Homework 7

Due 09/21/16

September 15, 2016

1. Find a recurrence $T(n)$ that describes the runtime of the RecursionMystery algorithm below:

```
   Input: data: array of integers
   Input: n: size of data
 1 Algorithm: RecursionMystery
 2 if n > 1 then
 3 |   min = max = 1
 4 |   for i = 2 to n do
 5 |   |   if data[i] < data[min] then
 6 |   |   |   min = i
 7 |   |   end
 8 |   |   if data[i] > data[max] then
 9 |   |   |   max = i
10 |   |   end
11 |   end
12 |   Swap data[1] and data[min]
13 |   if max > 1 then
14 |   |   Swap data[n] and data[max]
15 |   else
16 |   |   Swap data[min] and data[max]
17 |   end
18 |   if n > 2 then
19 |   |   Call RecursionMystery on data[2..n − 1]
20 |   end
21 end
22 return data
```

2. Draw the recurrence tree that corresponds to the recurrence $T(n) = 4T(n/2) + \Theta(1)$.