

Apply split and merge on the following image with threshold value equal to 3.

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

Ans. Condition : Absolute difference  $\leq 3$

Max value = 7 Min value = 0

$|7 - 0| = 7$  which is greater than 3

Therefore we will split the region into

4 sub regions. (splitting takes place when condition does not sat.)

①	5	6	6	6	7	7	6	6	b <sub>1</sub>	b <sub>2</sub>
	6	7	6	7	5	5	4	7	②	
	6	6	4	4	3	2	5	6	b <sub>3</sub>	
	5	4	5	4	2	3	4	6	b <sub>4</sub>	
③	0	3	2	3	3	2	4	7	3	a <sub>1</sub>
	0	0	0	0	2	2	5	6	2	a <sub>2</sub>
	1	1	0	1	0	3	4	4	3	a <sub>3</sub>
	1	0	1	0	2	3	5	4	2	a <sub>4</sub>

On region (a) Max = 7 Min = 4  
 $|7 - 4| = 3$  which is equal to threshold  
Therefore, no need to split.

On Region (b) max value = 7 and min value = 2  
 $|7 - 2| = 5$  which is greater than 3.  
Therefore we will split the region into 4 equal sub parts.

On Region (c)  
Max value = 3 min value = 0  
 $|3 - 0| = 3$  satisfies the condition so no need to split.

On Region (d) Max value = 7 and min = 0  
 $|7 - 0| = 7$  which is greater than 3  
The region will split into 4 sub regions.

On region (e)  
Max value  
Further we will check all the subregions since all of them are  $\leq 3$  no further splitting is required.

## Merging

check adjacent regions, if they fall within the threshold Then merge.

Consider region  $a$  and  $b_1$ .

Max value = 7 Min value = 4.

$|7-4| = 3$ , Then it is less than or equal to threshold Then merge.

Consider regions  $a b_1$  and  $b_2$ .

Max = 7 Min = 4.

$\delta = |7-4| = 3 \checkmark$  Merge.

Consider the region  $a b_1 b_2$  and  $b_4$ .

Max = 7 Min = 4.

$\delta = |7-4| = 3 \checkmark$  Merge.

Consider the region  $a b_1 b_2 b_4$  and  $d_2$ .

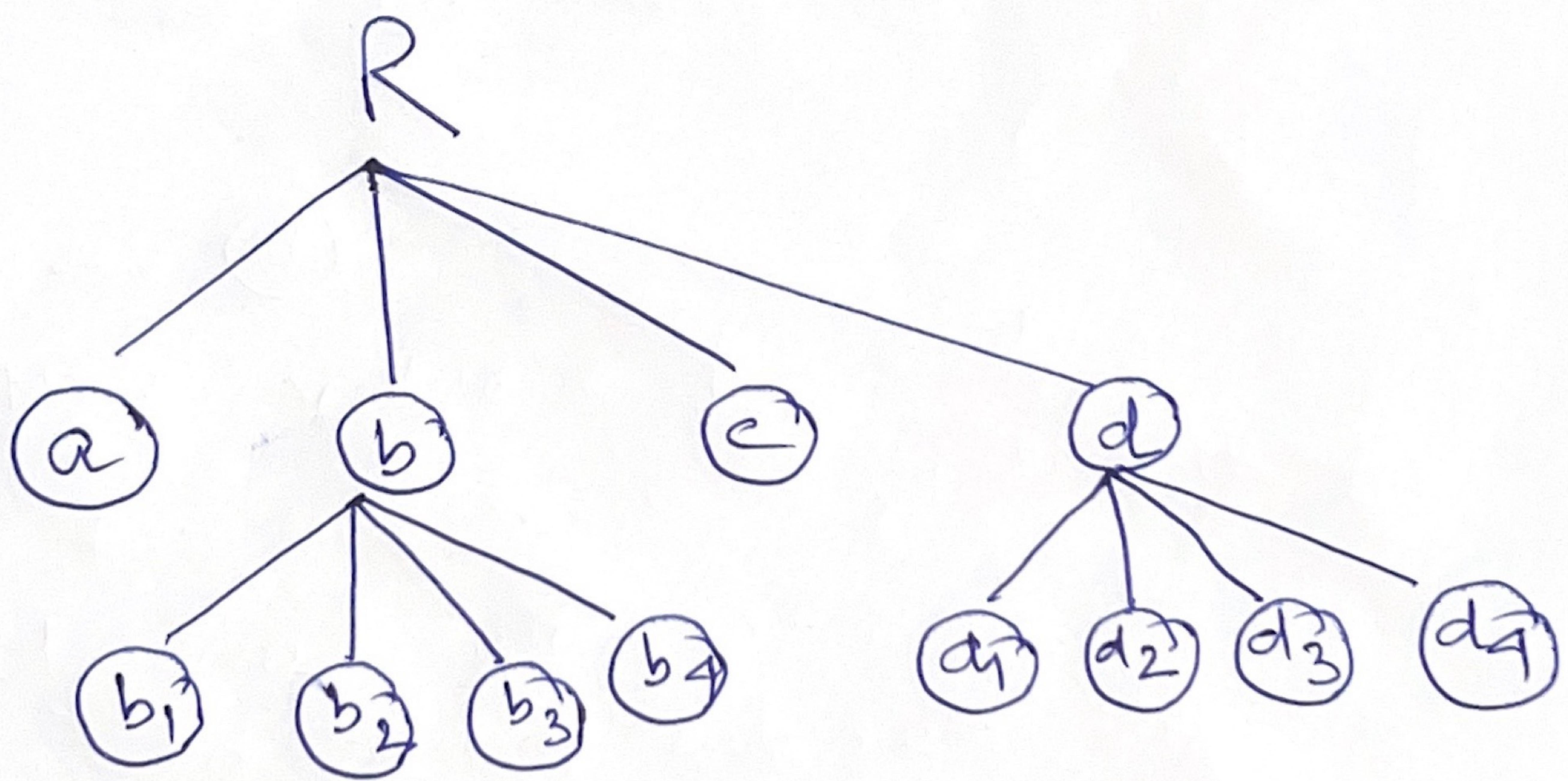
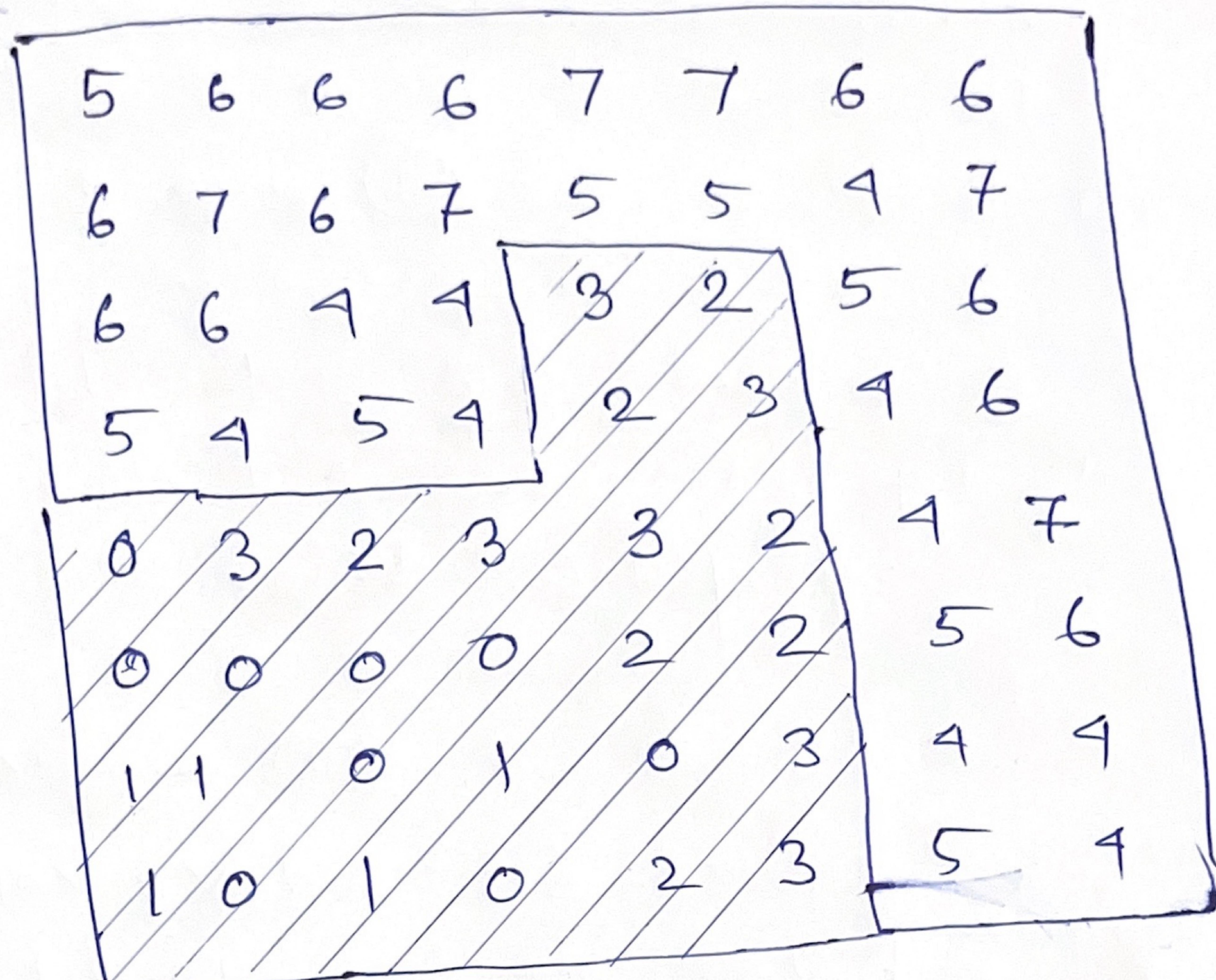
Max = 7 Min = 4.

$|7-4| = 3 \checkmark$  Merge.

Similarly merge  $(a b_1 b_2 b_4 d_2)$  with  $d_4$ .

Similarly merge  $c$ ,  $d_1$ ,  $b_3$  and  $d_3$

Final Segmentation



Quadtree structure for splitting.