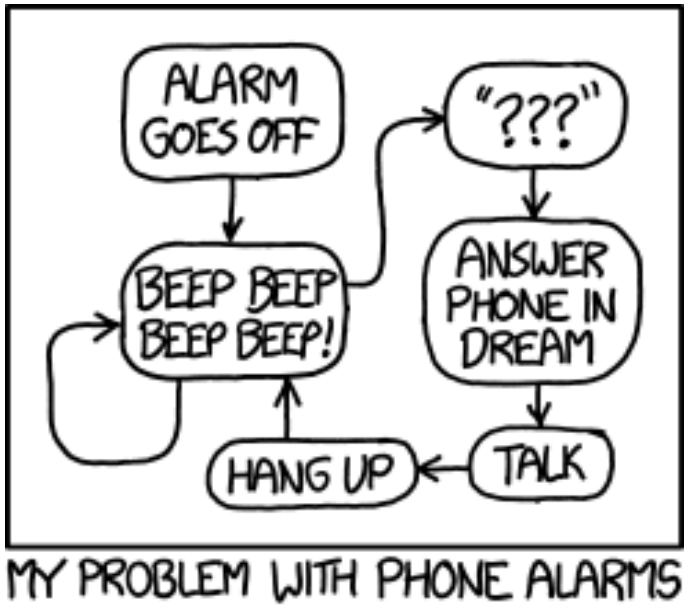
CSE 154

LECTURE 8: EVENTS AND TIMERS



attribute

Setting a timer

method	description
setTimeout(*function*, *delayMS*);	arranges to call given function after given delay in ms
setInterval(*function*, *delayMS*);	arranges to call function repeatedly every *delayMS* ms
clearTimeout(*timerID*); clearInterval(*timerID*);	stops the given timer

- both `setTimeout` and `setInterval` return an ID representing the timer
  - this ID can be passed to `clearTimeout`/`Interval` later to stop the timer

setTimeout example

```html
<button id="clickme">Click me!</button>
<span id="output"></span>
```

HTML

```js
window.onload = function() {
  document.getElementById("clickme").onclick = delayedMessage;
};

function delayedMessage() {
  document.getElementById("output").innerHTML = "Wait for it...";
  setTimeout(sayBooyah, 5000);
}

function sayBooyah() {    // called when the timer goes off
  document.getElementById("output").innerHTML = "BOOYAH!";
}
```

JS

Click me!

output

setInterval example

```
var timer = null;  // stores ID of interval timer

function delayMsg2() {
  if (timer === null) {
    timer = setInterval(rudy, 1000);
  } else {
    clearInterval(timer);
    timer = null;
  }
}

function rudy() {   // called each time the timer goes off
  document.getElementById("output").innerHTML += " Rudy!";
}
```

JS

Click me!

output

Passing parameters to timers

```
function delayedMultiply() {
  // 6 and 7 are passed to multiply when timer goes off
  setTimeout(multiply, 2000, 6, 7);
}
function multiply(a, b) {
  alert(a * b);
}
```

JS

Click me!

output

- any parameters after the delay are eventually passed to the timer function
  - doesn't work in IE; must create an intermediate function to pass the parameters
- why not just write this?

```
setTimeout(multiply(6 * 7), 2000);
```

JS

Common timer errors

- many students mistakenly write `()` when passing the function

```
setTimeout(booyah(), 2000);
setTimeout(booyah, 2000);

setTimeout(multiply(num1 * num2), 2000);
setTimeout(multiply, 2000, num1, num2);
```
JS

- what does it actually do if you have the `()` ?
  - it calls the function immediately, rather than waiting the 2000ms!

Checkboxes: <input>

yes/no choices that can be checked and unchecked (inline)

```
<input type="checkbox" name="lettuce" /> Lettuce
<input type="checkbox" name="tomato" checked="checked" /> Tomato
<input type="checkbox" name="pickles" checked="checked" /> Pickles
```

HTML

output

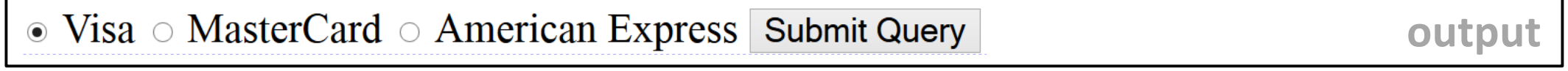
- none, 1, or many checkboxes can be checked at same time
- when sent to server, any checked boxes will be sent with value on:
  - http://webster.cs.washington.edu/params.php?tomato=on&pickles=on
- use checked="checked" attribute in HTML to initially check the box

Radio buttons: <input>

sets of mutually exclusive choices (inline)

```
<input type="radio" name="cc" value="visa" checked="checked" /> Visa
<input type="radio" name="cc" value="mastercard" /> MasterCard
<input type="radio" name="cc" value="amex" /> American Express
```

HTML



output

- grouped by name attribute (only one can be checked at a time)
- must specify a value for each one or else it will be sent as value on

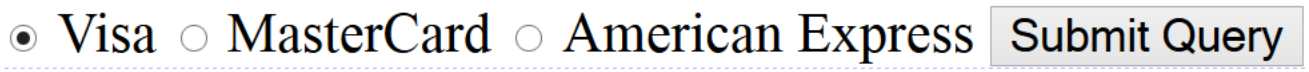
Text labels: <label>

```
<label><input type="radio" name="cc" value="visa"
checked="checked" /> Visa</label>

<label><input type="radio" name="cc" value="mastercard" />
MasterCard</label>

<label><input type="radio" name="cc" value="amex" /> American
Express</label>
```

HTML



output

- associates nearby text with control, so you can click text to activate control
- can be used with checkboxes or radio buttons
- label element can be targeted by CSS style rules

Drop-down list: <select>, <option>

menus of choices that collapse and expand (inline)

```
<select name="favoritecharacter">
  <option>Jerry</option>
  <option>George</option>
  <option selected="selected">Kramer</option>
  <option>Elaine</option>
</select>
```

HTML

- option element represents each choice
- select optional attributes: disabled, multiple, size
- optional selected attribute sets which one is initially chosen

Using <select> for lists

```
<select name="favoritecharacter[]" size="3" multiple="multiple">
  <option>Jerry</option>
  <option>George</option>
  <option>Kramer</option>
  <option>Elaine</option>
  <option selected="selected">Newman</option>
</select>
```

HTML

output

- optional multiple attribute allows selecting multiple items with shift- or ctrl-click
  - must declare parameter's name with [] if you allow multiple selections
- option tags can be set to be initially selected

Option groups: <optgroup>

```
<select name="favoritecharacter">
  <optgroup label="Major Characters">
    <option>Jerry</option>
    <option>George</option>
    <option>Kramer</option>
    <option>Elaine</option>
  </optgroup>
  <optgroup label="Minor Characters">
    <option>Newman</option>
    <option>Susan</option>
  </optgroup>
</select>
```

HTML

Submit Query

output

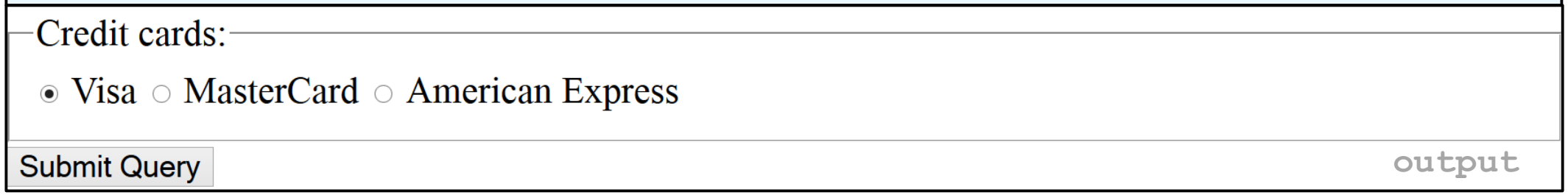
- What should we do if we don't like the bold appearance of the optgroups?

Grouping input: <fieldset>, <legend>

groups of input fields with optional caption (block)

```
<fieldset>
  <legend>Credit cards:</legend>
  <input type="radio" name="cc" value="visa" checked="checked" /> Visa
  <input type="radio" name="cc" value="mastercard" /> MasterCard
  <input type="radio" name="cc" value="amex" /> American Express
</fieldset>
```

HTML



output

- fieldset groups related input fields, adds a border; legend supplies a caption

Styling form controls

```
element[attribute="value"] {
  property : value;
  property : value;
  ...
  property : value;
}
```
CSS

```
input[type="text"] {
  background-color: yellow;
  font-weight: bold;
}
```
CSS

Borat

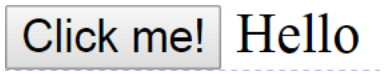
output

- attribute selector: matches only elements that have a particular attribute value
- useful for controls because many share the same element (input)

The innerHTML property

```
<button onclick="addText();">Click me!</button>
<span id="output">Hello </span>
```
HTML

```
function addText() {
  var span = document.getElementById("output");
  span.innerHTML += " bro";
}
```
JS



output

- can change the text inside most elements by setting the `innerHTML` property

Abuse of innerHTML

```
// bad style!
var paragraph = document.getElementById("welcome");
paragraph.innerHTML =
                "<p>text and <a href=\"page.html\">link</a>";
```

JS

- `innerHTML` can inject arbitrary HTML content into the page
- however, this is prone to bugs and errors and is considered poor style
- we forbid using `innerHTML` to inject HTML tags; inject plain text only
  - (later, we'll see a better way to inject content with HTML tags in it)

The six global DOM objects

Every Javascript program can refer to the following global objects:

name	description
document	current HTML page and its content
history	list of pages the user has visited
location	URL of the current HTML page
navigator	info about the web browser you are using
screen	info about the screen area occupied by the browser
window	the browser window