6.170 – Software Studio
GUIs & Events

Adam Chlipala, Mark Day, Daniel Jackson
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The Scary Concurrency Model from Java et al.

Arbitrary *interleavings* of threads make concurrent programs hard to understand!

```
x = 1;
y = x;
z = y + x;
```

```
x = 0;
y = x;
z = y - x;
```

```
x = 1;
y = x;
z = y + x;
```

```
x = 0;
y = x;
z = y - x;
```

```
x = 1;
y = x;
z = y + x;
```

```
x = 0;
y = x;
z = y - x;
```

OR

```
x = 0;
y = x;
```

```
x = 0;
y = x;
```

```
x = 0;
y = x;
z = y + x;
```

```
x = 0;
y = x;
z = y - x;
```

```
x = 0;
y = x;
z = y + x;
```

```
x = 0;
y = x;
z = y - x;
```

OR ....
Browser JavaScript Event Model

Whenever nothing is running in the JavaScript sandbox, the browser can activate the event from the front of the queue.

Event queue stores actions as events to be run once the current top-level function execution finishes. Only one thread running at a time per browser tab, with exclusive DOM access!

Each event is translated into one (or more) JavaScript functions that should be run.

Event Queue

- event
- event
- event
- event
Demo: Basic Events in HTML

Code in:

http://github.com/6170-fa14/6.170-lectures
If we click here, in what order do events fire?

Parents to children = capturing

Children to parents = bubbling

Web browsers historically have disagreed on which to do!
jQuery

An extremely popular JavaScript library, used by 95% of web sites with JavaScript!

Basically a remix of the browser DOM interface, “the way it should have been designed.”

Smoothes out browser incompatibilities (e.g., chooses bubbling).

http://jquery.org/
Demo: Basic Events with jQuery

Code in:

http://github.com/6170-fa14/6.170-lectures
Reactive GUIs

A trendy idea today: express GUIs more declaratively, with better separation of concerns and less imperative updating.

You can find dozens of frameworks with a web search for “reactive JavaScript”! (Some might use “reactive” slightly differently than we will here.)

It doesn't take much code to implement a simple reactive JavaScript framework and use it for some GUI widgets (and we get to practice asynchronous callbacks).
Demo: Star Rating Widget, Reactively

Code in:
http://github.com/6170-fa14/6.170-lectures
Miscellaneous

- Project 1.2 due in a little less than a week.
- Tomorrow's recitation: CSS, the visual styling system of the web
- *Next Monday*: second *in-class quiz!* On this week's material about objects and GUIs.