CSC505 – HW 1
Greg Timmons

1.) $T(n) = 4T(n/3) + O(n\sqrt{n})$

1.a) Root cost

$$O(n\sqrt{n})$$

1.b) Leaf cost

$$4^{log_3(n)}O(1)$$

1.c.i) Cost of layer k

$$4^k O\left(n\sqrt{n}/_{3^k}\right)$$

1.c.ii) Cost of all layers

$$\sum_{k=1}^{log_3(n)-1} 4^k O\left(n\sqrt{n}/_{3^k}\right)$$

1.d) Cost of algorithm

$$\left(O\left(n\sqrt{n}\right)\right) + \left(4^{log_3(n)}O(1)\right) + \left(\sum_{k=1}^{log_3(n)-1} 4^k O\left(n\sqrt{n}/_{3^k}\right)\right)$$

2.) $T(n) = 3T(n/3) + O(n)$

2.a) Root cost

$$O(n)$$

2.b) Leaf Cost

$$3^{log_3(n)}O(1)$$

2.c.i) Cost of layer k

$$3^k O\left(n/_{3^k}\right)$$

2.c.ii) Cost of all layers

$$\sum_{k=1}^{log_3(n)-1} 3^k O\left(n/_{3^k}\right)$$

2.d) Cost of the algorithm

$$(O(n)) + \left(3^{log_3(n)}O(1)\right) + \left(\sum_{k=1}^{log_3(n)-1} 3^k O\left(n/_{3^k}\right)\right)$$