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1  <html>
2  <head>
3  <title>Calculations</title>
4  <script language="javascript">
5  //Programmer: Aaron Yoon
6  //Project: calculate certain things about numbers in an array
7  //Date: 12/12/23
8
9  //declare an array object to hold integers
10 var numberArray = new Array();
11
12 //creates an object to hold how many numbers the array can hold
13 var arrayCap = 5000;
14
15 //function that takes in a number to find and outputs various different data about
    the array
16 function calculate()
17 {
18     resetArray();
19
20     var totalLoopsBrute = 0;
21     var totalLoopsBinary = 0;
22
23     var validLoopsBrute = 0;
24     var validLoopsBinary = 0;
25
26     for(var i = 0; i < 5000; i++){
27         var bruteCount = searchArray(numberArray);
28
29         if(bruteCount){
30             totalLoopsBrute += bruteCount;
31             validLoopsBrute++;
32         }
33
34         var sorted = numberArray.sort(function(a, b){return a - b});
35
36         var binaryCount = binarySearch(sorted);
37
38         if(binaryCount){
39             totalLoopsBinary += binaryCount;
40             validLoopsBinary++;
41         }
42
43         //resetArray();
44     }
45
46     //output the text
47     document.outputForm.txaaoutputField.value =
48         "Average loop counts with brute force: " + (totalLoopsBrute / validLoopsBrute
49         ) + "\n" +
50         "Average loop accounts with binary search: " + (totalLoopsBinary /
51         validLoopsBinary);
52
53     //brute force method
54     function searchArray(array){
55         var inputNum = Math.floor(Math.random() * (arrayCap));
56
57         var inputAppeared = false;
58
59         var loopCount = 1;
60
61         for(var i = 0; i < array.length; i++){
62
63             currentNumber = array[i];
64

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65         if(currentNumber == inputNum){
66             return loopCount;
67         }
68         else
69             loopCount++;
70     }
71
72     return null;
73 }
74
75 function binarySearch(array) {
76     var inputNum = Math.floor(Math.random() * arrayCap);
77
78     var start = 0;
79     var end = array.length - 1;
80
81     var loopCount = 1;
82
83     while (start <= end) {
84         var mid = Math.floor((start + end) / 2);
85
86         if (array[mid] == inputNum) {
87             return loopCount;
88         }
89         else
90             loopCount++;
91
92         if (inputNum < array[mid]) {
93             end = mid - 1;
94         }
95         else{
96             start = mid + 1;
97         }
98     }
99
100     return null;
101 }
102
103 function resetArray(){
104     //resets the array / fills the array with random numbers
105     for(var i = 0; i < arrayCap; i++){
106         numberArray[i] = Math.floor(Math.random() * arrayCap) + 1;
107     }
108 }
109 </script>
110 <style type="text/css">
111     label{color:blue;
112         font-size:25px;}
113 </style>
114 </head>
115 <body>
116     <center>
117         <h1>Calculations and Functions</h1>
118         <br>
119         <br>
120         <form name = "inputForm" onload="resetArray()">
121
122             <input type="button" name="btnCalculate" value="Calculate"
123                 onclick="calculate()" />
124
125             <input type="button" name="btnReset" value="Reset"
126                 onclick="resetArray()" />
127
128         </form>
129         <br>
130         <form name = "outputForm">

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132         <textarea readonly name = "txaoutputField" id="outputField"
133             rows="30" cols="70">
134         </textarea>
135     </form>
136 </center>
137 </body>
138 </html>
```