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semester faculty

Recursion, Devide and Conquer

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Exercise 1: Recursion

a) i. 2 - 5 - 6 - 4 - 9 - 8 - 12 - 11 - 7

ii. 7 - 4 - 2 - 6 - 5 - 11 - 8 - 9 - 12

iii. 2 - 4 - 5 - 6 - 7 - 8 - 9 - 11 - 12

Exercise 2: Diveide and Conquer

a)

12	10	3	21	17	5	9
12	10	3				
12						
12						
	10	3				
	10					
	10					
		3				
		3				
	3	10				
3	10	12				
			21	17	5	9
			21	17		
			21			
			21			
				17		
				17		
			17	21		
					5	9
					5	
					5	
						9
						9
					5	9
			5	9	17	21
3	5	9	10	12	17	21

b)

$[10, 7, 5, 15, 13, 3, 6, 11, 4]$
$[7, 5, 3, 6, 4, \mathbf{10}, 15, 13, 11]$
$[7, 5, 3, 6, 4, \mathbf{10}, 15, 13, 11]$
$[5, 3, 6, 4, \mathbf{7}, \mathbf{10}, 15, 13, 11]$
$[5, 3, 6, 4, \mathbf{7}, \mathbf{10}, 15, 13, 11]$
$[3, 4, \mathbf{5}, 6, \mathbf{7}, \mathbf{10}, 15, 13, 11]$
$[\mathbf{3}, 4, \mathbf{5}, 6, \mathbf{7}, \mathbf{10}, 15, 13, 11]$
$[\mathbf{3}, \mathbf{4}, \mathbf{5}, 6, \mathbf{7}, \mathbf{10}, 15, 13, 11]$
$[\mathbf{3}, \mathbf{4}, \mathbf{5}, \mathbf{6}, \mathbf{7}, \mathbf{10}, 15, 13, 11]$
$[\mathbf{3}, \mathbf{4}, \mathbf{5}, \mathbf{6}, \mathbf{7}, \mathbf{10}, 15, 13, 11]$
$[\mathbf{3}, \mathbf{4}, \mathbf{5}, \mathbf{6}, \mathbf{7}, \mathbf{10}, 13, 11, \mathbf{15}]$
$[\mathbf{3}, \mathbf{4}, \mathbf{5}, \mathbf{6}, \mathbf{7}, \mathbf{10}, 13, 11, \mathbf{15}]$
$[\mathbf{3}, \mathbf{4}, \mathbf{5}, \mathbf{6}, \mathbf{7}, \mathbf{10}, 11, \mathbf{13}, \mathbf{15}]$
$[\mathbf{3}, \mathbf{4}, \mathbf{5}, \mathbf{6}, \mathbf{7}, \mathbf{10}, \mathbf{11}, \mathbf{13}, \mathbf{15}]$

c) $[0, 0]$, da:

$l = 0, r = 1, p =$ element $l, i = l + 1, j = r$
$[0_0, 0_1]$ $\quad|\quad$ **while** $i \leq j$ **and** element $i \leq p$
$\overset{\uparrow}{l}\ \overset{\uparrow}{i,j}$

$[0_0, 0_1]$ $\quad|\quad i \not\leq j$
$\overset{\uparrow}{l}\ \overset{\uparrow}{j}\ \overset{\uparrow}{i}$

$[0_0, 0_1]$ $\quad|\quad$ da $l < j$
$\overset{\uparrow}{l}\ \overset{\uparrow}{j}\ \overset{\uparrow}{i}$

$[0_1, 0_0]$
$\overset{\uparrow}{l}\ \overset{\uparrow}{j}\ \overset{\uparrow}{i}$

new quicksort:
$l = 0, r = 0, p =$ element $l, i = l + 1, j = r$ $\quad|\quad$ da $l \not< r$
end $\rightsquigarrow$ *old quicksort:* $(l = 0, r = 1, p =$ element $l, i = 2, j = 1)$ $\quad|\quad$ da: $j \not< r$
end