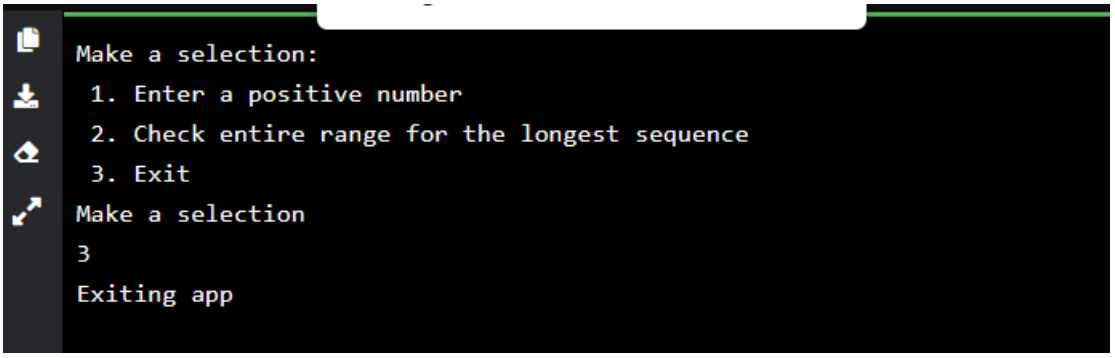
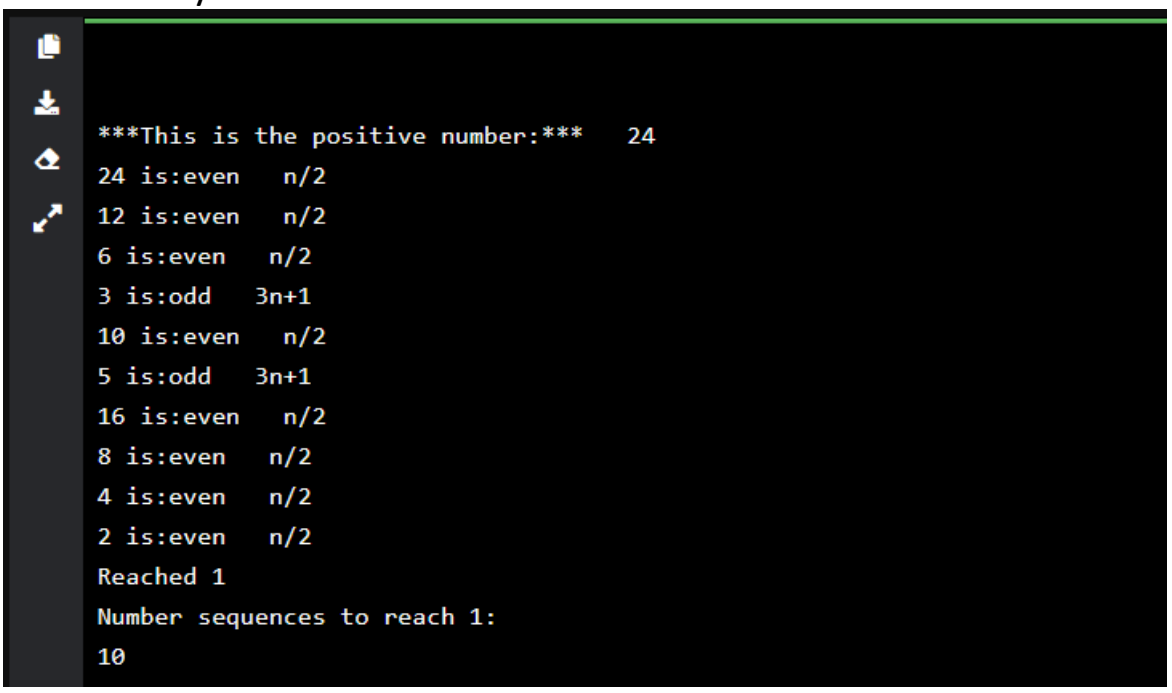
********** OUTPUT **********



Menu to explore the key areas of the problem

Successfully tested individual numbers



Tested maximum upper limit stated in the problem:

Make a selection:
1. Enter a positive number
2. Check entire range for the longest sequence
3. Exit
Make a selection

1
here 1
Enter a positive number
999999

This is the positive number: 999999
999999 is:odd 3n+1
2999998 is:even n/2
1499999 is:odd 3n+1
4499998 is:even n/2

2249999 is:odd 3n+1
6749998 is:even n/2
3374999 is:odd 3n+1
10124998 is:even n/2
5062499 is:odd 3n+1
15187498 is:even n/2
7593749 is:odd 3n+1
22781248 is:even n/2
11390624 is:even n/2
5695312 is:even n/2
2847656 is:even n/2
1423828 is:even n/2
711914 is:even n/2
355957 is:odd 3n+1
1067872 is:even n/2
533936 is:even n/2
266968 is:even n/2
133484 is:even n/2
66742 is:even n/2
33371 is:odd 3n+1
100114 is:even n/2
50057 is:odd 3n+1
150172 is:even n/2
75086 is:even n/2
37543 is:odd 3n+1
112630 is:even n/2
56315 is:odd 3n+1
168946 is:even n/2
84473 is:odd 3n+1
253420 is:even n/2
126710 is:even n/2
63355 is:odd 3n+1
190066 is:even n/2
95033 is:odd 3n+1
285100 is:even n/2
142550 is:even n/2
71275 is:odd 3n+1
213826 is:even n/2
106913 is:odd 3n+1
320740 is:even n/2
160370 is:even n/2
80185 is:odd 3n+1
240556 is:even n/2
120278 is:even n/2
60139 is:odd 3n+1
180418 is:even n/2
90209 is:odd 3n+1
270628 is:even n/2
135314 is:even n/2
67657 is:odd 3n+1
202972 is:even n/2
101486 is:even n/2
50743 is:odd 3n+1
152230 is:even n/2

76115 is:odd 3n+1
228346 is:even n/2
114173 is:odd 3n+1
342520 is:even n/2
171260 is:even n/2
85630 is:even n/2
42815 is:odd 3n+1
128446 is:even n/2
64223 is:odd 3n+1
192670 is:even n/2
96335 is:odd 3n+1
289006 is:even n/2
144503 is:odd 3n+1
433510 is:even n/2
216755 is:odd 3n+1
650266 is:even n/2
325133 is:odd 3n+1
975400 is:even n/2
487700 is:even n/2
243850 is:even n/2
121925 is:odd 3n+1
365776 is:even n/2
182888 is:even n/2
91444 is:even n/2
45722 is:even n/2
22861 is:odd 3n+1
68584 is:even n/2
34292 is:even n/2
17146 is:even n/2
8573 is:odd 3n+1
25720 is:even n/2
12860 is:even n/2
6430 is:even n/2
3215 is:odd 3n+1
9646 is:even n/2
4823 is:odd 3n+1
14470 is:even n/2
7235 is:odd 3n+1
21706 is:even n/2
10853 is:odd 3n+1
32560 is:even n/2
16280 is:even n/2
8140 is:even n/2
4070 is:even n/2
2035 is:odd 3n+1
6106 is:even n/2
3053 is:odd 3n+1
9160 is:even n/2
4580 is:even n/2
2290 is:even n/2
1145 is:odd 3n+1
3436 is:even n/2
1718 is:even n/2
859 is:odd 3n+1

2578 is:even n/2
1289 is:odd 3n+1
3868 is:even n/2
1934 is:even n/2
967 is:odd 3n+1
2902 is:even n/2
1451 is:odd 3n+1
4354 is:even n/2
2177 is:odd 3n+1
6532 is:even n/2
3266 is:even n/2
1633 is:odd 3n+1
4900 is:even n/2
2450 is:even n/2
1225 is:odd 3n+1
3676 is:even n/2
1838 is:even n/2
919 is:odd 3n+1
2758 is:even n/2
1379 is:odd 3n+1
4138 is:even n/2
2069 is:odd 3n+1
6208 is:even n/2
3104 is:even n/2
1552 is:even n/2
776 is:even n/2
388 is:even n/2
194 is:even n/2
97 is:odd 3n+1
292 is:even n/2
146 is:even n/2
73 is:odd 3n+1
220 is:even n/2
110 is:even n/2
55 is:odd 3n+1
166 is:even n/2
83 is:odd 3n+1
250 is:even n/2
125 is:odd 3n+1
376 is:even n/2
188 is:even n/2
94 is:even n/2
47 is:odd 3n+1
142 is:even n/2
71 is:odd 3n+1
214 is:even n/2
107 is:odd 3n+1
322 is:even n/2
161 is:odd 3n+1
484 is:even n/2
242 is:even n/2
121 is:odd 3n+1
364 is:even n/2
182 is:even n/2

91 is:odd 3n+1
274 is:even n/2
137 is:odd 3n+1
412 is:even n/2
206 is:even n/2
103 is:odd 3n+1
310 is:even n/2
155 is:odd 3n+1
466 is:even n/2
233 is:odd 3n+1
700 is:even n/2
350 is:even n/2
175 is:odd 3n+1
526 is:even n/2
263 is:odd 3n+1
790 is:even n/2
395 is:odd 3n+1
1186 is:even n/2
593 is:odd 3n+1
1780 is:even n/2
890 is:even n/2
445 is:odd 3n+1
1336 is:even n/2
668 is:even n/2
334 is:even n/2
167 is:odd 3n+1
502 is:even n/2
251 is:odd 3n+1
754 is:even n/2
377 is:odd 3n+1
1132 is:even n/2
566 is:even n/2
283 is:odd 3n+1
850 is:even n/2
425 is:odd 3n+1
1276 is:even n/2
638 is:even n/2
319 is:odd 3n+1
958 is:even n/2
479 is:odd 3n+1
1438 is:even n/2
719 is:odd 3n+1
2158 is:even n/2
1079 is:odd 3n+1
3238 is:even n/2
1619 is:odd 3n+1
4858 is:even n/2
2429 is:odd 3n+1
7288 is:even n/2
3644 is:even n/2
1822 is:even n/2
911 is:odd 3n+1
2734 is:even n/2
1367 is:odd 3n+1

4102 is:even n/2
2051 is:odd 3n+1
6154 is:even n/2
3077 is:odd 3n+1
9232 is:even n/2
4616 is:even n/2
2308 is:even n/2
1154 is:even n/2
577 is:odd 3n+1
1732 is:even n/2
866 is:even n/2
433 is:odd 3n+1
1300 is:even n/2
650 is:even n/2
325 is:odd 3n+1
976 is:even n/2
488 is:even n/2
244 is:even n/2
122 is:even n/2
61 is:odd 3n+1
184 is:even n/2
92 is:even n/2
46 is:even n/2
23 is:odd 3n+1
70 is:even n/2
35 is:odd 3n+1
106 is:even n/2
53 is:odd 3n+1
160 is:even n/2
80 is:even n/2
40 is:even n/2
20 is:even n/2
10 is:even n/2
5 is:odd 3n+1
16 is:even n/2
8 is:even n/2
4 is:even n/2
2 is:even n/2
Reached 1

Number sequences to reach 1:
258

** Process exited - Return Code: 0 **

Turned off the sequences to conserve memory and report output for chosen ranges.
However it still failed to execute entire computation due to memory constraints on web.

```
Enter a lowest positive number
32
Enter a highest number less than 1000000
66


***This is the positive number:***   32
Reached 1
Number sequences to reach 1:
5


***This is the positive number:***   33
Reached 1
Number sequences to reach 1:
26


***This is the positive number:***   34
Reached 1
Number sequences to reach 1:
13


***This is the positive number:***   35
Reached 1
Number sequences to reach 1:
13
```

Some validation:

Ensure lower number is greater than higher number
Ensure higher number is less than 1,000,000
Check ensure both are positive

```
} while (!(lowerNumber<higherNumber) || !(higherNumber<1000000)  || (lowerNumber<0) || (higherNumber<0)    )
```

CODE

```
/*
Online Java - IDE, Code Editor, Compiler

Online Java is a quick and easy tool that helps you to build, compile, test your programs online.
*/

import java.util.Scanner;

public class Main
{

   public static void main(String[] args) {

      String selection;
      boolean checkInt;
      int choice;
      int positiveNumber=0;
      int higherNumber;
      int lowerNumber;

      do{

      System.out.println("Make a selection:");
      System.out.println(" 1. Enter a positive number");
      System.out.println(" 2. Check entire range for the longest sequence");
      System.out.println(" 3. Exit");
      Scanner reader=null;
      reader = new Scanner(System.in); // Reading from System.in
      System.out.println("Make a selection");
      checkInt = reader.hasNextInt();

      selection = reader.nextLine();
      choice = Integer.valueOf(selection);

      reader=null;

      } while(!checkInt);

      switch (choice)
      {
         case 1:
            System.out.println("here 1");
            do
            {

      Scanner reader=null;
      reader = new Scanner(System.in); // Reading from System.in
```

```
        System.out.println("Enter a positive number");
        positiveNumber=reader.nextInt();
        processSequence(positiveNumber, positiveNumber+2);
        } while (positiveNumber>999999);


             break;
          case 2:
            System.out.println("2");

            do
             {

        Scanner reader=null;
        reader = new Scanner(System.in); // Reading from System.in
        System.out.println("Enter a lowest positive number");
        lowerNumber=reader.nextInt();
        System.out.println("Enter a highest number less than 1000000");


        higherNumber=reader.nextInt();

        processSequence(lowerNumber, higherNumber);


        } while (!(lowerNumber<higherNumber) || !(higherNumber<1000000)  || (lowerNumber<0)
|| (higherNumber<0)    );

             break;
          case 3:
            System.out.println("Exiting app");
            System.exit(0);
          default:
          System.out.println("Invalid selection");
          break;
        }


}

static void processSequence(int positiveNumber, int higherNumber)
{
   int[] array = new int[10000000];

        int num=positiveNumber;
        array[num]=positiveNumber;
        int count=0;

        System.out.println("\n");
        for (int k =positiveNumber; k<higherNumber-1;k++ )
        {
        System.out.println("***This is the positive number:***   " + positiveNumber);
        for (int i=positiveNumber; i<array.length-positiveNumber;i++)
        {
```

```
      if (array[i]%2==0)
      {
         count++;
         num++;

         array[num]=(array[num-1])/2;
         //System.out.println(array[i]+ " is:"  + "even   n/2");    *** UN-COMMENT TO GET STATUS
OF SEQUENCE

      }

      if (array[i]<0)
         {
            System.out.println("Number is not positive");
            break;
         }

      if (array[i]%2==1)
      {

         count++;
         num++;

         array[num]= ((array[num-1])*3)+1;
         //System.out.println(array[i]+ " is:"  + "odd   3n+1");    *** UN-COMMENT TO GET STATUS
OF SEQUENCE

      }

      if (array[num]==1)
      {
         System.out.println("Reached 1");
         //=positiveNumber+1;
         //System.out.println("\n\nPositive number:  " + positiveNumber);
         System.out.println("Number sequences to reach 1:  \n" + count);

         processSequence(positiveNumber+1, higherNumber);

         break;
      }


   }
}


}


}
```