ame: Harris Sprahci

Pledge: "I pledge my honor I have abided by Steven's Honor System."

1. The only difference would be to copy L_1 into L_2 in its original order (not reversed).

2.

left		right	
72	×	93 →	0
36	×	186 →	0
18	×	372 →	0
9	×	744 →	744
4	×	1488 →	0
2	×	2976 →	0
1	×	5952 →	5952

$$\boxed{6696}$$

3. An input whose elements are reverse sorted.

Ex: 10, 9, 8, 7 ....., 1

(Also if array is already sorted, quicksort will not be able to check and run worst case)

3b. $\Theta(n) \cdot \Theta(n) = \Theta(n^2)$

4. On pg 3

4.

5.
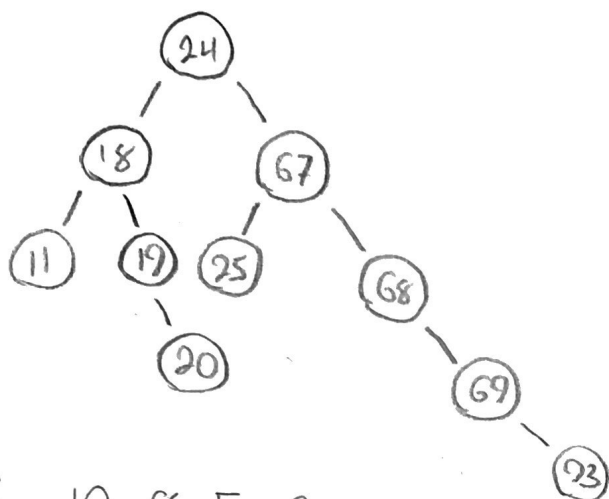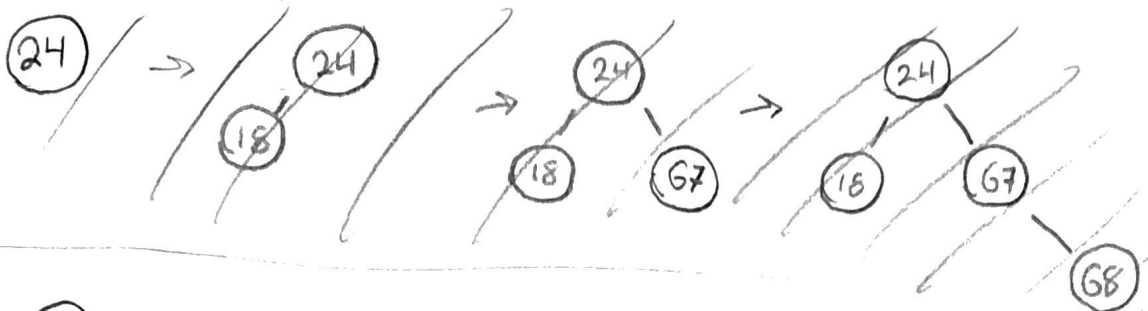
6. 10, 8, 5, 3, 5, 2, 1, 7, 1, 6 ← Preorder

6b. 3, 5, 5, 8, 1, 2, 10, 1, 7, 6 ← Inorder

6c.* 3, 5, 5, 1, 2, 8, 1, 6, 7, 10 ← Post order

6d. 5

6e. 5

6f.* 4

6g. 3

6h. 5

7. $a = 2, b = 4, d = 0$

Is $4^0 > 2$? No → $T(n) \in \Theta(n^{\log_4 2}) = \boxed{\Theta(n^{1/2})}$

7b. $a = 2, b = 4, d = 1/2$

Is $4^{1/2} > 2$? Equal → $T(n) \in \boxed{\Theta(n^{1/2} \log_4 n)}$

7c. $a = 2, b = 4, d = 1$

Is $4^1 > 2$? Yes → $T(n) \in \boxed{\Theta(n)}$

7d. $a = 2, b = 4, d = 2$

$4^2 > 2$? Yes → $T(n) \in \boxed{\Theta(n^2)}$

7e. $a = 2, b = 4, d = 3$

Is $4^3 > 2$? Yes

$T(n) \in \boxed{\Theta(n^3)}$

8. $T(n) = 6T(n/3) + n(\sqrt{n})$
$\quad = 6T(n/3) + n^{3/2}$

b* $a = 6, b = 3, d = 3/2$
$\rightarrow b^d = \overline{3^3} > 5$
$\rightarrow 5 < 6 = a$ thus $T(n) \in \Theta(n^{\log_3 6}) = \boxed{\Theta(n^{1 + \log_3 2})}$

$C_0 = 2421$
$C_1 = 1759$
$C_2 = 160$

$\boxed{2\,496\,060}$

#4. Multiply (2205, 1132)
$C_0 = $ Multiply (22, 11)
$\quad C_0' = $ Multiply (2, 1) = 2
$\quad C_2' = $ Multiply (2, 1) = 2
$\quad C_1' = $ Multiply (4, 2) = $8 - c_2' - c_0' =$
$\qquad\qquad\qquad\qquad 8 - 2 - 2 = 4$

$\rightarrow 2$
$\quad\;\; 4$
$\quad\;\; 2$
$\;\overline{\quad 242}$

$C_a = $ Multiply (05, 32)
$\quad C_0' = $ Multiply (0, 3) = 0
$\quad C_2' = $ Multiply (5, 2) = 10
$\quad C_1' = $ Multiply (5, 5) = $25 - c_0' - c_2' = 15$

$\rightarrow 0$
$\quad\;\; 15$
$\quad\;\; 10$
$\;\overline{\quad 160}$

$C_1 = $ Multiply (27, 43)
$\quad C_0' = $ Multiply (2, 4) = 8
$\quad C_2' = $ Multiply (7, 3) = 21
$\quad C_1' = $ Multiply (9, 7) = $63 - c_0' - c_2' = 34$

$\rightarrow 8$
$\quad\;\; 34$
$\quad\;\; 21$
$\;\overline{\quad 1161} - 242 - 160 = 759$