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Problem Set 2

Part A

1)

Iteration 0	3	0	4	6	2	5	1	7
Iteration 1	0	3	4	6	2	5	1	7
Iteration 2	0	1	4	6	2	5	3	7
Iteration 3	0	1	2	6	4	5	3	7
Iteration 4	0	1	2	3	4	5	6	7
Iteration 5	0	1	2	3	4	5	6	7
Iteration 6	0	1	2	3	4	5	6	7
Iteration 7	0	1	2	3	4	5	6	7

2)

a) Write the formula for the number of steps to perform k sequential searches on a list of size n
$f(n, k) = k*n$

b) Write the formula for the number of steps to perform k binary searches on a list of size n
$f(n, k) = k*log(n)$

c) Solve $f(10,000, k) > g(10,000, k)$
$k*10000 > k*log2(10000) + 10,000*log2(10000)$
k > 13.31 from wolfram alpha
We would need to search 14 times

d) Solve $g(n, 1,000,000) < f(n, 1,000,000)$
$1000000*log2(n) + n*log2(n) < 1000000*n$
These equations do not have an intersecting n value.
If you are doing 1,000,000 searches, sorting first is always more efficient no matter how large or small the data set is.