Design Tools

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Design tools should...

[Hartmann, PhD thesis '09]

- Decrease UI construction time
- Isolate designers from implementation details
- Enable designers to explore an interface technology previously reserved to engineers or other technology experts

Goal: facilitate rapid iteration

[Hartmann, PhD thesis ’09]

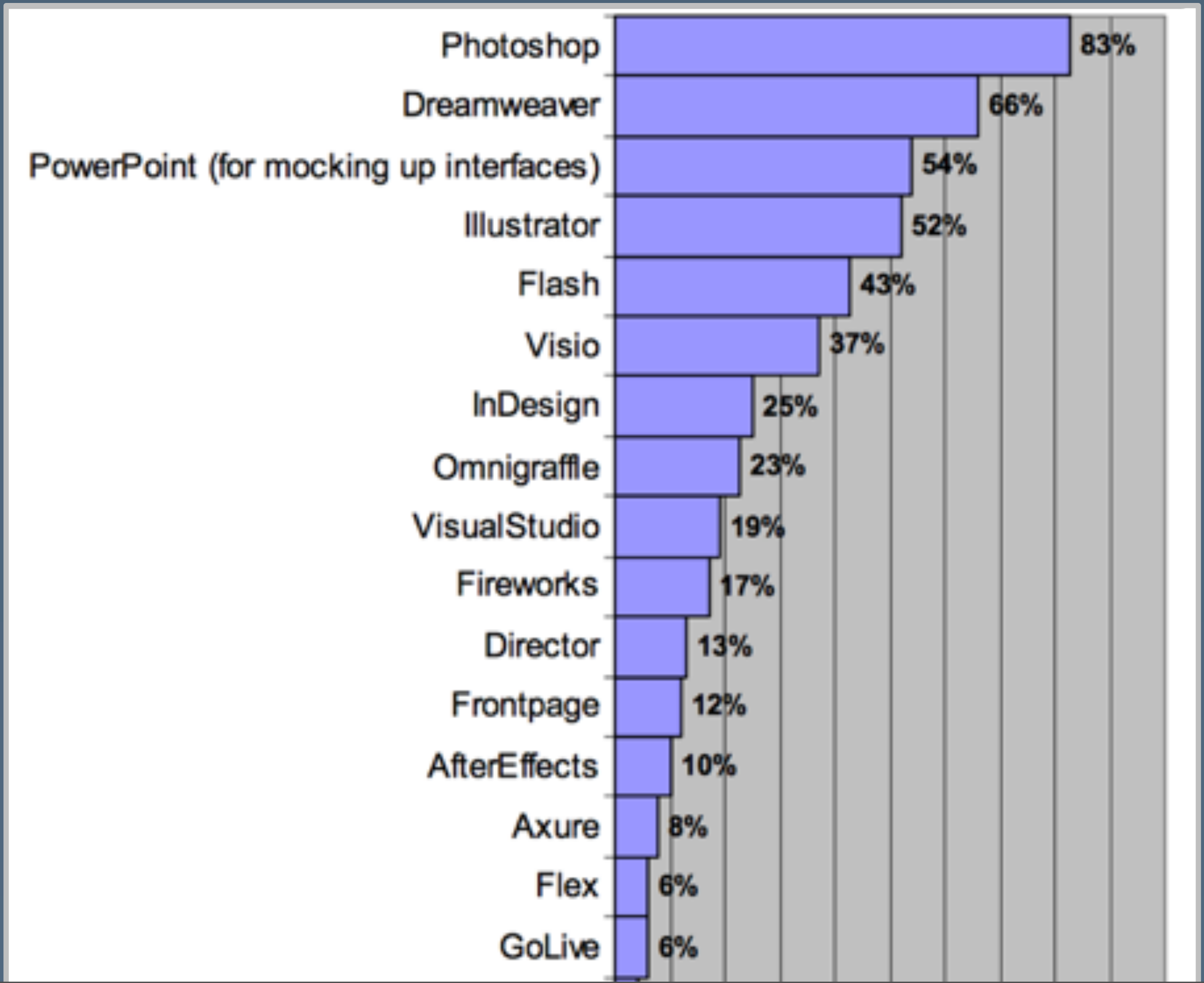
- Prototypes enable exploration and iteration around concrete artifacts
- The more fluid the prototyping process is, the more you can learn before you sink time into engineering

Early stage design

What tools do designers use?

[Myers et al., VLHCC '08]

- Survey of 259 interaction designers



SILK: Sketching Interfaces Like Krazy [Landay, CHI '96]

- Combine the fluidity of paper-based sketching with the interactivity of interactive tools
- Technique: sketch recognition of basic UI components

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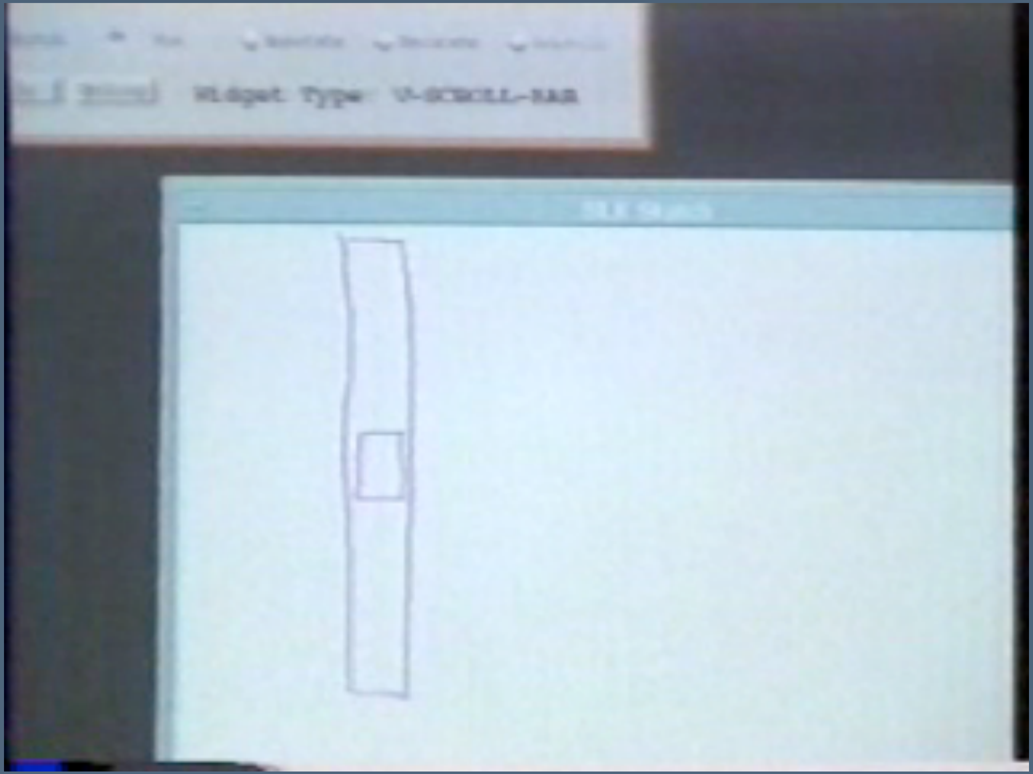

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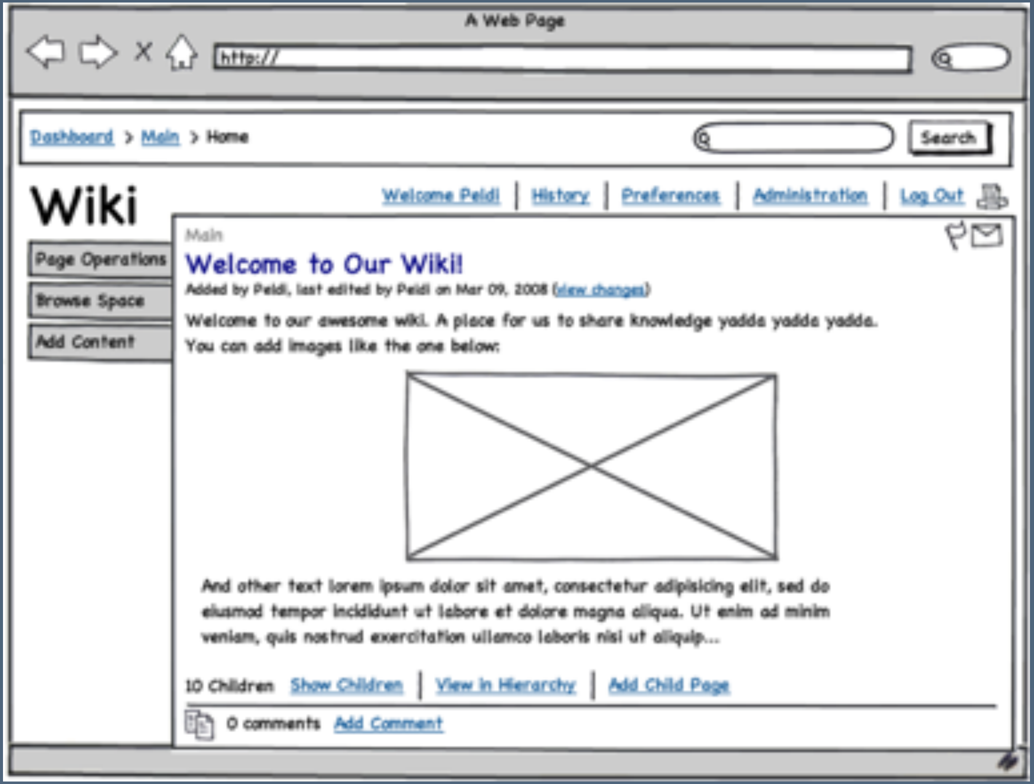

Added by Peldi, last edited by Peldi on Mar 09, 2008 (view changes)

Welcome to our awesome wiki. A place for us to share knowledge yadda yadda yadda. You can add images like the one below:

And other text lorem ipsum dolor sit amet, consectetur adipisicing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris nisi ut aliquip...

Led to: Balsamiq

DENIM: web site storyboarding

[Lin et al., CHI ’00]

- Enable fluid, informal interactions for web site design
- Work at a higher level of abstraction than HTML

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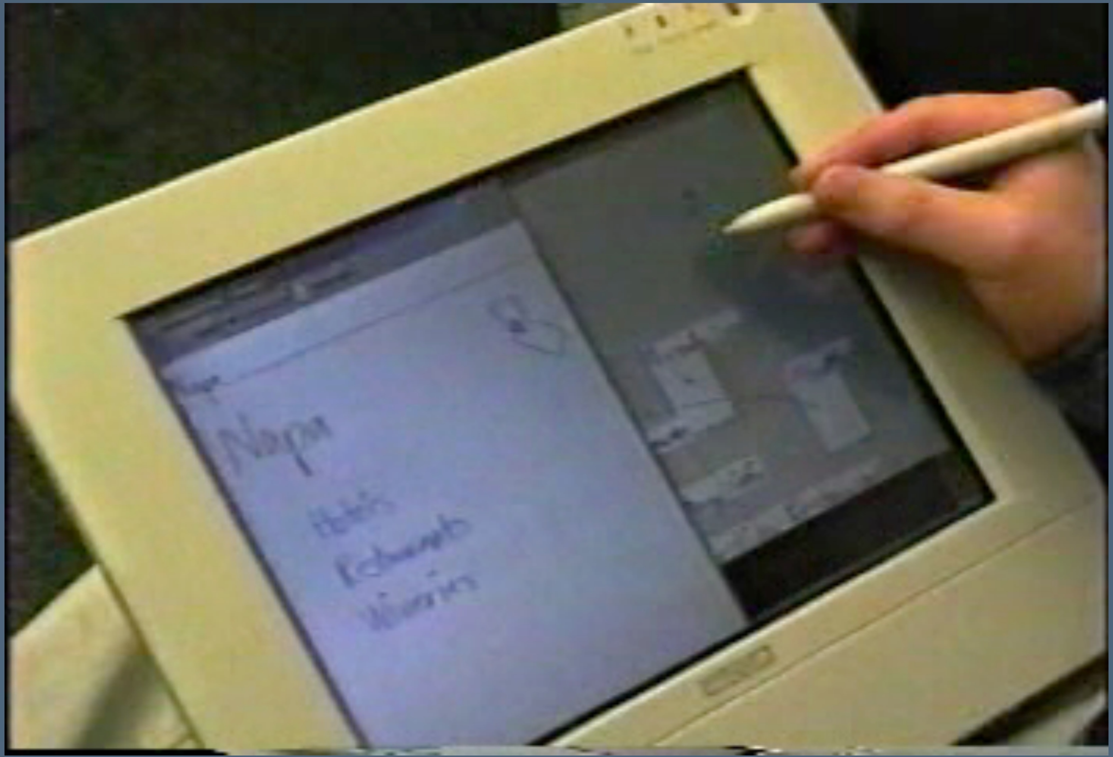

Designer’s Outpost: fluid interactive brainstorming

[Klemmer et al., UIST ’01]

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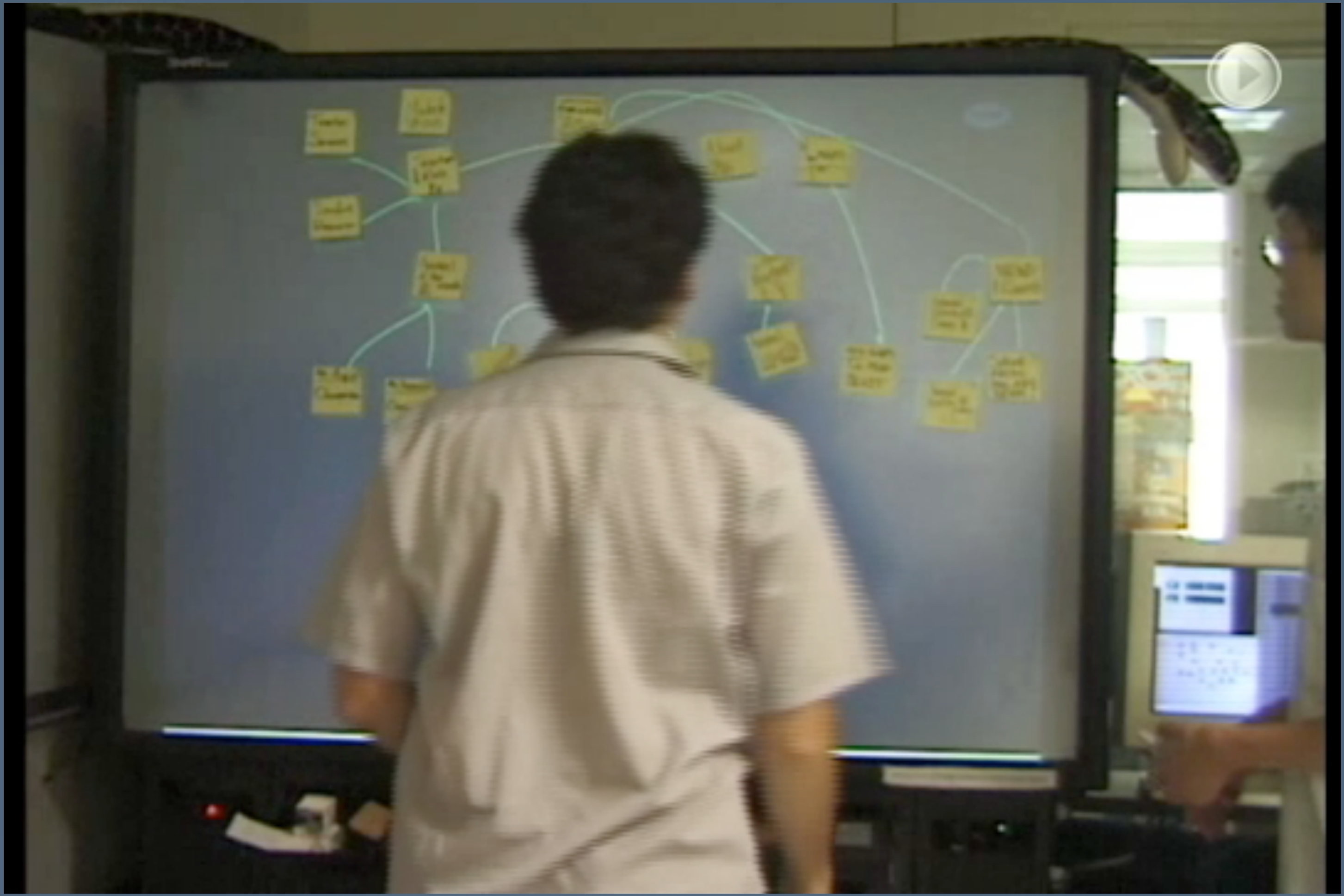
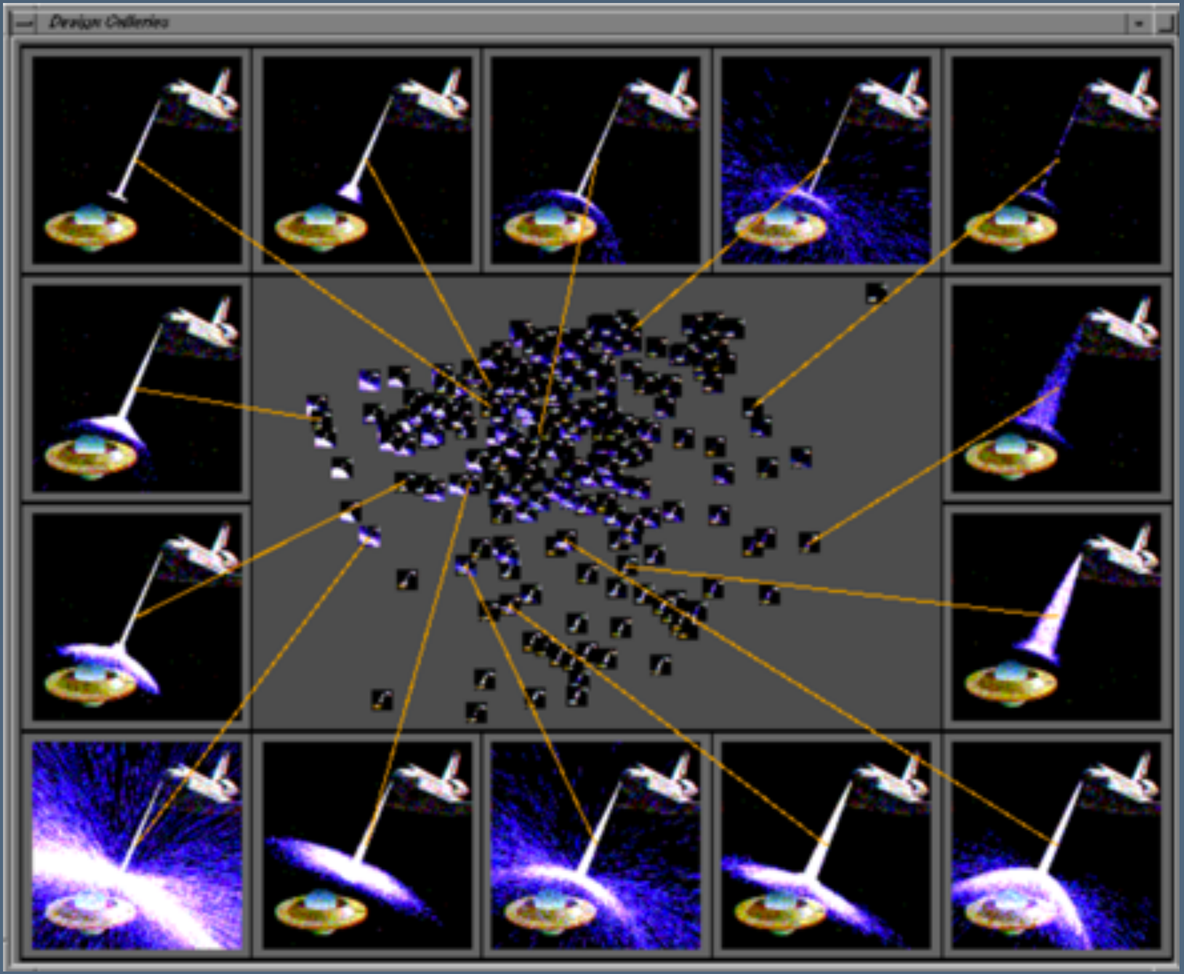


Design galleries: comparing alternatives [Marks et al., SIGGRAPH '97]

- Automatically generate perceptually-varying alternatives within a design space



Juxtapose: interactive parameter tuning [Hartmann et al., UIST '09]

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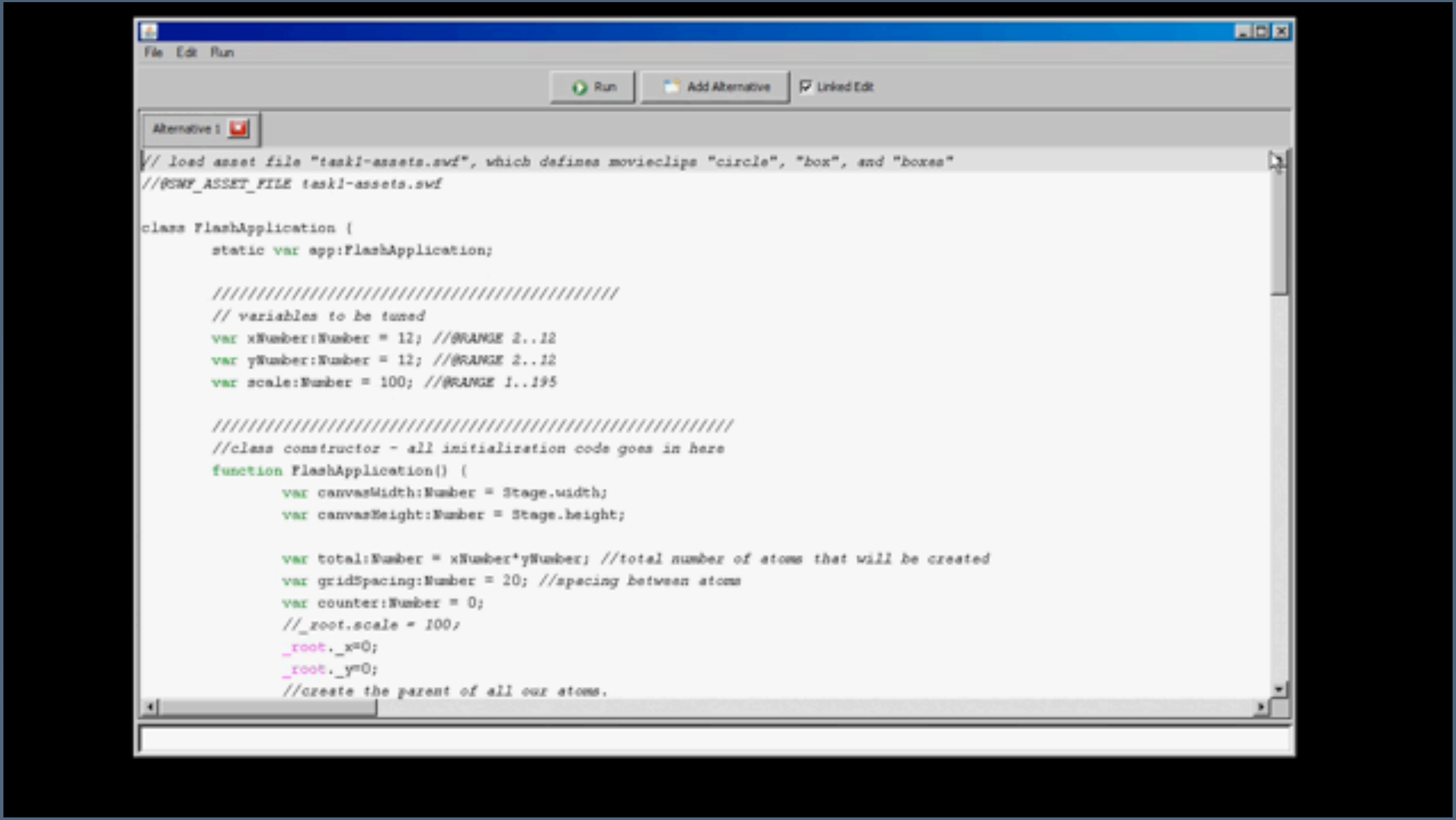
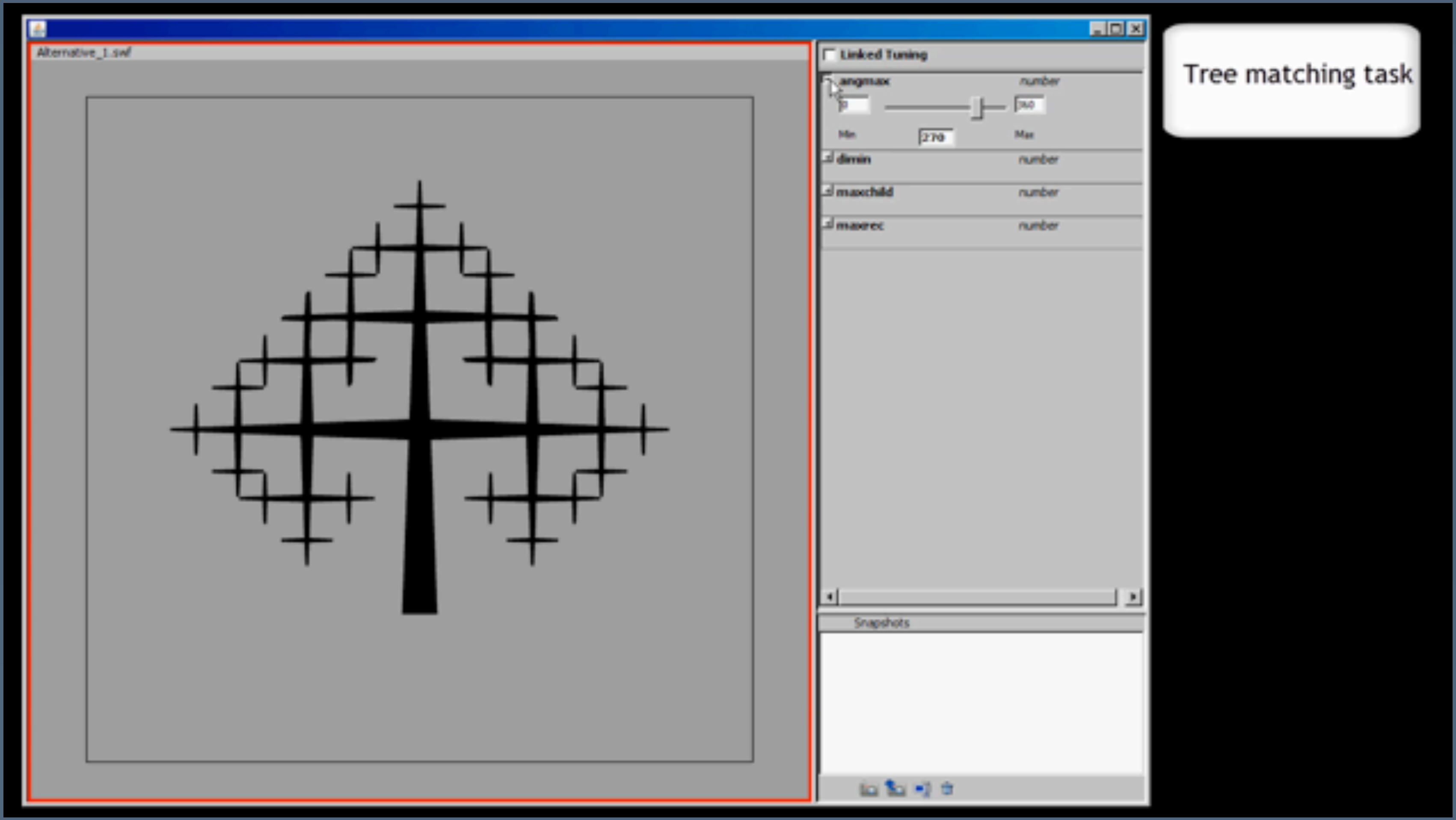


```
// load asset file "task1-assets.swf", which defines movieclips "circle", "box", and "boxes"
//@SWF_ASSET_FILE task1-assets.swf

class FlashApplication {
        static var app:FlashApplication;

        ////////////////////////////////////////////////
        // variables to be tuned
        var xNumber:Number = 12; //@RANGE 2..12
        var yNumber:Number = 12; //@RANGE 2..12
        var scale:Number = 100; //@RANGE 1..195

        ////////////////////////////////////////////////////////////
        //class constructor - all initialization code goes in here
        function FlashApplication() {
                var canvasWidth:Number = Stage.width;
                var canvasHeight:Number = Stage.height;

                var total:Number = xNumber*yNumber; //total number of atoms that will be created
                var gridSpacing:Number = 20; //spacing between atoms
                var counter:Number = 0;
                //_root.scale = 100;
                _root._x=0;
                _root._y=0;
                //create the parent of all our atoms.
```

Juxtapose: interactive parameter tuning [Hartmann et al., UIST ’09]



Led to: Inventing on Principle

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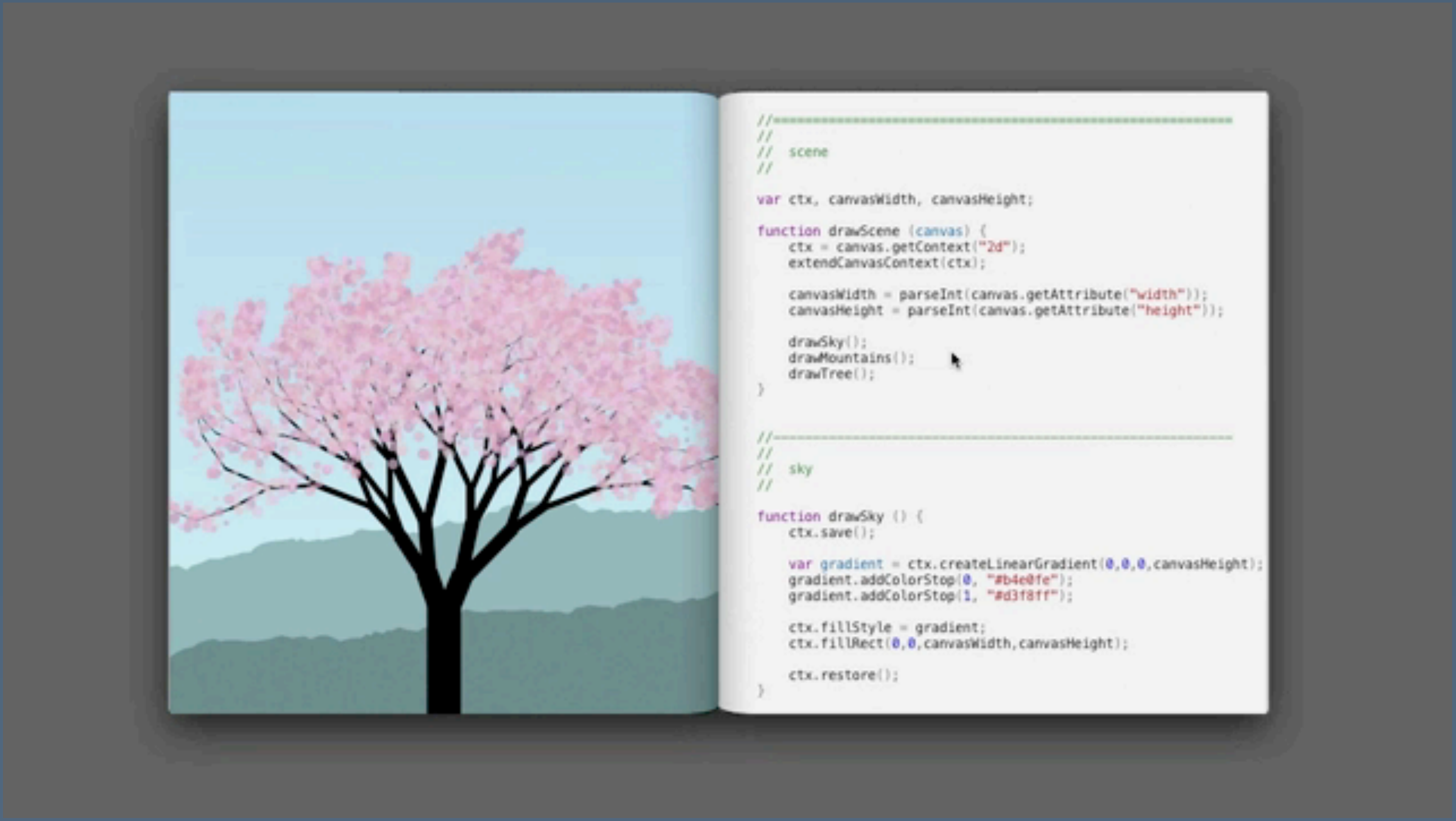

```
//=====================================================================
//
//  scene
//

var ctx, canvasWidth, canvasHeight;

function drawScene (canvas) {
    ctx = canvas.getContext("2d");
    extendCanvasContext(ctx);

    canvasWidth = parseInt(canvas.getAttribute("width"));
    canvasHeight = parseInt(canvas.getAttribute("height"));

    drawSky();
    drawMountains();
    drawTree();
}


//---------------------------------------------------------------------
//
//  sky
//

function drawSky () {
    ctx.save();

    var gradient = ctx.createLinearGradient(0,0,0,canvasHeight);
    gradient.addColorStop(0, "#b4e0fe");
    gradient.addColorStop(1, "#d3f8ff");

    ctx.fillStyle = gradient;
    ctx.fillRect(0,0,canvasWidth,canvasHeight);

    ctx.restore();
}
```

Physical prototyping

The challenge of physical prototyping

- Prototype the **bits**, or prototype the **atoms**?

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- Goal: lower the threshold to prototype interactive systems that depend on electronics and physical materials

Phidgets [Greenberg and Fitchett, UIST '01]

- USB plug-and-program I/O devices
  - servos
  - LEDs
  - buttons
  - sliders
- Goal: program physical devices like you would a GUI widget

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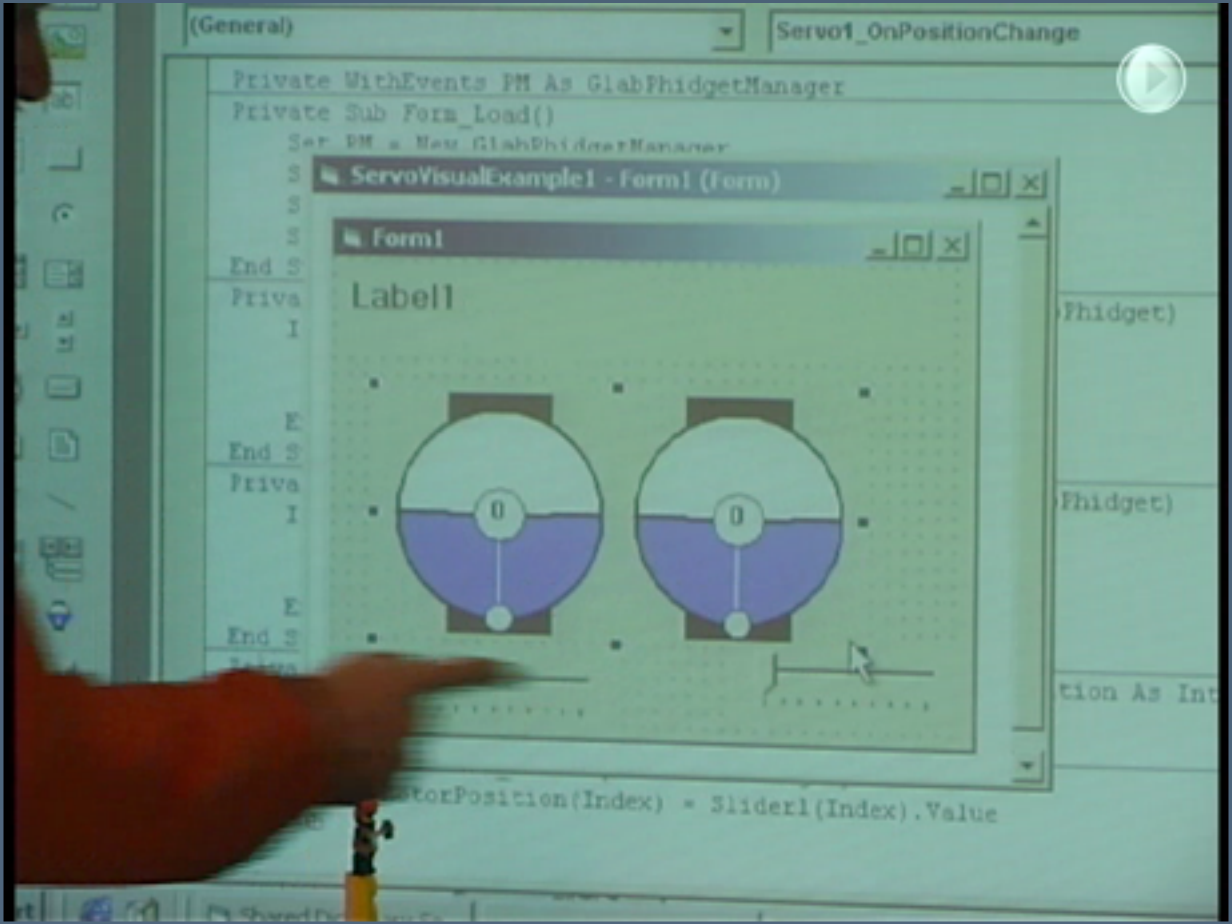
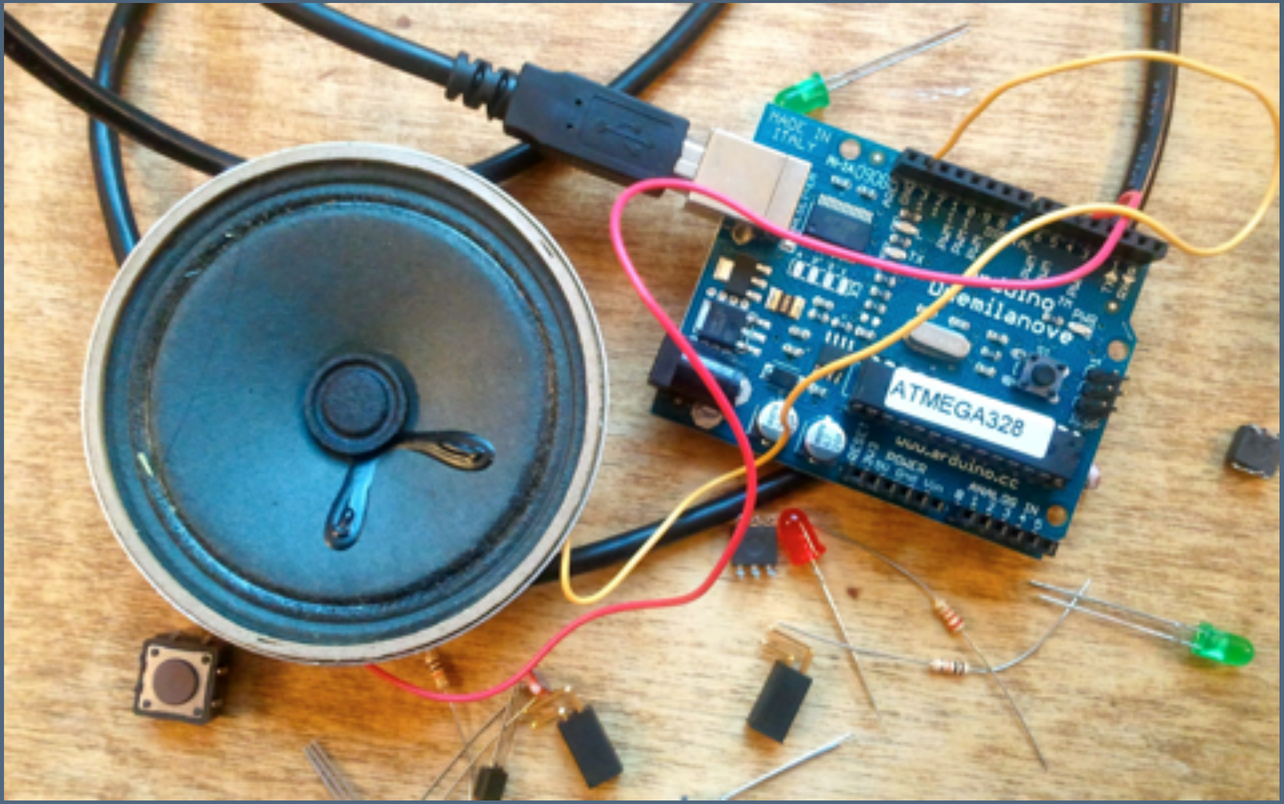


```
Private WithEvents PM As GlabPhidgetManager
Private Sub Form_Load()
    Set PM = New GlabPhidgetManager
```

```
torPosition(Index) = Slider1(Index).Value
```

Led to: Arduino

- Maker board for artists, programmers and hobbyists



Led to: Makey Makey

[Silver et al., TEI ’12]

- Alligator clips map onto keystrokes

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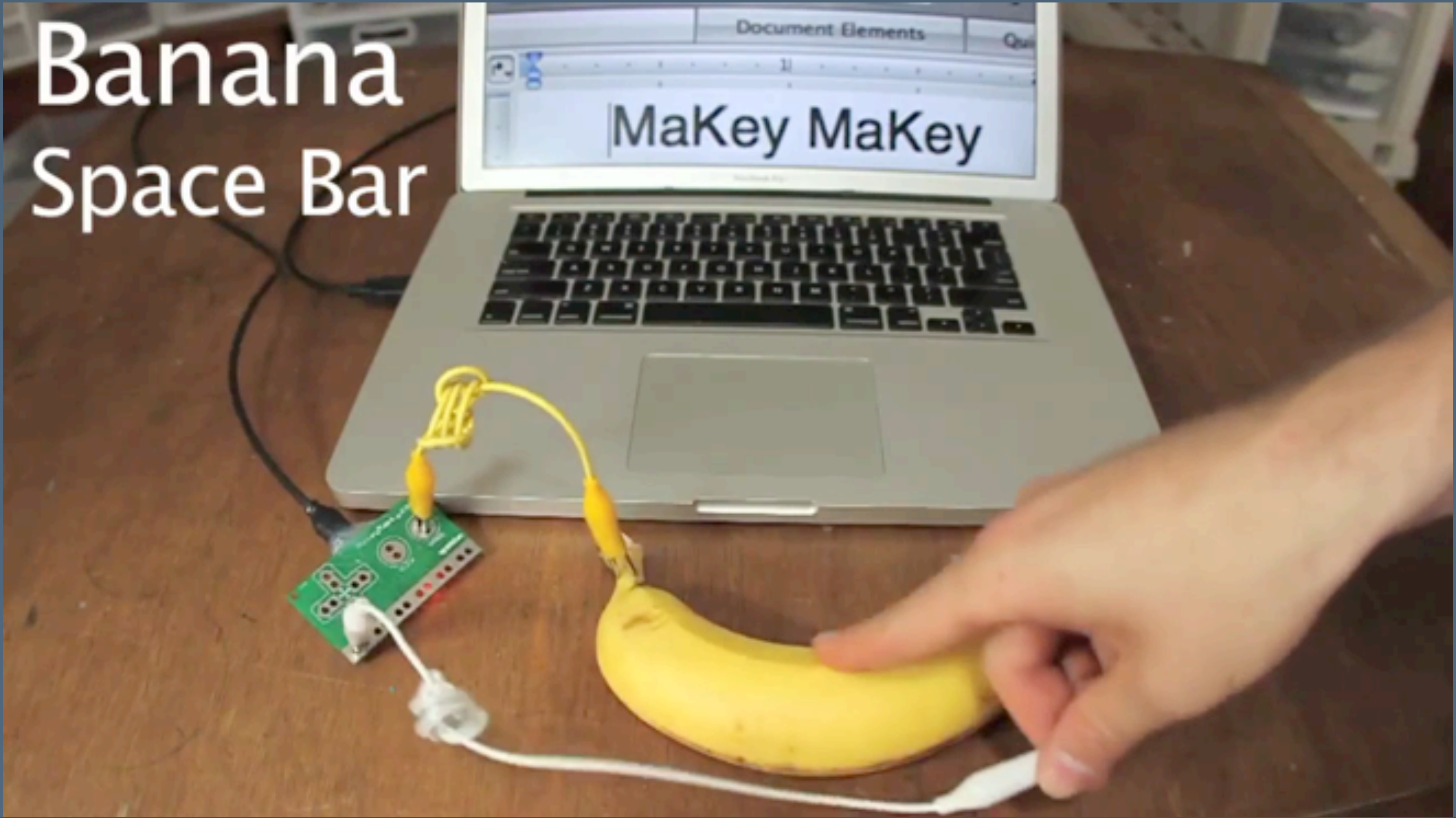

d.tools: prototyping behavior via statecharts [Hartmann et al., UIST '06]

- Plug-and-play HW, visual statechart behaviors

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Authoring sensor-based interaction by demonstration

[Hartmann et al., CHI ’07]

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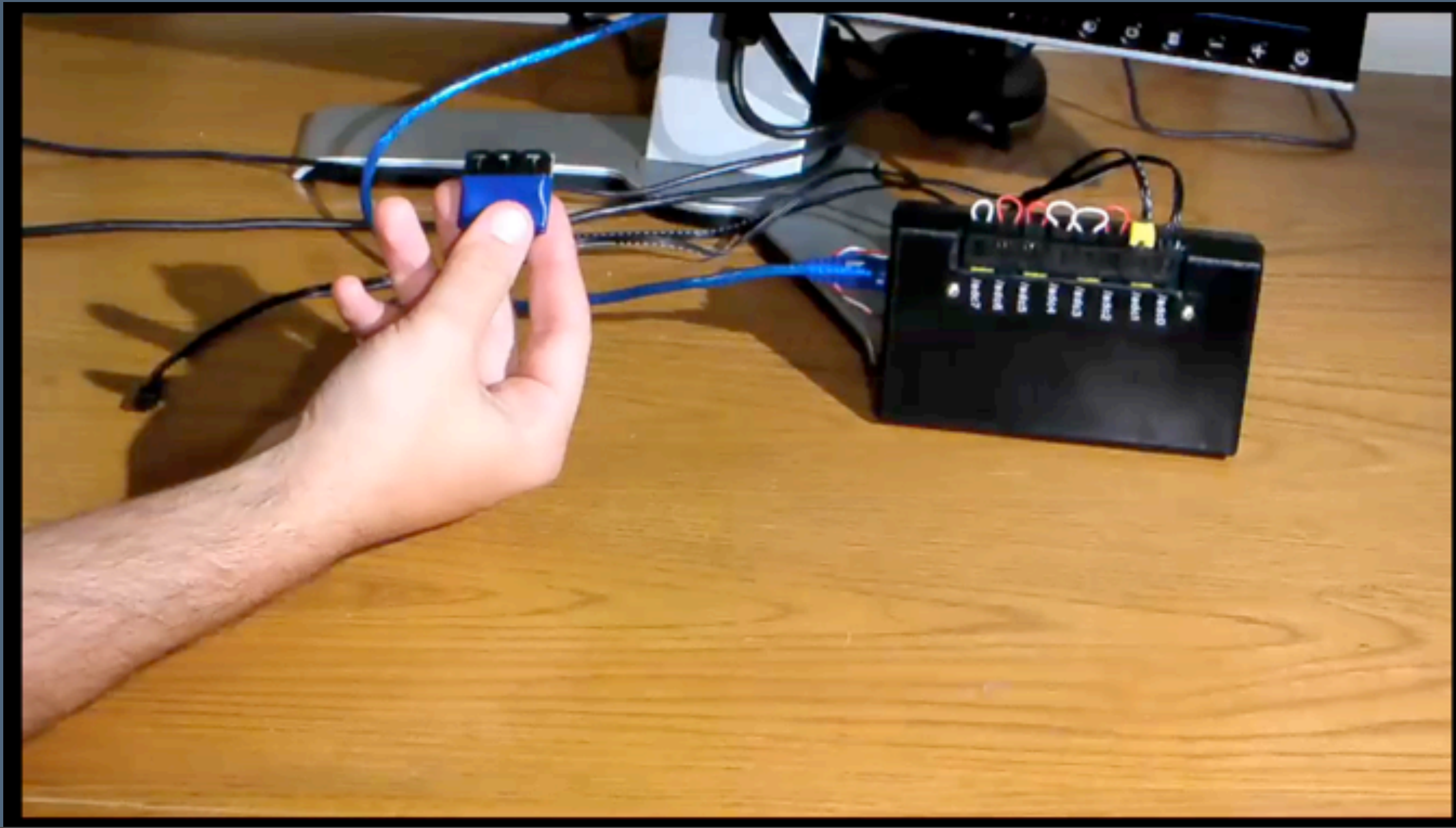

Fabricating custom capacitive hardware [Savage et al., UIST '12]

- Author behaviors; software does circuit layout

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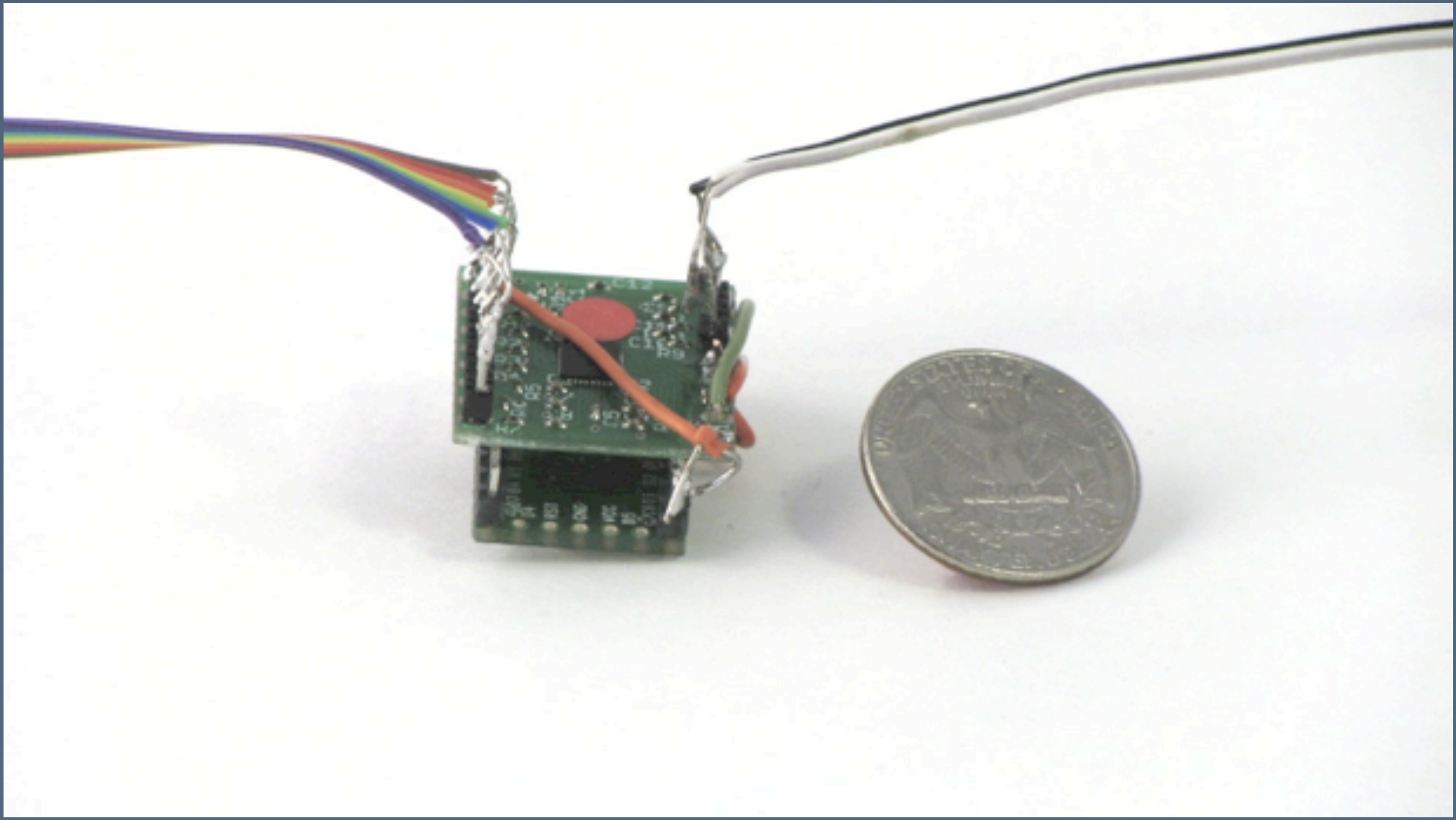
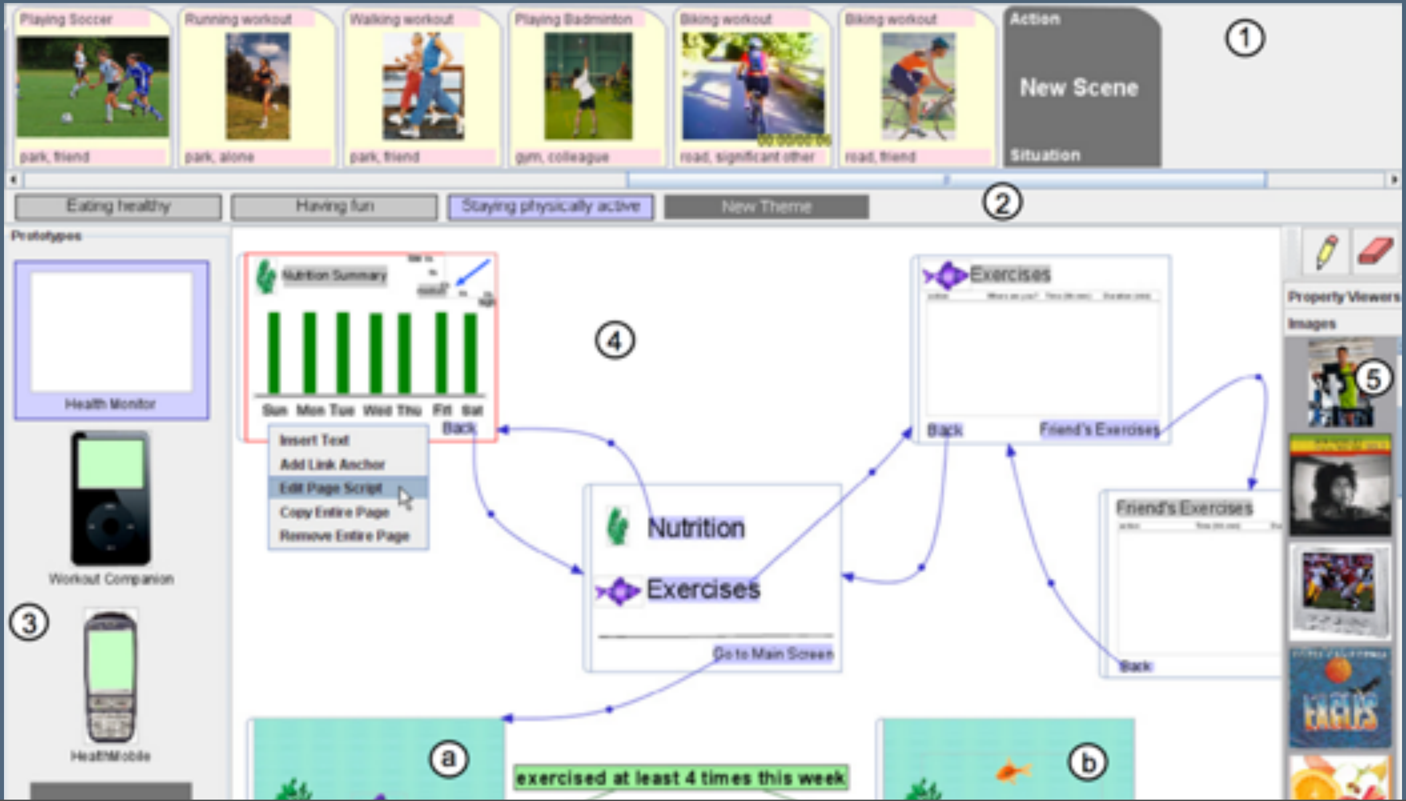


Behavior prototyping

Prototyping for daily, long-lived activities [Li and Landay, CHI ’08]

- Rather than treating sensors or states as the top-level abstraction, focus on **activites**


Playing Soccer
park, friend
Running workout
park, alone
Walking workout
park, friend
Playing Badminton
gym, colleague
Biking workout
road, significant other
Biking workout
road, friend
Action
New Scene
Situation
1
Eating healthy
Having fun
Staying physically active
New Theme
2
Prototypes
Health Monitor
Workout Companion
HealthMobile
3
Nutrition Summary
Sun Mon Tue Wed Thu Fri Sat
Back
Insert Text
Add Link Anchor
Edit Page Script
Copy Entire Page
Remove Entire Page
4
Nutrition
Exercises
Go to Main Screen
Exercises
Back
Friend's Exercises
Friend's Exercises
Back
Property Viewers
Images
5
a
exercised at least 4 times this week
b