Module III:
Processes

Javascript arrays and while loops

Arrays

- arrays are a means to store tabular data:
  ```javascript
  var colours=new Array("red","green","blue");
  ```

- equivalent to:
  ```javascript
  var colours=new Array();
colours[0] = "red";
colours[1] = "green";
colours[2] = "blue";
  ```

Arrays: A common mistake

- The first element of an array has index 0, not 1!!
  ```javascript
  var colours=new Array("red","green","blue");
  ```

  index of “red” is 0,
  index of “green” is 1!

Note:
Normal folks count 1,2,3,…
Computer Scientists count 0,1,2,…
Experiment: Arrays

what does this code do?

```javascript
var colours = new Array("red","green","blue");
alert("There are "+colours.length+" colours.");
alert("One colour is "+colours[1]+".");

colours[0] = "yellow";
alert("The colours are: \"+"+
    colours[0] + colours[1] + colours[2];
```

A 2-Dimensional Array

Arrays within arrays (nested arrays):

```javascript
var phoneBook = new Array();
phoneBook[0] = new Array("Ada", "604-123-4567");
```

Clicker Exercise

```javascript
var phoneBook = new Array();
phoneBook[0] = new Array("Ada", "604-123-4567");

What is phoneBook[1,1]?

A. "Ada"
B. "604-123-4567"
C. "Anne"
D. "604-234-4567"
```

while Loops

- while loops are a means to repeat instructions

```javascript
var number = -2;
while (number < 0){
    alert("The number "+number+" is negative.");
    number = number + 1;
}
```

if this condition is true...

execute the body and then check the condition again
Clicker Exercise: while Loops

model and predict

```javascript
var number = -2;
while (number < 0)
{
    alert("The number " + number + " is negative.");
    number = number + 1;
}
```

How many times will the while loop execute?

A. 0 times  
B. 1 time  
C. 2 times  
D. 3 times

Clicker Exercise: while Loops

model and predict

```javascript
var number = 0;
while (number < 0)
{
    alert("The number " + number + " is negative.");
    number = number + 1;
}
```

How many times will the while loop execute?

A. 0 times  
B. 1 time  
C. 2 times  
D. 3 times

Clicker Exercise: while Loops

model and predict

```javascript
var number = 2;
while (number < 0)
{
    alert("The number " + number + " is negative.");
    number = number + 1;
}
```

How many times will the while loop execute?

A. 0 times  
B. 1 time  
C. 2 times  
D. 3 times

Searching phoneBook

- while loops are useful to search for data in an array
- an example is provided in the directory2.html file on the course webpage
### Searching phoneBook

```javascript
function phoneNumber(name) {
    var index = 0;
    while (index < phoneBook.length) {
        if (phoneBook[index][0] == name) {
            result = phoneBook[index][1];
        }
        index = index + 1;
    }
    return result;
}
```

### A common mistake

```javascript
function phoneNumber(name) {
    var index = 0;
    while (index < phoneBook.length) {
        if (phoneBook[index][0] = name) {
            result = phoneBook[index][1];
        }
        index = index + 1;
    }
    return result;
}
```

### Learning Goals (revisited)

- recognize the use of and predict the behaviour of instructions, variables and flow of control constructs in short programs specified in Scratch or Javascript, or in other clearly expressed processes (which may or may not be computer related)
- make small modifications to short program fragments to achieve clearly specified tasks
- apply the "model/predict/experiment/refine" technique to learn new programming constructs and debug short programs