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.

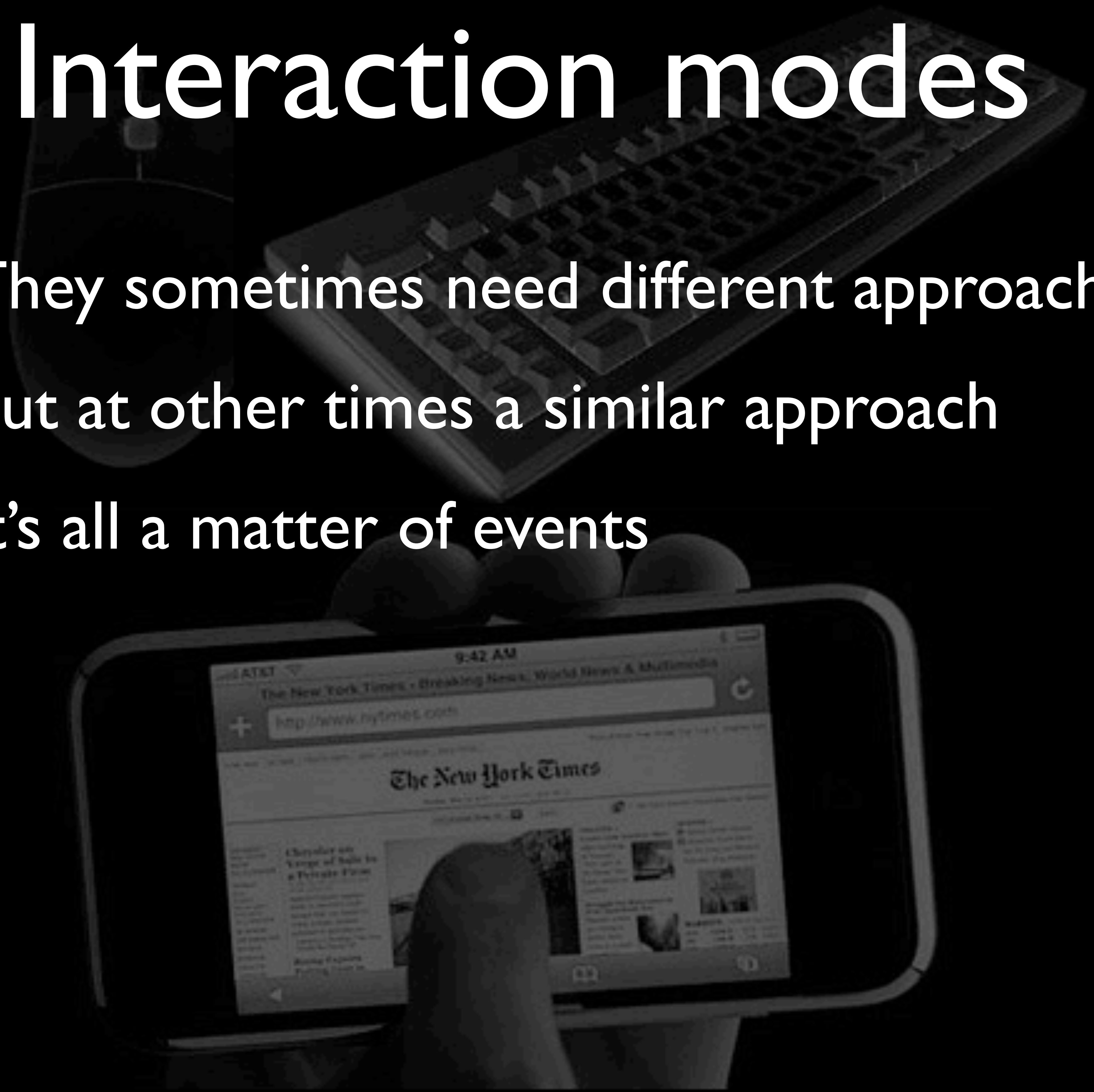
Text

And now we also have touch

AT&T
9:42 AM
The New York Times - Breaking News, World News & Multimedia
http://www.nytimes.com
The New York Times
Chrysler on Verge of Sale to a Private Firm

Interaction modes

- They sometimes need different approaches
- but at other times a similar approach
- It’s all a matter of events



keydown
keypress
keyup

mouseover
mouseout
mousedown
mouseup
mousemove
mouseenter
mouseleave

touchstart
touchmove
touchend
touchcancel

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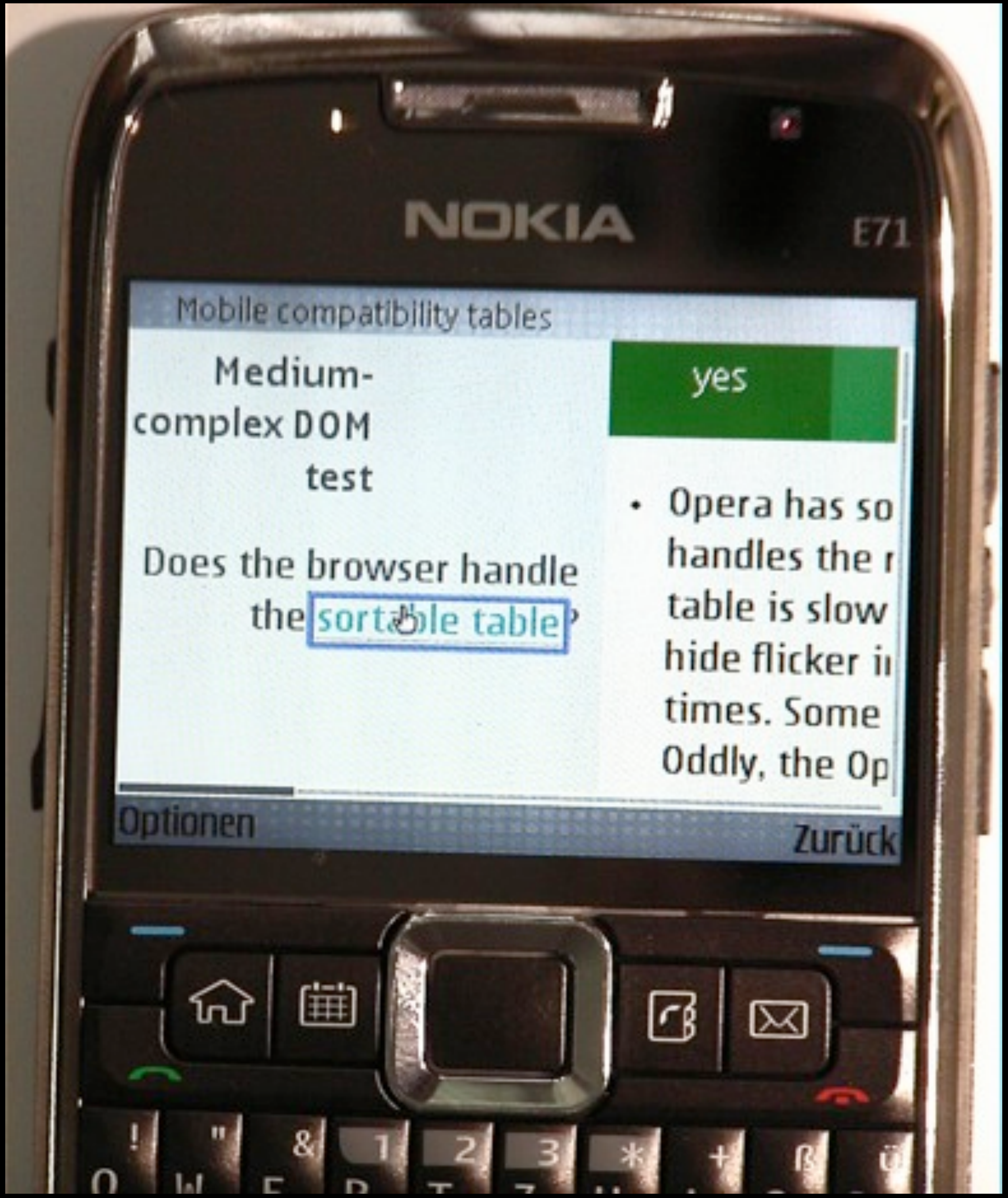
Interaction modes

- 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



Mobile compatibility tables

Medium-complex DOM test

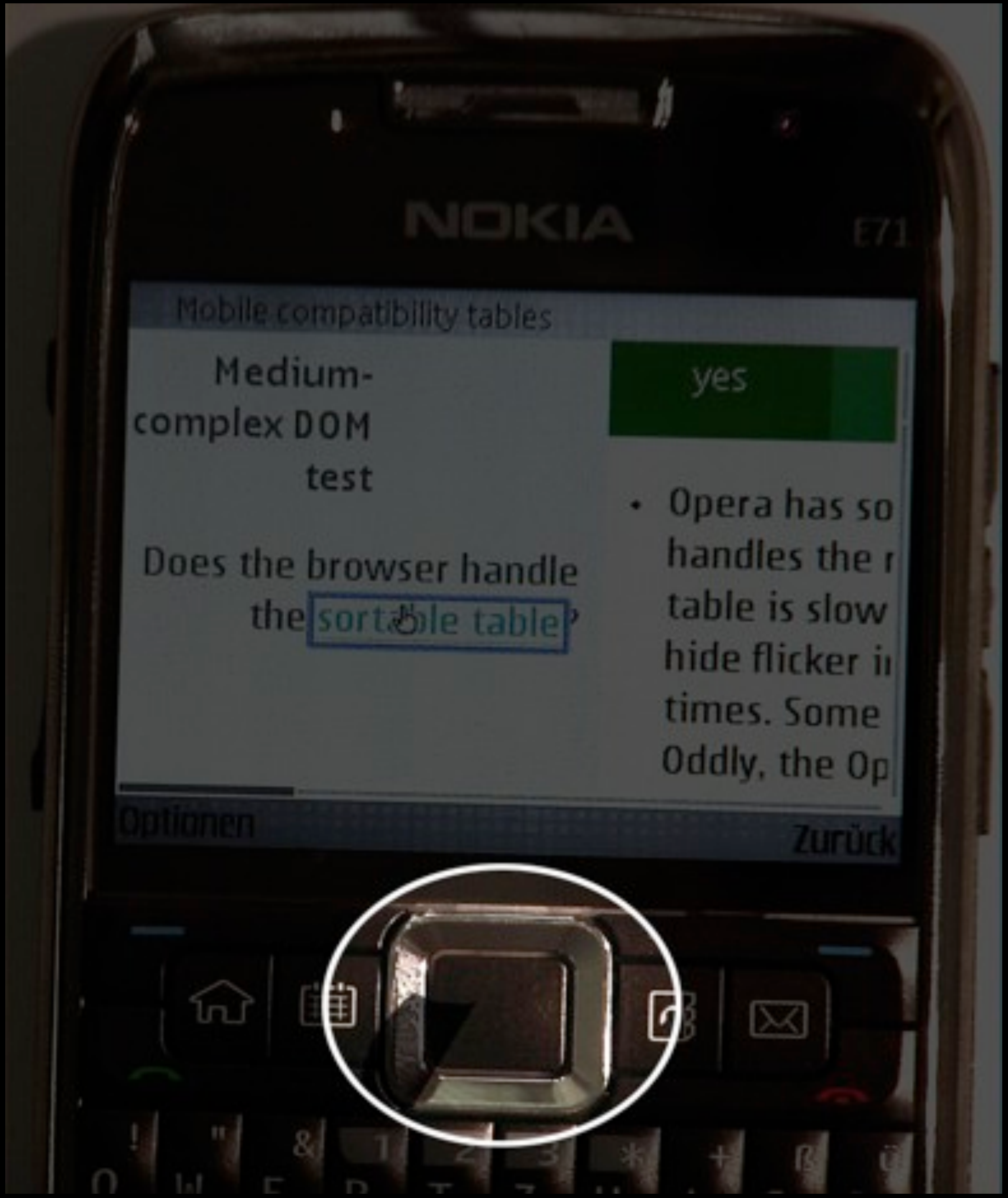
Does the browser handle the sortable table?

yes

- Opera has so handles the r table is slow hide flicker i times. Some Oddly, the Op

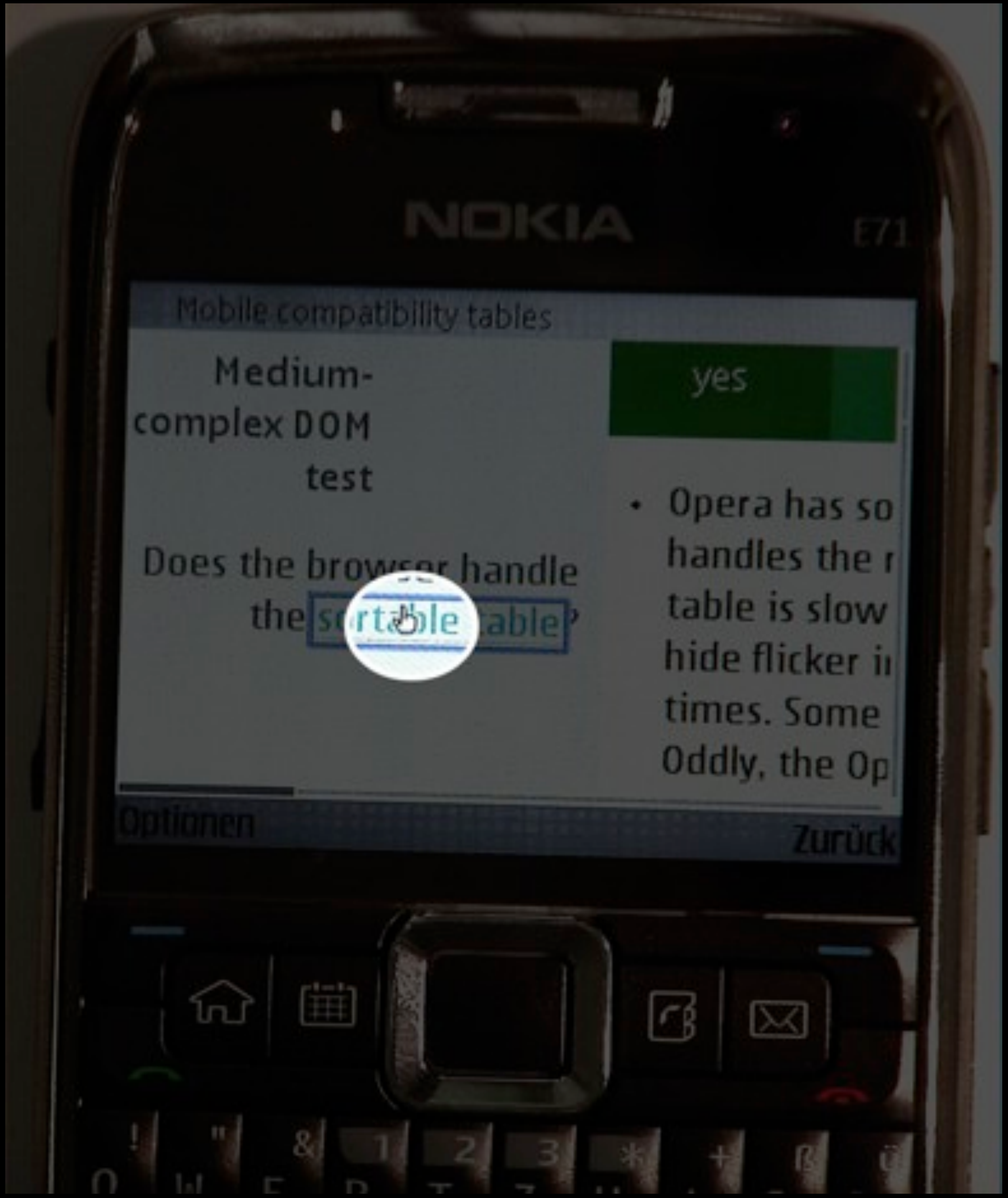
Interaction modes

- 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.

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Example 1

- 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
- 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

Mouse	Keyboard	Touch
mousedown	keydown	touchstart
mousemove	keypress	touchmove
mouseup	keyup	touchend
mouseover	focus	–
mouseout	blur	–

load, unload, click, submit, resize, zoom, change etc. etc.

Interaction modes

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Interaction modes

Mouse	Keyboard	Touch
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mouseover	focus	–
mouseout	blur	–

load, unload, click, submit, resize, zoom, change etc. etc.

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, target Touches
- 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
- 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
- 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
- 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

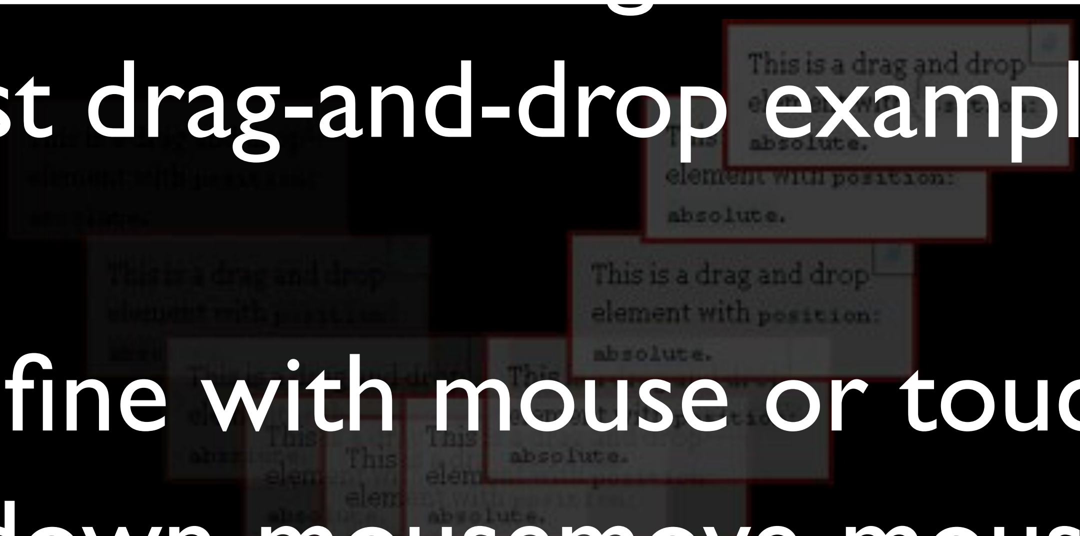
- Workaround:
- make sure that the div is clickable:
- `div.onclick = function (){}`
- An empty event handler is enough.

- 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

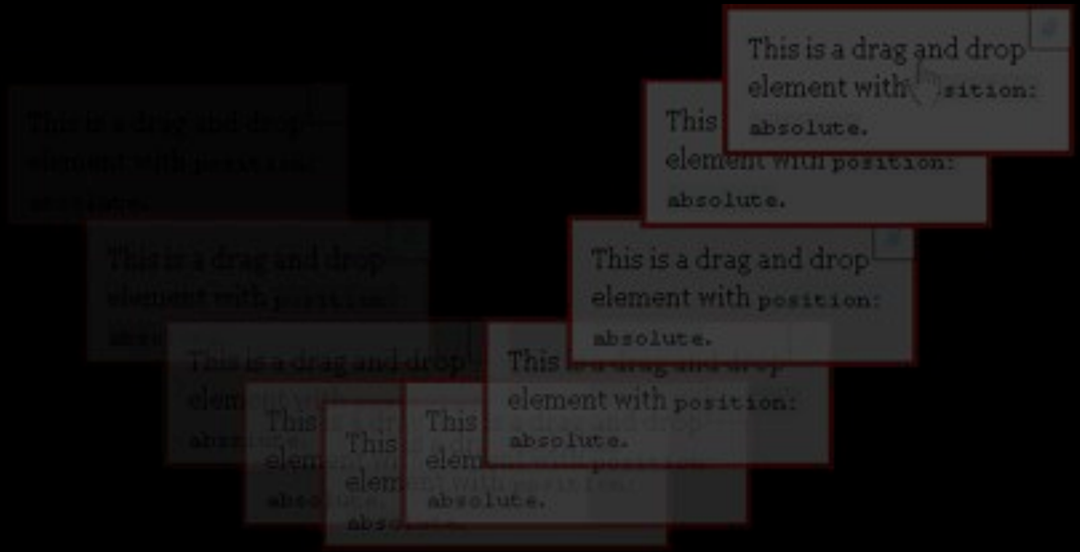


This is a drag and drop element with position: absolute.

- 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.

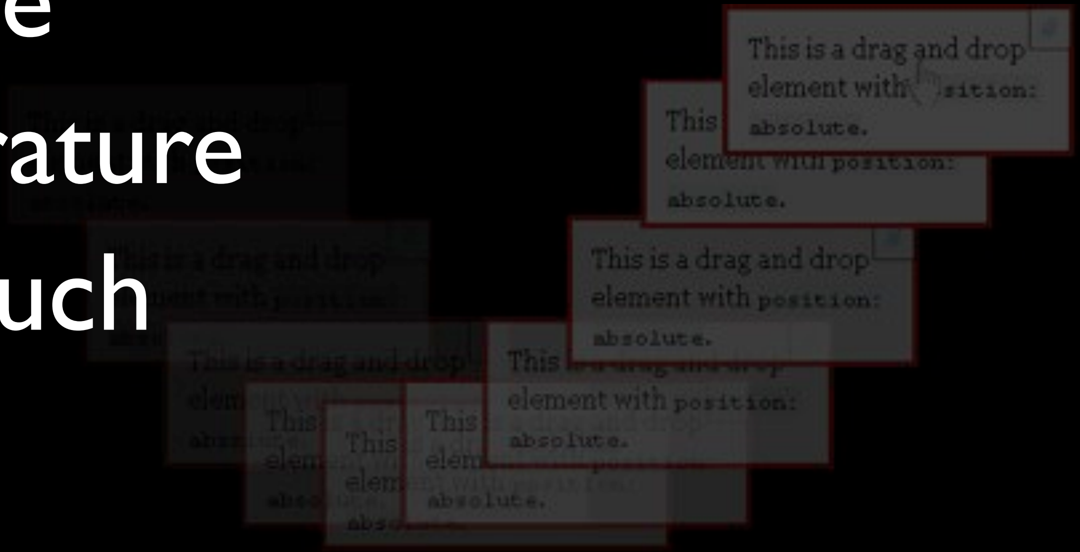
Still, that doesn’t mean they’re the same.



This is a drag and drop element with `position: absolute`.

Touch !== mouse

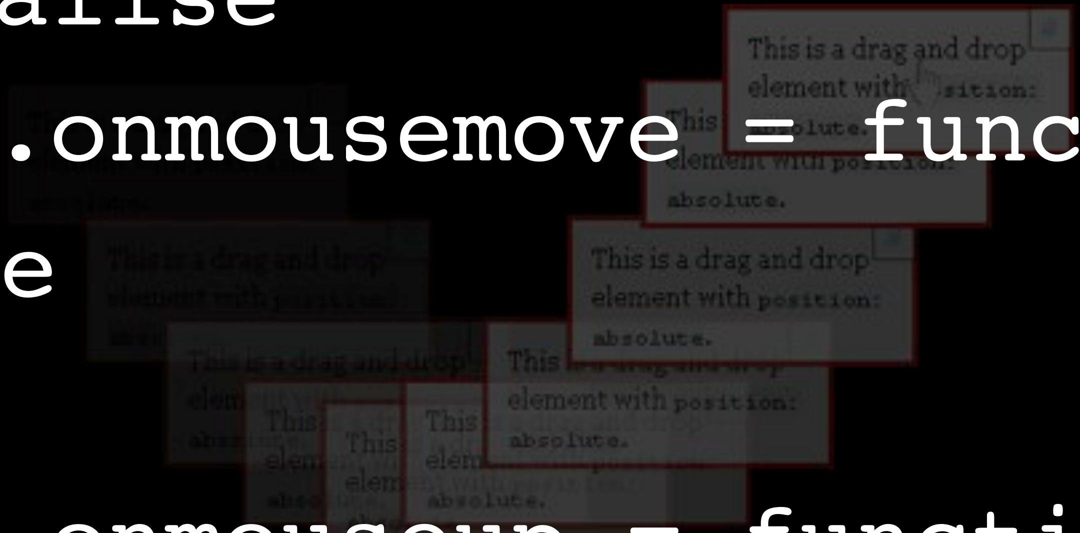
- Area
- Pressure
- Temperature
- Multitouch



This is a drag and drop element with `position: absolute.`

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

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element.onmousedown = function (e) {
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  document.onmousemove = function (e) {
    // move
  }
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    document.onmousemove = null;
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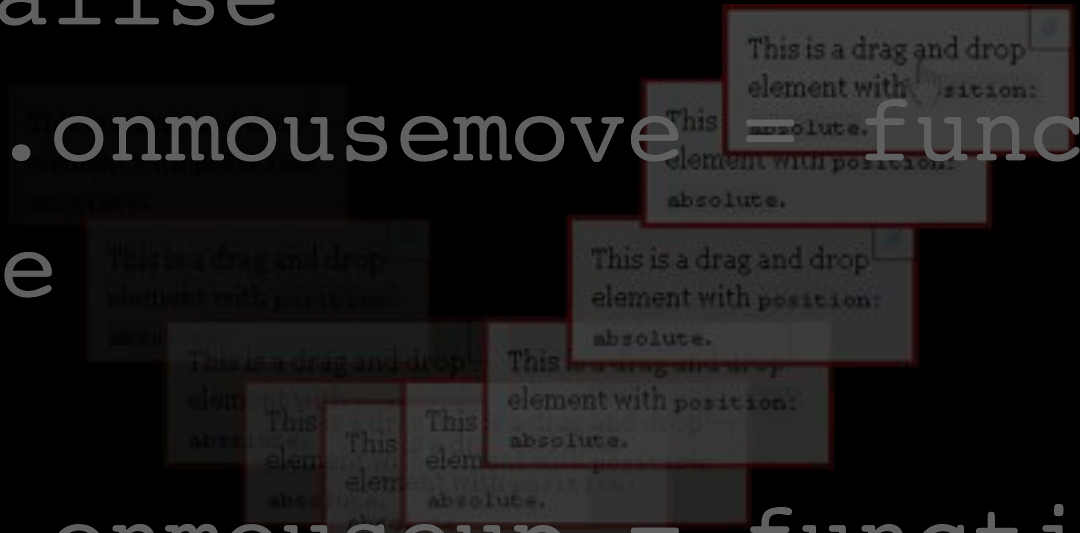

Drag and drop

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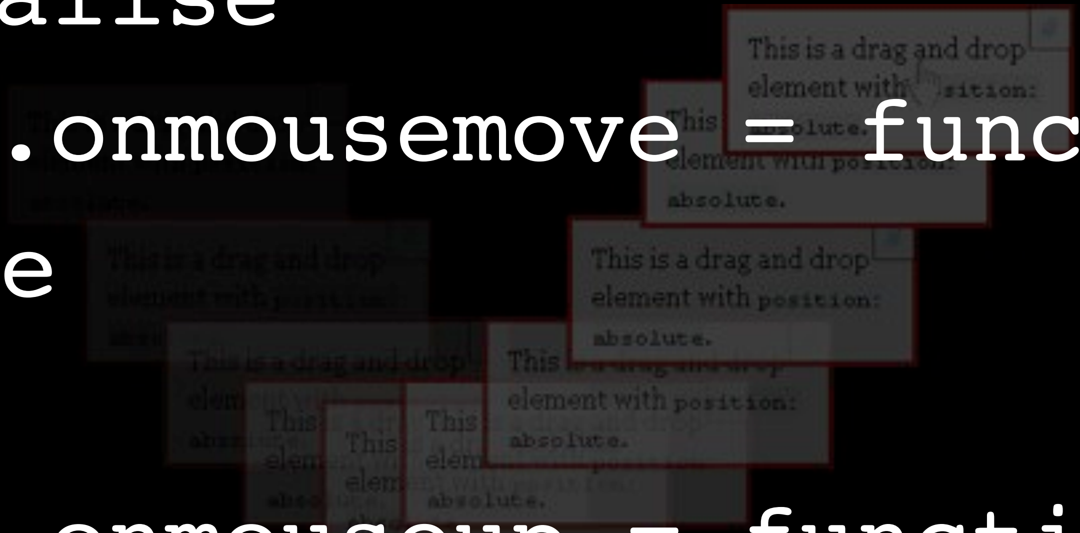
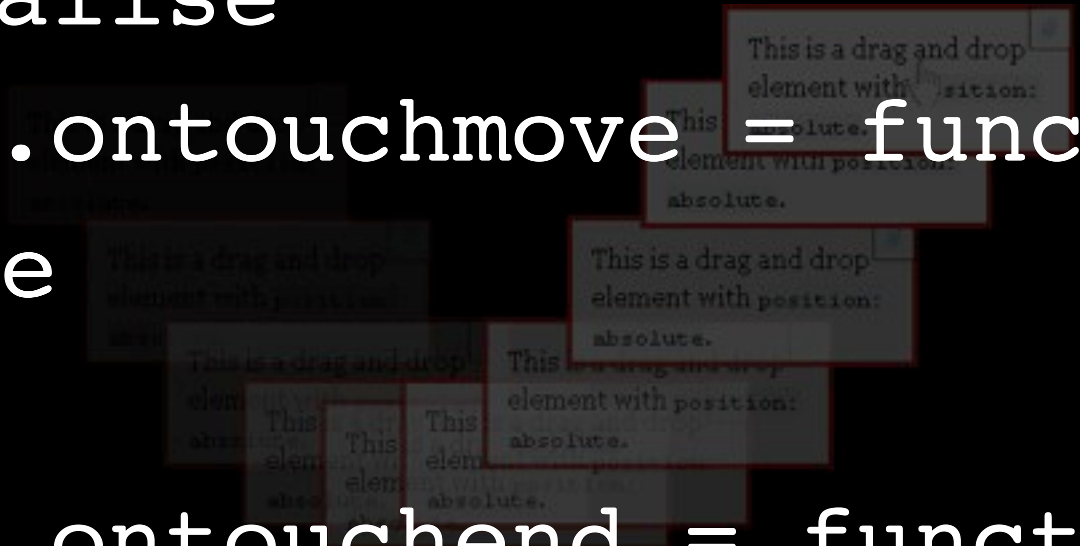


This is a drag and drop element with position: absolute.

Drag and drop

```
element.ontouchstart = function (e) {
  // initialise
  document.ontouchmove = function (e) {
    // move
  }
  document.ontouchend = function (e) {
    document.ontouchmove = null;
    document.ontouchend = null;
  }
}
```

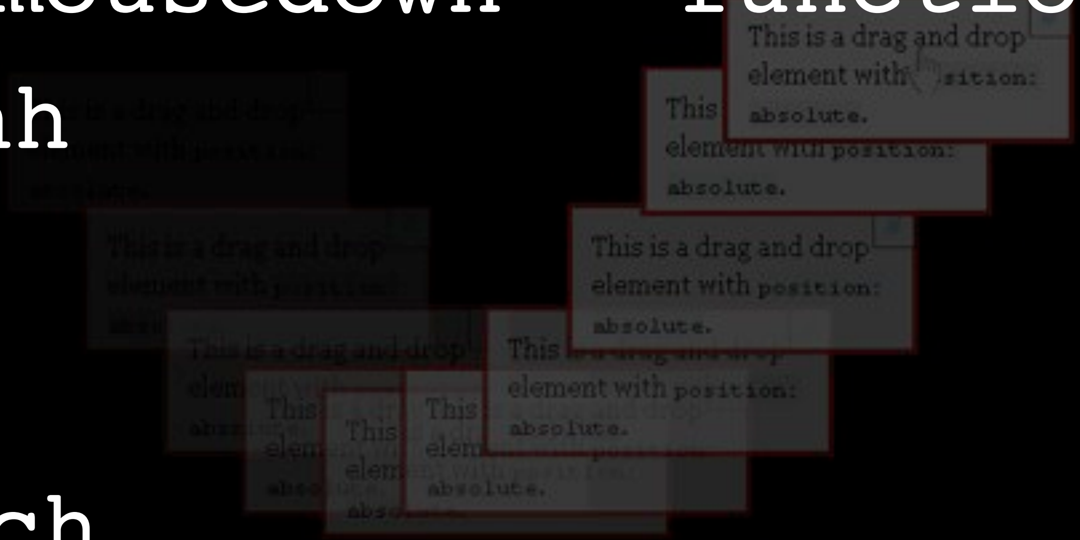


Drag and drop

```
element.ontouchstart = function (e) {
  // initialise
  element.ontouchmove = function (e) {
    // move
  }
  element.ontouchend = function (e) {
    element.ontouchmove = null;
    element.ontouchend = null;
  }
}
```

Drag and drop

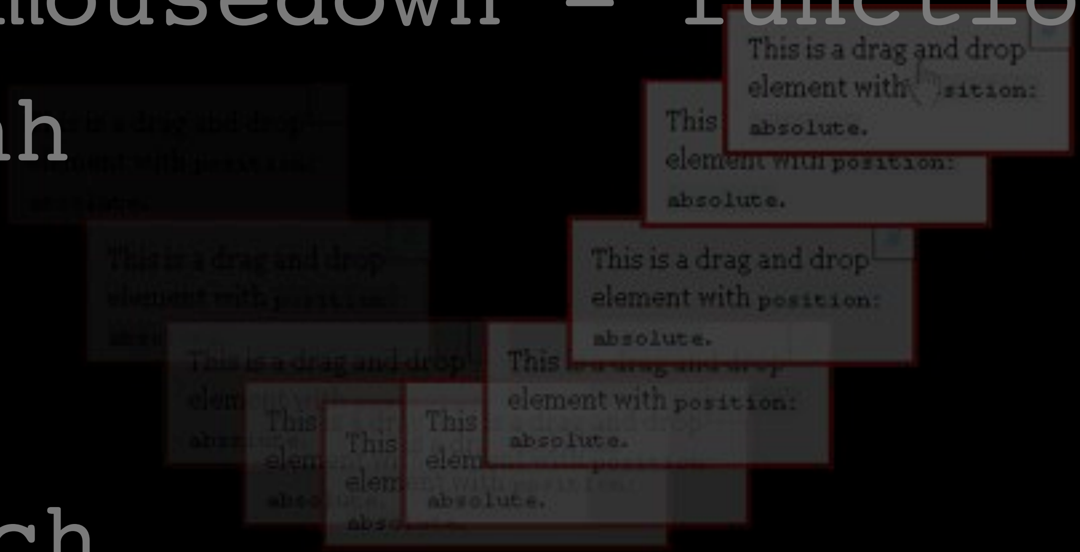
```
// for mouse
element.onmousedown = function (e) {
   // yaddah
}

// for touch
element.ontouchstart = function (e) {
   // yaddah


}
```



This is a drag and drop element with position: absolute.

Drag and drop

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



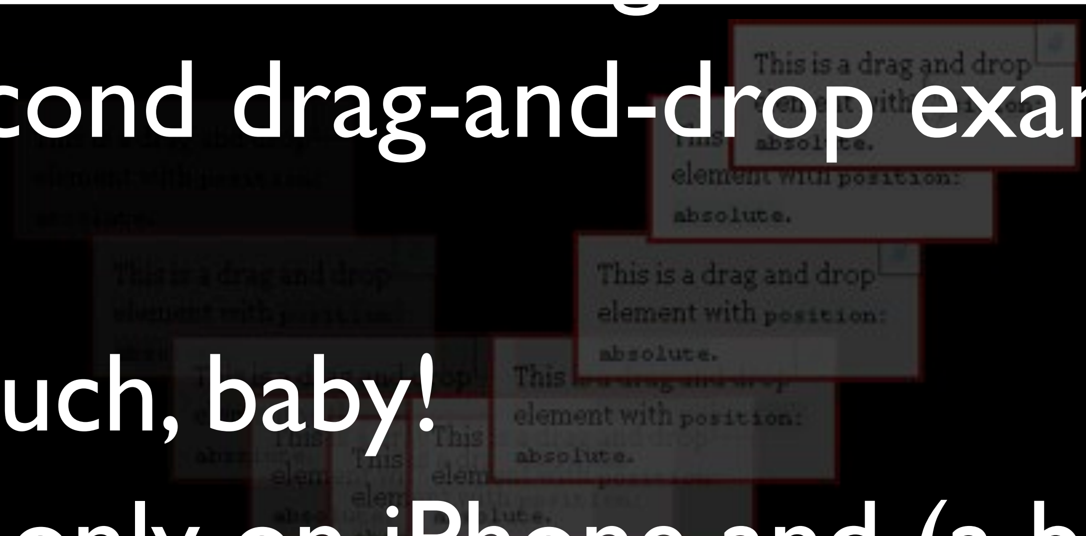
This is a drag and drop element with position: absolute.

```
// 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



This is a drag and drop element with position: absolute.

Example 7

- 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.