The touch events

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<!DOCTYPE html>, 13 April 2011
Before we start

• please open the following link on your phone
  • http://quirksmode.org/touchevents
  • It gives links to test files I’ll refer to in my presentation.
  • The touch tests work on iPhone, Android, bada, BlackBerry Torch, and Opera Mobile 10.1+
In the beginning was the mouse
In the beginning was the mouse

Then we figured out we had to do something about the keyboard, too.
And now we also have touch
Interaction modes

- They sometimes need different approaches
- but at other times a similar approach
- It’s all a matter of events
mouseover
mouseout
mousedown
mouseup
mousemove
mouseenter
mouseleave
touchstart
touchmove
touchend
touchcancel
Interaction modes

• On desktop it’s simple
• Someone uses either the keyboard, or the mouse
• The two interaction modes can largely ignore each other
• (though they may use the same functions)
• On mobile it’s not so simple
Interaction modes

- Nokia E71
- No touchscreen
Interaction modes

- Nokia E71
- No touchscreen
- 4-way navigation (keys)
Interaction modes

• Nokia E71
• No touchscreen
• 4-way navigation (keys)
• but the keys steer a mouse cursor
• Key events and mouse events at the same time
Besides, touchscreen phones must support the mouse events, too.

There are too many websites that depend on mouse events.
Example 1

• [http://quirksmode.org/touchevents](http://quirksmode.org/touchevents)
• Open the first dropdown example

• Task: Click on option 3.2
• Works. A bit oddly, but works.
• This script uses mouseover and mouseout; no touch events.
Example 2

- [http://quirksmode.org/touchevents](http://quirksmode.org/touchevents)
- Now open the second dropdown example

- Task: Click on option 3.2
- Does not work.
- This is with the touch events swapped in for the mouse events.
Comparison

• Not a fair comparison.

• Touchstart and touchend are not the equivalents of mouseover and mouseout.

• Mouseover and mouseout are about hover state

• and hover state does not exist on touchscreens.
Hover

• Hover states cannot function on touchscreens.
• There is no way of saying “I may be interested in this element, but I’m not sure yet.”
• This will change the ways we interact with websites
• change for the good
# Interaction modes

<table>
<thead>
<tr>
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<th>Touch</th>
</tr>
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<tbody>
<tr>
<td>mousedown</td>
<td>keydown</td>
<td>touchstart</td>
</tr>
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<td>keypress</td>
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<td>keyup</td>
<td>touchend</td>
</tr>
<tr>
<td>mouseover</td>
<td>focus</td>
<td>–</td>
</tr>
<tr>
<td>mouseout</td>
<td>blur</td>
<td>–</td>
</tr>
<tr>
<td>load, unload,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>click, submit,</td>
<td></td>
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</tr>
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| change etc.    |             |                   | etc.
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load, unload, click, submit, resize, zoom, change etc. etc.
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Stick with click

- Really means “activate”
- Works everywhere, on every phone
- But: slow
The slowness of click

If you touch an element, it may mean several things

• “I want to single-tap”
• “I want to scroll this”
• “I want to pinch-zoom”
• “I want to double-tap”

Thus a click (or rather, a single tap) is a bit slow: it needs to wait until the OS is certain you don’t want to do anything else.
The touch event spec

- Touchstart, touchmove, touchend
- touches, changedTouches, targetTouches
- Touchenter, touchleave
- Area
- Force
Touch and mouse

• If you touch an element the touch events fire,
• but the mouse events fire, too.
• Just not quite like you’re used to
Touch and mouse

If you touch an element, the following events all fire, in this order:

- touchstart
- mouseover
-mousemove (only one!)
- mousedown
- mousedown
- mouseup
- click
- :hover styles are applied
Touch and mouse

That’s not as big a problem as you’d think.

Generally you use either the touch events or just one mouse event.

Only problem: mousemove. But it won’t work on touchscreens in any case.
Touchmove

- Touchmove fires when the touch moves (<duh />)
- But...
- it continues firing even if the finger leaves the element the event is handled on.
- `element.ontouchmove = doSomething;`
- `doSomething` is still called after the finger leaves the element
- What we’d really need is touchenter and touchleave. They’re in the spec, but not yet supported.
Touch and mouse

- touchstart
- mouseover
-mousemove (only one!)
- mousedown
- mouseup
- click
- :hover styles are applied
Touch and mouse

- touchstart
- mouseover
-mousemove (only one!)

On iPhone and Symbian,
if a DOM change occurs onmouseover or
onmousemove,
all other events are cancelled.
This probably makes sense somehow...
Touch and mouse

If you touch another element,

• the mouseout event fires on the original element
• the :hover styles are removed from the original element
• Now you understand why the first dropdown menu works as it works.
Example 3

• [http://quirksmode.org/touchevents](http://quirksmode.org/touchevents)

• See for yourself at the touch action test page.

• (This is the page I used to determine all these facts.)
Example 4

• [http://quirksmode.org/touchevents](http://quirksmode.org/touchevents)
• Now try the Event Delegation page.

• I created it to study the weirdest bug ever. On the iPhone.
iPhone bug

• If you touch the bordered div a click event fires (eventually)
• It’s supposed to bubble up to the document, where it is caught
• `document.onclick = changeBorder;`
• However, on the iPhone the bubbling stops just below the `<body>`.
• For the life of me I can’t figure out why (though it’s likely deliberate)
iPhone bug

• Workaround:
  • make sure that the div is clickable:
  • `div.onclick = function (){}`
  • An empty event handler is enough.

• Or ...

  • `div {cursor: pointer}`
  • Don’t ask me why Apple thought this was a good idea.
Example 5

- http://quirksmode.org/touchevents
- The first drag-and-drop example
- Works fine with mouse or touch.
- mousedown-mousemove-mouseup
- touchstart-touchmove-touchend
- Completely equivalent
So mousedown and mouseup are the true equivalents of touchstart and touchend.

Still, that doesn’t mean they’re the same.
Touch !== mouse

- Area
- Pressure
- Temperature
- Multitouch
Drag and drop

element.onmousedown = function (e) {
    // initialise
    document.onmousemove = function (e) {
        // move
    }
    document.onmouseup = function (e) {
        document.onmousemove = null;
        document.onmouseup = null;
    }
}
Drag and drop

element.onmousedown = function (e) {
  // initialise
  document.onmousemove = function (e) {
    // move
  }
  document.onmouseup = function (e) {
    document.onmousemove = null;
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    }
}
Drag and drop

element.ontouchstart = function (e) {
    // initialise
document.ontouchmove = function (e) {
        // move
    }

document.ontouchend = function (e) {
    document.ontouchmove = null;
document.ontouchend = null;
}
}
 Drag and drop

```javascript
element.ontouchstart = function (e) {
    // initialise

    element.ontouchmove = function (e) {
        // move
    }

    element.ontouchend = function (e) {
        element.ontouchmove = null;
        element.ontouchend = null;
    }
}
```
Drag and drop

// for mouse
element.onmousedown = function (e) {
    // yaddah
}

// for touch
element.ontouchstart = function (e) {
    // yaddah
}
Drag and drop

// for mouse
element.onmousedown = function (e) {
    // yaddah
}

// for touch
element.ontouchstart = function (e) {
    // yaddah
    element.onmousedown = null;
}
Example 6

- http://quirksmode.org/touchevents
- The second drag-and-drop example
- Multitouch, baby!
- Works only on iPhone and (a bit stilted) Opera Mobile 10.1+
- Completely impossible with mouse
- Would be fun for games, especially on a tablet
Example 7

- [http://quirksmode.org/touchevents](http://quirksmode.org/touchevents)
- The scrolling layer example

- Works fine in all browsers that support the touch events
- But: how are we going to port this to other interaction models?
- Keyboard: arrow keys
- But what about the mouse?
Thank you!
Questions?

http://quirksmode.org
http://twitter.com/ppk

I'll post these slides on my site.