Solutions for Section #5

Solution 1: String Split

Some thought questions to ensure you understand the solution:

- Why does the for loop test rely on <= instead of <?
- What’s the best description you have for what i is tracking on behalf of the algorithm?
- The internal if test checks to see if i === str.length first before advancing on to check the return value of indexOf?

```javascript
/**
 * Function: split
 * ----------------
 * Returns an array of the applied string when exploded around all of the characters within the supplied delimiter.
 */
function split(str, delimiters) {
    let start = 0;
    let fragments = [];
    for (let i = 0; i <= str.length; i++) {
        if (i === str.length || delimiters.indexOf(str.charAt(i)) !== -1) {
            let fragment = str.substring(start, i);
            fragments.push(fragment);
            start = i + 1;
        }
    }
    return fragments;
}
```

Solution 2: Keith Numbers

Some thought questions to ensure you understand the solution:

- What does the use of array throughout the implementation of isKeithNumber buy you? What would have been the alternative?
- How would the implementation of isKeithNumber need to change had the implementation of createDigitsArray not reversed the digits array just before returning it?
- What’s the advantage of calling shift on the partials array within isKeithNumber? Had the shift call been omitted, how could the implementation of isKeithNumber change to account for the omission?
- Note that the while loop test within isKeithNumber uses < instead of <=. What would have happened had you accidentally used <= instead?
/**
 * Predicate Function: isKeithNumber
 * -----------------------------
 * Returns true if and only if the supplied integer,
 * assumed to be positive, is a Keith number.
 *
 * It does so by maintaining as much of the Fibonacci-like
 * sequence needed to generate the next sequence number,
 * and stops when the most recently introduced number either
 * equals n (that's good!) or exceeds it (that's not good!)
 */
function isKeithNumber(n) {
    if (n <= 0) return false;
    let partials = createDigitsArray(n);
    while (partials[partials.length - 1] < n) {
        let sum = sumArray(partials);
        partials.push(sum);
        partials.shift();
    }
    return partials[partials.length - 1] === n;
}

/**
 * Function: createDigitsArray
 * ---------------------------
 * Accepts an integer called n (assumed to be positive)
 * and produces an array of all of its digits, in order,
 * such that the most significant digit is in the leading
 * position and the least significant digit is in
 * the final position.
 */
function createDigitsArray(n) {
    let digits = [];
    while (n > 0) {
        let digit = n % 10;
        digits.push(digit);
        n = Math.floor(n/10);
    }
    digits.reverse();
    return digits;
}

/**
 * Function: sumArray
 * -------------
 * Returns the sum of all integers residing with the
 * supplied array.
 */
function sumArray(array) {
    let sum = 0;
    for (let i = 0; i < array.length; i++) {
        sum += array[i];
    }
    return sum;
}
Solution 3: Disappearing Squiggles

/**
 * File: DisappearingSquiggles.js
 * -------------------
 * This graphics program allows a user to draw squiggles that,
 * once completed, live for five seconds before disappearing.
 */

const GWINDOW_WIDTH = 500;
const GWINDOW_HEIGHT = 300;
const DELAY = 5000;

/**
 * Function: DisappearingSquiggles
 * -------------------
 * Implements the full graphics program that allows users to
 * draw squiggles that disappear after five seconds.
 */
function DisappearingSquiggles() {
    let gw = GWindow(GWINDOW_WIDTH, GWINDOW_HEIGHT);
    let inProgress = null;       // no squiggle actively being drawn
    let lastx = -1, lasty = -1;  // no squiggle actively being drawn

    /**
     * Inner function: mousedownAction
     * -------------------
     * Initiates the squiggling process by noting that
     * no lines have been drawn just yet while recording
     * the position of the mousedown event so the first
     * drag event knows where the user first clicked.
     */
    let mousedownAction = function(e) {
        inProgress = [];
        lastx = e.getX();
        lasty = e.getY();
    }

    /**
     * Inner function: dragAction
     * -------------------
     * Lays down a line between the most recent mouse
     * event location (either the first location from
     * mousedownAction, or from the previous dragAction),
     * caches the line that was just drawn in an array that
     * can easily be reached during erase time, and records
     * the current mouse drag location so the *next* drag
     * action knows where the next line to be drawn starts.
     */
    let dragAction = function(e) {
        let line = GLine(lastx, lasty, e.getX(), e.getY());
        gw.add(line);
        inProgress.push(line);
        lastx = e.getX();
        lasty = e.getY();
    };
}
/**
 * Inner function: mouseupAction
 * -----------------------------
 * Takes a snapshot of all the lines that have accumulated
 * since the last mousedown event, since those all contribute
 * to the very squiggle that needs to be erased five seconds
 * from now.
 */
let mouseupAction = function(e) {
  let completed = inProgress; // thought question: why is this necessary?
  let removeSquiggle = function() {
    for (let i = 0; i < completed.length; i++) {
      gw.remove(completed[i]);
    }
  };
  setTimeout(removeSquiggle, DELAY);
  // next three lines are technically not necessary,
  // but good for bookkeeping purposes
  inProgress = null;
  lastx = -1;
  lasty = -1;
}

gw.addEventListener("mousedown", mousedownAction);
gw.addEventListener("drag", dragAction);
gw.addEventListener("mouseup", mouseupAction);