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CS 385 Algorithms
“I pledge my honor that I have abided by the Stevens Honor System” - Himanshu Rana(hrana2)

1. In the else statement where L1 is copied to L2 in reverse order, it would that L1 is copied to L2 not in reverse order
2.

n	m	744 +5952 **6696**
72	93	
36	186	
18	372	
9	744	
4	1488	
2	2978	
1	5952	

3. a) The worst case scenario is when each element in the array is less than the pivot
   b) Θ(n^2)

4. 2205 * 1132 = 2,496,060

   c2 = a1 * b1 = 22 * 11 = 242
   c0 = a0 * b0 = 05 * 32 = 160
   c1 = (a1 + a0) * (b1 + b0) - (c2 + c0) = (27 * 43) - 402

   05 * 32

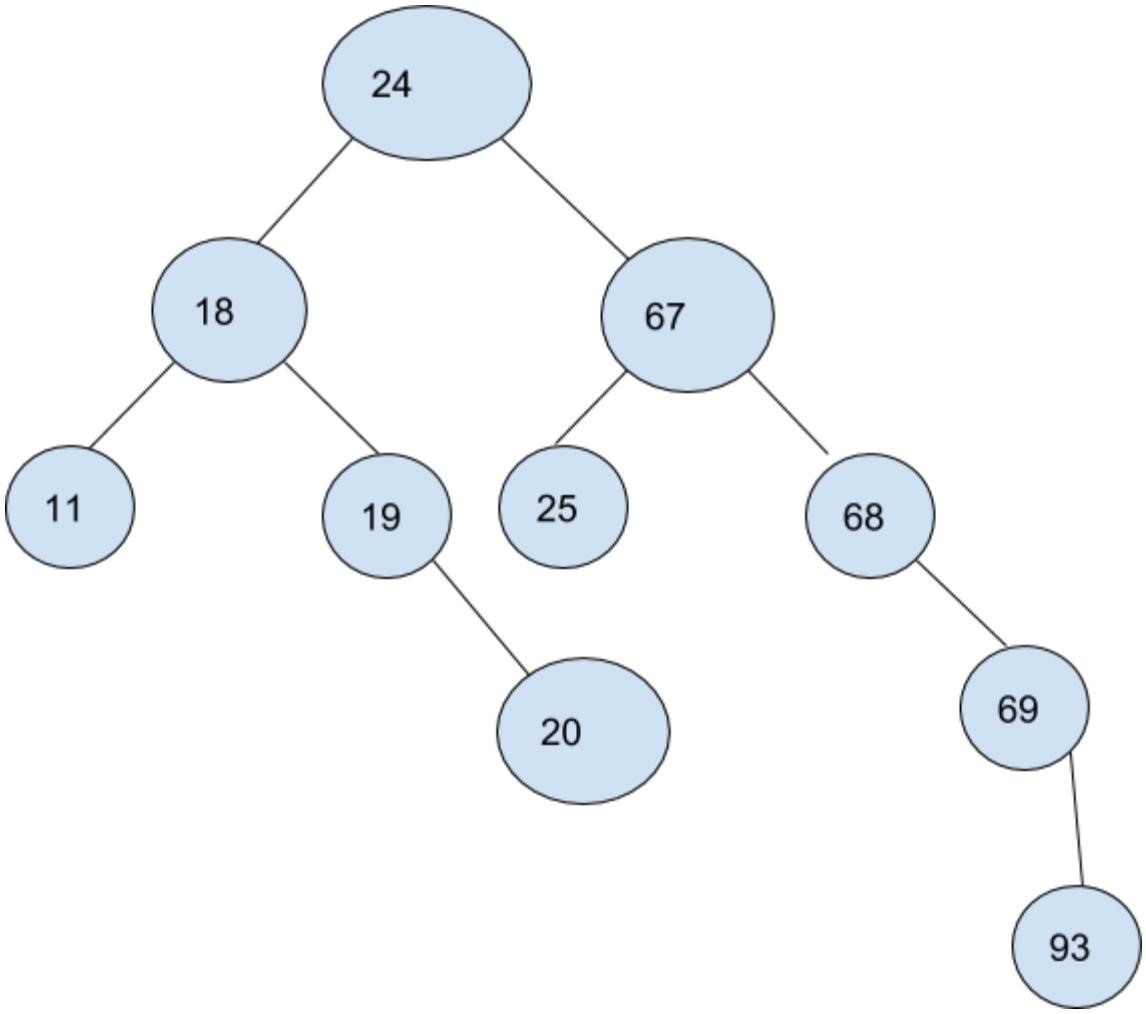
   c2 = a1 * b1 = 0 * 3 = 0
   c0 = a0 * b0 = 5 * 2 = 10
   c1 = (a1 + a0) * (b1 + b0) - (c2 + c0) = 25 - 10 = 15

   22 * 11
   c2 = a1 * b1 = 2 * 1 = 2
   c0 = a0 * b0 = 2 * 1 = 2
   c1 = (a1 + a0) * (b1 + b0) - (c2 + c0) = 8 - 4 = 4

27 * 43

c2 = a1 * b1 = 2 * 4 = 8
c0 = a0 * b0 = 7 * 3 = 21
c1 = (a1 + a0) * (b1 + b0) - (c2 + c0) = 63 - 29 = 34
242(10^4) + 754(10^2) + 160 = 2,496,060

5. 24, 18, 67, 68, 69, 25, 19, 20, 11, 93



6. a) 10, 8, 5, 3, 5, 2, 1, 7, 1, 6
   b) 3, 5, 5, 8, 1, 2, 10, 1, 7, 6
   c) 3, 5, 5, 1, 2, 8, 1, 6, 7, 10
   d) 5 internal nodes
   e) 5 leaves
   f) 4 is the max width
   g) 3 is height

7. a) T(n) = 2T(n/4) + 1 $\Theta(n^{1/2}) = \Theta(\sqrt{n})$
   A = 2, b = 4, d = 0
   2 > 4^0

   b) T(n) = 2T(n/4) + $\sqrt{n}$ $\Theta(\sqrt{n}\log n)$
   A = 2, b = 4, d = ½
   2 = 4^½

   c) T(n) = 2T(n/4) + n $\Theta(n)$
   A = 2, b = 4, d = 1
   2 < 4

   d) T(n) = 2T(n/4) + n^2 $\Theta(n^2)$
   A = 2, b = 4, d = 2
   2 < 4^2

   e) T(n) = 2T(n/4) + n^3 $\Theta(n^3)$
   A = 2, b = 4, d = 3
   2 < 4^3

8) a) T(n) = 6T(n/3) + n^(3/2) $\Theta(n^{(\log \text{ base } 3 \text{ of } 6)})$
   b) a = 6, b = 3, d = 3/2
   6 > $\sqrt{27}$