Outline

- Motivation
- Phidget
- d.tools
- Gainer
- Arduino / Wiring
- Summary
Motivation

- Pentiment Summer Course 2008
  - Wearable Computing / E-Textiles (Eyal Sheffer)

- Cooperation Design Department
  - Master Project „Emotional Tent“
Motivation

Emotional Tent:
- react on visitors
- visitors make the organism come alive
- different sub-projects:
  - Interactiv Skin
  - Tunnel
  - Cocoons
  - Five Senses
  - Swarm
  - Fluffy
  - LED Wall + Jacket

Is it possible to design an organism that communicates through different senses, and in such a way, that the viewer becomes the designer as well as part of the object?

[http://ambientawareness.org]
Motivation

- **Experiences:**
  - artists have great ideas
  - whole different culture
    - different way of doing things and starting projects
    - misunderstandings
  - need to assemble electronic parts to electronic circuits
    - few have knowledge about electronics in general
    - few have soldering experiences
  - need to integrate microcontroller
    - but few can program a MCU
Phidget

- „Physical widgets for prototyping physical user interfaces“
- research project in 2001
- University of Calgary
- Saul Greenberg and Chester Fitchett

Phidgets, Inc. ([www.phidget.com](http://www.phidget.com)) produces electronic components
Phidget

- USB Moduls for sensing and control
- USB API for Programming
- libraries for:
  - Flash / Flex
  - Max / Msp
  - Java
  - .Net
  - Python
  - Labview
  - Matlab
  - Microsoft Robotics Studio
  - ...

[http://www.phidget.com]
d.tools

- HCI Group at Stanford
- developed 2005 by B. Hartmann, S. R. Klemmer, et al.

**d.tools was built to support design thinking rather than implementation tinkering.**

[http://hci.stanford.edu/dtools/]

- hardware and software platform
- initial prototype with Flash and Phidgets
- now plug-in for Eclipse with its own hardware platform
- prototyping through statecharts

[http://hci.stanford.edu/dtools/]
d.tools

- several components
- each with own microcontroller
- master observes the presents of components
- inform PC through OpenSoundControl (OSC)
d.tools

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Gainer

- project launched 2005 in Japan
- team leader Shigeru KOBAYASHI
- open-source

IO – Platform:
  - a PSoC microcontroller (CY8C29466, Cypress)
  - a USB-to-UART bridge (FT232RL, FTDI)
  - an I/O module PCB board (original)
  - resistors, capacitors, LEDs and so on

Software Libraries:
  - Flash
  - Max/MSP
  - Processing
Arduino / Wiring

- Wiring developed from Hernando Barragán 2003 (Interaction Design Institute Ivrea)
- small IO – Board based on Atmel MCU
- based on Wiring the international Arduino Projekt was launched

[http://www.arduino.cc]
Arduino / Wiring

- IO – Board complete open-source
- can communicate with Flash, Processing, Max/MSP,...
- but also stand alone programming environment based on Processing
Arduino / Wiring

- user writes Sketches
- C like language
- uploading to IO – Board by clicking on the upload button
- Boot loader on Atmel starts Sketch
- communication through USB – Serial converter

environment extendable by writing libraries
Arduino / Wiring

- development environment runs on Windows, OS X and Linux
- simple and clear
- extensible (Shields)
- several sensors and actors available
- huge community ➔ several tutorials and libraries
- interesting related projects
Arduino / Wiring

- **LilyPad:**
  - microcontroller board designed for wearables
  - developed by Leah Buechley
  - University of Colorado 2007
  - can be sewn to fabric
  - available as of October 2007 from Spark Fun
  - fully Arduino compatible
  - Spark Fun has developed a lot of different sensors and actors

[http://www.sparkfun.com]

[http://www.cs.colorado.edu/~buechley/]
Arduino / Wiring

- **Fritzing:**
  - open-source initiative
  - started October 2007
  - University of Applied Science Potsdam

...support designers and artists to take the step from physical prototyping to actual product.

Summary

- a lot of different tools
  - **Phidget** ➔ hardware only / no programming environment
  - **d.Tool** ➔ no hardware available / graphical programming environment / testing and analyzing tools integrated
  - **Gainer** ➔ complete open-source / libraries for Flash, Max / MSP, Processing / no programming environment
  - **Wiring / Arduino** ➔ complete open-source/ programming environment / huge community and sub – project

- Arduino most commonly used by artists
- missing graphical programming and simulation environment
Have a look at

- Emotional Tent: www.ambientawareness.org
- Phidget Projekt: http://grouplab.cpsc.ucalgary.ca/phidgets
- Phidget Inc.: www.phidget.com
- d.tools: http://hci.stanford.edu/dtools/
- Gainer: http://gainer.cc
- Wiring: http://wiring.org.co/
- Arduino: http://www.arduino.cc/
- Lilypad: http://web.media.mit.edu/~leah/LilyPad/index.html
- Fritzing: http://www.fritzing.org/
Literature

[1] ARDUINO: Arduino Homepage. –
http://www.arduino.cc


Literature


Literature


Questions?

The End