 3-D printers, maker culture also consists of traditional arts and crafts, robotics, electronics and metalworking and woodworking. Its parent DIY culture is a burgeoning one, no longer confined to hardcore creative types. Today, it is mainstream.
This Talk: Three Parts
This Talk:

Three Parts

Rise of Maker/Do-It-Yourself Movement

Making & Makerspaces at UMD

‘Making’ in the Classroom
Rise of Maker/Do-It-Yourself Movement

Making & Makerspaces at UMD

‘Making’ in the Classroom
Wired

The DIY Revolution Starts Now

HOW TO Make Stuff
25 AWESOME PROJECTS
If You Can Think It, You Can Build It!

Wired

THE DESIGN ISSUE

This Machine Will Change the World

Print amazing objects at home!

THE NEW REPLICATOR 3-D PRINTER
'Maker culture' emphasizes learning-through-doing (constructivism) in a social environment. Typical interests include electronics, robotics, 3D printing, and the use of CNC tools, as well as more traditional activities such as metalworking, woodworking, and traditional arts and crafts.

Wikipedia
Maker Culture
http://en.wikipedia.org/wiki/Maker_culture
'Maker culture' emphasizes learning-through-doing (constructivism) in a social environment. Typical interests include electronics, robotics, 3D printing, and the use of CNC tools, as well as more traditional activities such as metalworking, woodworking, and traditional arts and crafts. The culture stresses new and unique applications of technologies, and encourages invention and prototyping. There is a strong focus on using and learning practical skills and applying them creatively.

Wikipedia
Maker Culture
http://en.wikipedia.org/wiki/Maker_culture
Computer Science

Fabrication

Art/Craft

Engineering

Design

making
why
now?
The Arduino has lowered the barrier to programming physical computing systems and created a vibrant eco-system of use.
3. The Internet

Websites provide easy access to help, supportive communities, and, just as importantly, purchasable materials.
4. New Tools/Materials

3D-Printing

CNC machines
4. New Tools/Materials
5. Supportive Community
It's a wrap! See you in New York

Live from @makerfaire Bay Area 2014 on Instagram

- Littigram of the radical P!Popu Mocanico hanging out with...
- Littigram from Maker Faire Bay Area last weekend. After the...
- We'd love to see some more of your photos! Just...
- A recent @makerfaire x @SocialGreg x @DominoPajak about key elements needed for a IoT: bit.ly/tjXujpX - amazing time-lapse photos!
- Ian Ferguson @fergo_4rm
- Ashley T. @MyToys
- ashutosh syal @SyalAshutosh
- Check out this cool article about @structur3Dprint, our neighbours.
HCIL Booth at the Silver Spring Mini-Maker Faire
Rise of Maker/DIY Movement

Making & Makerspaces at UMD

‘Making’ in the Classroom
Rise of Maker/DIY Movement

Making & Makerspaces at UMD

‘Making’ in the Classroom
Making at UMD
terrapin (n.) /tərəpɪn/

1. Any of several North American turtles of the family Emydidae, that live in fresh or brackish water: especially diamondback terrapin.

The diamondback terrapin has been the University of Maryland’s official school mascot since 1932.

hacker (n.) /hækər/

1. One who makes innovative customizations or combinations of retail electronic and computer equipment.

2. One who combines excellence, playfulness, cleverness, and exploration in performed activities.

Make awesome stuff.
Meet fantastic people.
Maybe even win a hackathon.
No experience needed. Join now!

We do three things:


2. Hack nights. Make something every Wednesday evening.

3. Hackathon trips. Everyone should go to a hackathon.
Terrapin Hackers Awarded 1st Place Trophy in Major League Hacker Standings

October 18, 2013

On November 6, 2013, the Terrapin Hackers were officially crowned the champions of the inaugural Major League Hacking season in a ceremony held at the Jeong H. Kim Rotunda. MLH Commissioner Mike Swift presented a handmade two-foot statue to the dozens of Hackers who spent countless hours building and coding innovative apps and products during the six-week season.

The president and co-founder of Terrapin Hackers, Shariq Hashme, a double major in Computer Science and Electrical Engineering, stood in front of a crowd of computer science and engineering students and proudly demonstrated the winning hacks from HackRU at Rutgers University and M-Hacks at the University of Michigan.

The students were recognized by distinguished faculty and staff as well. Dr. Samir Khuller, Department Chair of Computer Science and Dr. Rama Chellappa, Department Chair of Electrical and Computer Engineering offered congratulatory speeches to the members of Terrapin Hackers and Dr. Darryl Pines, Dean of the Clark School of Engineering also offered the students words of encouragement as well.

The Terrapin Hackers http://www.terrapinhackers.com/, are a dynamic group of over 150 computer science, engineering and other students from the University of Maryland claimed first place in the Major League Hacking Standings http://mlh.io/standings/. Throughout the first half of the fall semester, the Terrapin Hackers spent their weekends competing in Hackathons—24 to 96 hour events in which students code or 'hack' a software or hardware project from scratch. The Terrapin Hackers travelled to events in:

- Philadelphia (PennApps http://2013f.pennapps.com/)
- Michigan (M-Hacks http://www.mhacks.org/)
- New York (HackNY http://hackny.org/)
- Boston (HackMIT http://www.hackmit.org/)
- New Jersey (HackRU http://www.hackru.org/).

RECENT NEWS

May 01, 2014
Amnon Lotem Recognized with the 2014 Gödel Prize

April 30, 2014
Sergey Ivanov Runs Boston Marathon

April 24, 2014
Computer Science Department Alumni Keynote Speakers at Bitcamp Hackathon

April 16, 2014
Fang Cao Named 2014 Truman Scholar

April 14, 2014
Rajash Chintis Wins Outstanding Graduate Student Award

Browse All News >>
a new hackathon experience

Take what you love, fuse it with tech, build something the world has never seen.

Camp is a place for creation, exploration, and imagination. At Bitcamp, you’ll have 36 hours to combine your curiosities and wild ideas with code and gadgets to make something awesome. Throw in world-class mentors and hundreds of peers from around the world, and you’re in for an amazing time. See you by the bonfire.

FAQ
@bitcmp, today I attended my first hackathon and my way of thinking has forever changed.....
UMD Maker/Hackerspaces
Is it a Hackerspace, Makerspace, TechShop, or FabLab?

By Gui Cavalcanti  Posted May 22nd, 2013 1:34 pm  Category Education, Maker Pro, Makers, Makerspaces  View Comments

The past decade has seen the sudden, dramatic appearance of community spaces offering public, shared access to high-end manufacturing equipment. These spaces are interchangeably referred to as hackerspaces, makerspaces, TechShops, and FabLabs. This can lead the intended audience to become incredibly confused as to why there might be so many names for a single concept. I’d like to take some time to untangle the mess, explain the concepts behind each title, and talk about why I now make significant distinctions between all of these types of spaces.

Let’s start with the hardest to untangle – what’s the difference between a Hackerspace and a Makerspace?

**Hackerspaces**

I’ll start by saying that there are many people “in the know” who don’t make any distinctions between the term ‘hackerspace’ and ‘makerspace’. Truth be told, these people usually associate themselves with hackerspaces. I personally find that I need to differentiate between the two, because at this point the concepts and representations behind the words have diverged significantly for me. Let’s start with a little bit of history on hackerspaces, both paraphrased from Wikipedia and drawn from personal knowledge.
UMD Maker/Hackerspaces
STARTUP SHELL
http://startupshell.org/

COLLIDER
http://www.collider.org/

McKELDIN LIBRARY
http://startupshell.org/

HCIL HACKERSPACE
http://slidesha.re/1mHefoy
what makes a space a makerspace
Need to use a 3-D printer? Try your local library.

BY ANDREA PETERSON | August 1, 2013 at 8:15 am

It's no secret that tech is forcing libraries to change. A public service that primarily lends physical books seems almost quaint in a world where you can download hundreds upon thousands of books from Project Gutenberg and search through an almost unfathomable amount of data via Google. So libraries are bringing in e-book rentals, computers loaded with graphic design programs, and yes, 3-D printers to maintain their digital street cred.

Nicholas Kerelchuck, manager of the recently opened Digital Commons at the Martin Luther King Jr. Memorial Library in Washington, says 3-D printers are in high demand even though they've only had a few weeks to be introduced.

The 3-D printer at the Martin Luther King Jr. Memorial Library in Washington (Andrea Peterson/The Washington Post)
McKeldin Library gains 3-D printer

There's a brand new 3-D printer in McKeldin Library, and anyone can use it. But so far, no one has.

Nested in a corner behind the Terrapin Learning Commons Tech Desk on the library's second floor, the microwave-sized, black-accented MakerBot Replicator 2 glows blue through a window. The $2,500 piece of equipment, paid for through funds from the student technology fee, officially became accessible to the public on Friday, and learning commons staff said they are still waiting for the first person to request to print an object.

“We wanted to give students across different disciplines access to a resource they may not have through their own department,” said Gary White, library public services associate dean. “A low-cost way to bring an idea of innovation forward.”

The learning commons staff is on hand to acquaint students with the MakerBot, a machine that uses...
MakerBot Replicator 2
3D-Printer in McKeldin Library
MLK LIBRARY
Downtown Washington DC
Digital Commons at MLK

DIGITAL COMMONS

3-D PRINTING

3-D SCANNING

EVENTS + CLASSES

DIGITAL COMMONS TECHNOLOGY MADE POSSIBLE IN PART BY

INSTITUTE OF MUSEUM AND LIBRARY SERVICES
MLK Library Dream Lab
http://dclibrary.org/digitalcommons
How do you design a space for making?
I want(ed) to make the HCIL Hackerspace a place to...

...inspire creativity & excitement
...encourage and allow for serendipitous interaction
...attract a diverse set of students
...allow students to experiment, play, learn, make
...build community and imbue a spirit of collaboration
...rapidly prototype physical computing designs
...promote working with low-tech and high-tech materials together
...
Human-Centered
Iterative Design
Layout and Decor

The layout below is only a sketch and not definitive. The overall goal here is to maximize workspace while still allowing for sufficient storage. The 4'x8' window, which looks into the larger HCIL space would be replacing, in part, the peg board. Evan notes that the peg board is useful, however, for quickly storing and accessing tools so we will have to come up with a plan here.

Windows

As part of this transition, we are likely going to be installing two windows: one largish 4'x8' window facing the HCIL and one smaller 4'x6' facing the hallway. This will be dependent on cost and feedback from fellow lab members. The goal here is to make the “closet” feel less cavernous and more like a part of the larger HCIL. The windows will also bring in more light and allow passerby to briefly look in to see the activities in the lab.

Allison: I think the windows will be a great addition and Jon’s idea of putting back the logo on the hallway window is inspired. Jon- you’ll just need to let us know when we need to take down the shelf and pics on the lab wall that will get a window.

Krist: I think the windows will be great. A minor addition maybe a curtain that you can
Google Docs enabled multiple parties to easily provide feedback and even make their own edits to the planning doc.
PEGBOARD

- Whiteboard slot 3½
- Whiteboard slot 2 ½” x 41" ½"
- Lots of grey stack boxes (Husky)
- 113" black shelving above peg board
- 83" black shelving above doorway
- Big grey boxes
- Big drill bit?
- Larger screw tips for drill
- New storage bins from that storage bin place
- IKEA colored rug
- Whiteboard on wheels
- Pillow/leg laptop holder
- Pro projector
- More Labour bins (tiny) for stuff
- Twenty white panelboard
- SKU 346-4428
- Wood glue aisle
We allowed the space to evolve over time as we observed use and added additional equipment.
Making is enabled not just by space but **ready access to material and tools**
Three Soldering Stations
HCIL Hackerspace
Two Mannequins
HCIL Hackerspace
Wall of Electronic Components
HCIL Hackerspace
Two 3D-Printers
HCIL Hackerspace
One CNC Machine
HCIL Hackerspace
Top Five Tips

1. Observe the use of space and iterate
2. Allow the makers to help make the space
3. Configure not just for work but for inspiration
4. Big, open tables are important for collaboration
Students Working Outside The Hackerspace
Students Working Outside The Hackerspace
Students Working Outside
The Hackerspace
Top Five Tips

1. Observe the use of space and iterate
2. Allow the makers to help make the space
3. Configure not just for work but for inspiration
4. Big, open tables are important for collab making
5. Provide as much equipment as you can afford & keep it organized/accessible
Rise of Maker/DIY Movement

Making & Makerspaces at UMD

‘Making’ in the Classroom
For me, the type of making that gets me excited combines computation with physical material to create new interactive experiences (e.g., fabrics, objects)
My ‘Maker’ Course

**CMSC838f**
Tangible Interactive Computing
Fall 2012

**CMSC838f**
Tangible Interactive Computing
Spring 2014

Tangible Interactive Computing

Instructor
Dr. Joe Frederick
Instructor Professor
Email: jf@cs.umd.edu
Website: http://www.cs.umd.edu/~jf
Office: 1770 AV Williams
Office Hours: 1:00-2:00 PM
Office Phone: 301-405-4393

Course Overview
This course is about creating tangible interactive computing. We will make, learn, and teach tools and systems to create interactive tools and systems. This is an interactive, hands-on class designed to give students the tools and skills to create interactive tools and systems.

**Preamble**

"Joy is a well-made object, equated only to the joy of making it."

Dr. Joe Frederick

Course Overview
This course is about creating tangible interactive computing. We will make, learn, and teach tools and systems to create interactive tools and systems. This is an interactive, hands-on class designed to give students the tools and skills to create interactive tools and systems.

The recent emergence of new forms of tangible and interactive computing has led to a new field of research and development in the area of interactive computing. This course will explore the latest developments in this field, including the latest tools and techniques for creating interactive tools and systems.

**Course Overview**

This course is about creating tangible interactive computing. We will make, learn, and teach tools and systems to create interactive tools and systems. This is an interactive, hands-on class designed to give students the tools and skills to create interactive tools and systems.

**Instructor**

Dr. Joe Frederick

**Office Hours**

1:00-2:00 PM

**Office Phone**

301-405-4393

**Website**

http://www.cs.umd.edu/~jf
"Joy is a well-made object, equaled only to the joy of making it."
>a Canadian Native American tribe saying, as quoted by Mark Frauenfelder (author, co-founder of *BoingBoing*) & editor of *MAKE Magazine*.

**Preamble**

This class is about making, being creative, taking risks. We will make to learn and learn to make. We will use materials to help us think and to push our own boundaries of what interactive computing is and could be. I taught this class once before: [http://cmsc336f12.wikispaces.com](http://cmsc336f12.wikispaces.com). It was, by most accounts, a success (I think!). I learned a lot. The class learned a lot. Most importantly, along the way, we had fun together, we made interesting things, and we helped each other (peer learning ftw).

As another indicator of success, the aforementioned Fall2012 class generated one MS thesis topic, one PhD thesis topic, and two publications (with more to come!). In addition, the instructables posted for the final project have garnered over 74,265 views and have been favored 317 times (as of Jan. 2014) including [HandSight](http://www.instructables.com/id/HandSight/) (9,330 views, 58 favorites), [indoor/outdoor tracker](http://www.instructables.com/id/indoor-outdoor-tracker/) (33,642 views, 88 favorites), [x-track music visualizer](http://www.instructables.com/id/x-track-music-visualizer/) (7,150 views, 63 favorites), and the [HCIL Hackerspace interactive living wall](http://www.instructables.com/id/HCIL-Hackerspace-interactive-living-wall/) (22,613 views, 98 favorites). I hope for a similar diversity of compelling ideas and successes this year!

I will state up front: in this class, I do not have all the answers (note: I never do but particularly not in this class). I am learning with you. I am pushing myself to learn new things. You should too. So, it's likely that we'll experience some failures along the way. A mini-project might fail. My lectures might fail. But that's OK. Failures can often lead to accidental innovation and they most certainly help you learn. If you don't fail sometimes, you're not trying hard enough. :)
Sandbox Days
Alternates with lectures; focused on discussions, rapid prototyping, & peer learning
MPA02 High-Low Tech Input/Output

Due: Monday, March 24 (before class time)
Now Due: Wednesday, March 26 (before class, meet in HCIL)

What To Do
In this assignment, your goal is to rethink the materiality of computing and interaction. You must make a primary input device (e.g., paper joystick) or a primary output device (e.g., ambient display) using low-tech materials such as paper, conductive paint, play-dough, tape, water, food, etc. The primary interactivity must be mediated by the low-tech material (i.e., the low-tech material cannot be superfluous to your design, it must be directly integrated).

Some inspirational projects:
- Faww Qu's high-low tech version of Flappy Bird
- Jie Qi and Leah Buechley's "Computational Sketchbook" (video)
- Leah Buechley's High-Low Tech Living Wall

Material Ideas and Some How-Tos
Leah Buechley's High-Low Tech Group has a nice listing of material sources for electronic and conventional textiles, conductive inks and paper, and other materials. Browse their list and the list below and be inspired!

Paper Circuits
- Art, Craft, and Technology, Leah Buechley at the Cyberlearning Research Summit, 2012
- How to "Sketch" With Electronics, Leah Buechley at TEDYouth, 2011
- Paper Circuits with Copper Tape, Leah Buechley's High-Low Tech Group
- Microcontroller Circuit with Copper Tape, Leah Buechley's High-Low Tech Group
- Paper Speakers, Leah Buechley's High-Low Tech Group

Projects
- LED Paper Dragon Kite, Leah Buechley's High-Low Tech Group
- Electronic Origami Flapping Crane, Leah Buechley's High-Low Tech Group
- Computational Sketchbook, by Jie Qi and Leah Buechley

Conductive Paint
- My Love/Hate Relationship with Conductive Paint, by Dia via Sparkfun
Richard brought spaghetti & sauce
STARRY NIGHT
By Meethu Malu & Hitesh Maidasani, Spring 2014
instructables
Let's Make circuits

Featured

Build a prop vintage baseball shin guard by dominus in Props

Ultimate Nerf Stryfe Mod by BritLiv in Nerf

Measure the speed of Nerf darts by BritLiv in Nerf
Dark walnut coffee table
by Thor02

Low Budget Pallet Outdoor Lounge
by bamseine

Arts and crafts pallet clock
by ridlysp8

Pallet End Table
by mlairymd

Pallet Projects
by jessyrafhnk

DIY PALLETT WOOD TREE SHELF
TUTORIAL
by Eco-Rustic
Ever looked in a sky full of stars and wondered what you were looking at? Where’s that bright shiny object? Why is it there? This instructable is for you to make a Starry Night display of your own. Using paper circuits and simple lighting techniques to make this light display, you can create your own personal Starry Night. You’ll learn a little bit about constellations, learn how to make simple circuits, and how to make a conductive paper display. This project is fun and easy. But, it’s all educational. To get you started, this instructable will show you how to make the display and a constellation chart. The chart will guide you in making constellations that you can use to tell the story of your Starry Night. So, let’s get started!
CMSC838f Instructables Stats

Total Views:

Total Favorites:
Even after 1.5 years, the first round of Instructables are still making an impact!
StarryNight: Paper Circuits and Astronomy for Kids!

by meethumalu

Ever looked in a sky full of stars and wondered what you were looking at? Where's the best way to go about this? This article shows you how to make a paper circuit that lights up the stars! You'll learn how to make an LED wiring diagram and practice some wiring for fun. This is a great way to introduce kids to circuits and electronics. It's a fun activity for a rainy day or just for fun!
Student interaction extends beyond classroom

Community suggests new ideas and alternative approaches!
instructables in the classroom!

1. **Fulfilled original goal**: allowed for impact beyond the classroom & to contribute back to the maker community

2. **Impact continued over time**: student Instructables sustained interest/readership long after course completed

3. **Interaction with maker community**: Instructables provided a forum for students to interact w/makers

4. **Intrinsic satisfaction**: The above three things served to increase student’s sense of accomplishment & satisfaction
We are creatures who need to make.
social

We are creatures who need to make, learn, & share together.

Frank Bidart
Poet
Quote from: Wilkinson & Petrich, The Art of Tinkering, 2014
Upcoming ‘Maker’ Talks Today

1:05PM BodyVis: Body Learning Through Wearable Sensing & Visualization
Leyla Norooz & Jon Froehlich

1:19PM Social Fabric Fitness: The Design & Evaluation of Wearable E-textile Displays to Support Group Running
Matt Mauriello, Jon Froehlich, Michael Gubbels

1:47PM Current and Future Mobile and Wearable Device Use by People with Visual Impairments
Hanlu Ye, Meethu Malu, Uran Oh, Leah Findlater

Michael Gubbels & Jon Froehlich
Making in the HCIL
31st HCIL Symposium
May 29, 2014
@jonfroehlich
Icon Credits

**Quadcopter**
by Nithin Davis Nanthikkara
http://thenounproject.com/term/quadcopter/22061/

**Bearded Man**
by Riccardo Greg
http://thenounproject.com/term/bearded-man/36280/

**Students**
by Hadi Davodpour
http://thenounproject.com/term/students/28126/

**Eye**
by Michael Rowe
http://thenounproject.com/term/eye/19791/

**Heart**
by Public Domain
http://thenounproject.com/term/heart/219/

Acknowledgements
Thanks to the students, faculty, and staff of the HCIL back in the summer of 2012 who helped me setup the HCIL Hackerspace. Thanks to Professor Tom Yeh for donating the Makerbot Replicator 3D printer, Sparkfun.com for donating some equipment, Steve Hodges at Microsoft Research for donating .NET Gadgeteer Kits, John Krumm for facilitating Microsoft donations of Kinects for Windows, and the students who are helping me build this course as we go along. To learn more about the inspirations for this class, read here.
Book Resources

Make: Electronics
Physical Computing
Practical Electronics for Inventors
Making Things Talk
Encyclopedia of Electronic Components
Encyclopedia of Electronic Components
Fashioning Technology
Sew Electric

Electronic Books

E-Textiles

More on website
Some Online Resources

http://learn.sparkfun.com
http://learn.adafruit.com/
http://www.instructables.com/
http://highlowtech.org/
http://proquest.safaribooksonline.com/
http://itp.nyu.edu/physcomp/Tutorials
How To Start A Hackerspace: Part 2 – A Place To Hack All The Things

Now that you have a concrete idea of who your hackers are, you also know what kind of space needs they’ll have. Next, narrow down what will be done in the space. Don’t forget, there’s plenty of room to grow your space to include many different kinds of hackers as your Hackerspace matures (covered in later sections of this “How To”)

Talk to the people you’re starting the space with and make the most detailed list in a shared spreadsheet of what different hackers need to do their hacking (and keep in mind that you’ll probably be adding to this list as you get into your space).

Here’s an example of physical needs you may have on your list:

- 220 power
- Running water
- Ventilation
- Concrete floor
- Natural light
- Darkroom and darkroom supplies (have your photo hacker make a list)
- Air conditioned room for servers
- Area for physical hack projects
- Sound proof room for audio/video recording/editing
- 24/7 Access
- Spray paint booth
- Place to put a car lift
- Etc, Etc, Etc...

Once you have your list, now you’ll need to go to the next step: How To Start A Hackerspace: Part 3 – A Home For Your Hackerspace. Stop back tomorrow!
Makerspace Playbook
By Michele "Binka" Hubinka On May 11, 2012 7 18 Comments

Take a peek our current draft of the Makerspace Playbook, intended to offer some guidance to those who are hoping to start a Makerspace at their school or in their community. We welcome your feedback on the kinds of things we should add to this Playbook, what you think we got right and wrong, and any changes you'd make in general. We already know we'd like to add things like sample letters to garner support from administration and potential funders, more spotlights of teachers doing this kind of making with their students, and more detail about what the new roles for teachers, mentors, and shop hosts might entail. What do you need to know to get your Makerspace up and running?

Besides this draft of the Makerspace Playbook, we've also made some progress on the companion document—High School Makerspace Tools & Materials, so we have a new draft of that to share with you, too.

- Makerspace Playbook (April 2012)
- High School Makerspace Tools & Materials (April 2012)

Eventually, we'd like both of these documents to exist online in a form we can all freely contribute to the information and refine what we have learned about running Makerspaces. For now, you can send your feedback to us using the form below.

Name (required)

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make space

How to Set the Stage for Creative Collaboration
Scott Doorley and Scott Witthoft
with a foreword by David Kelley