

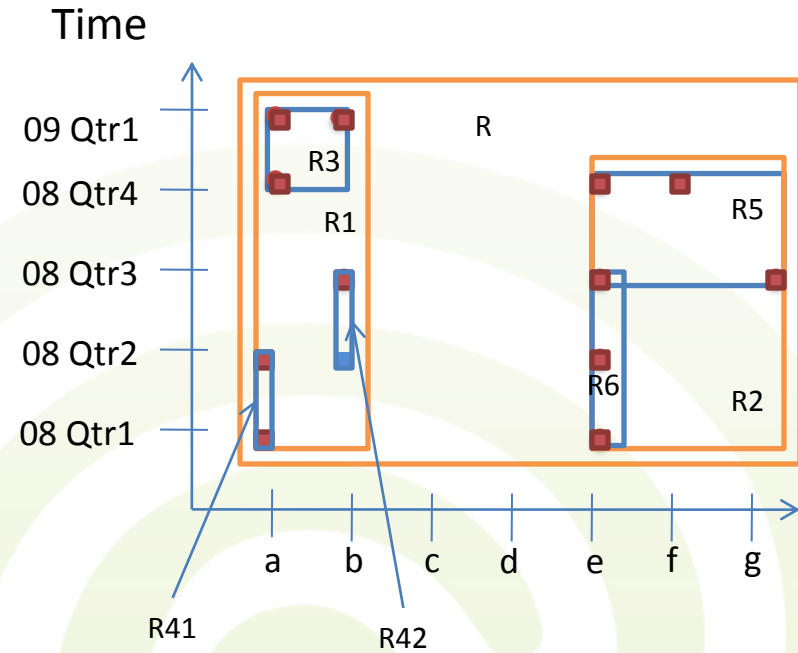
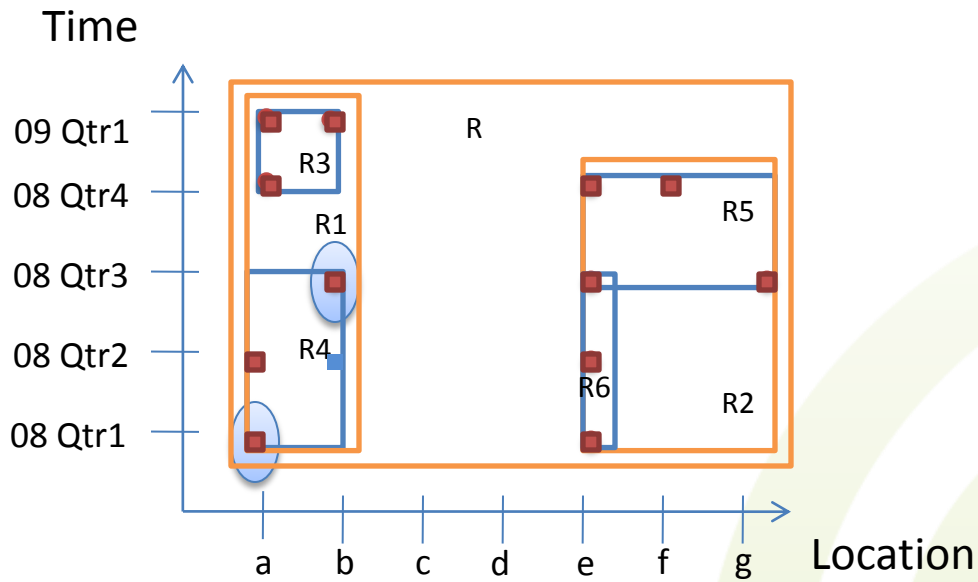


5. Indexes

- Exercise I.a

$M = 3$;

Insert: ("08 Qtr2", "b")



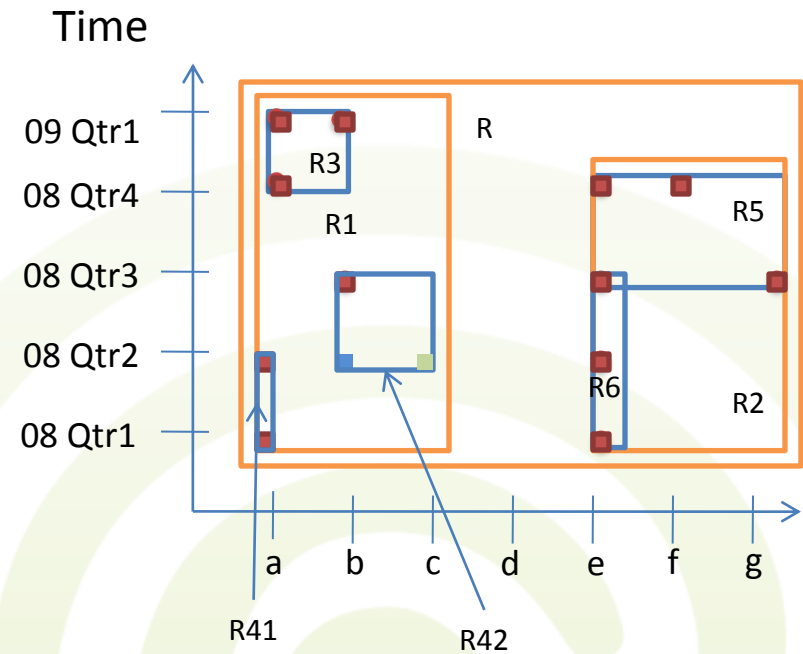
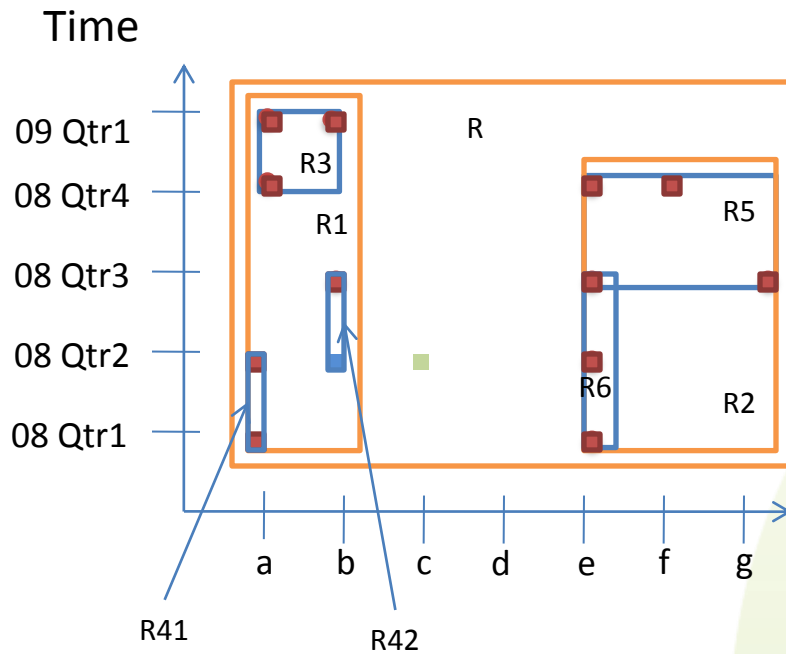


5. Indexes

- Exercise I. a

$M = 3$;

Insert: ("08 Qtr2", "c")



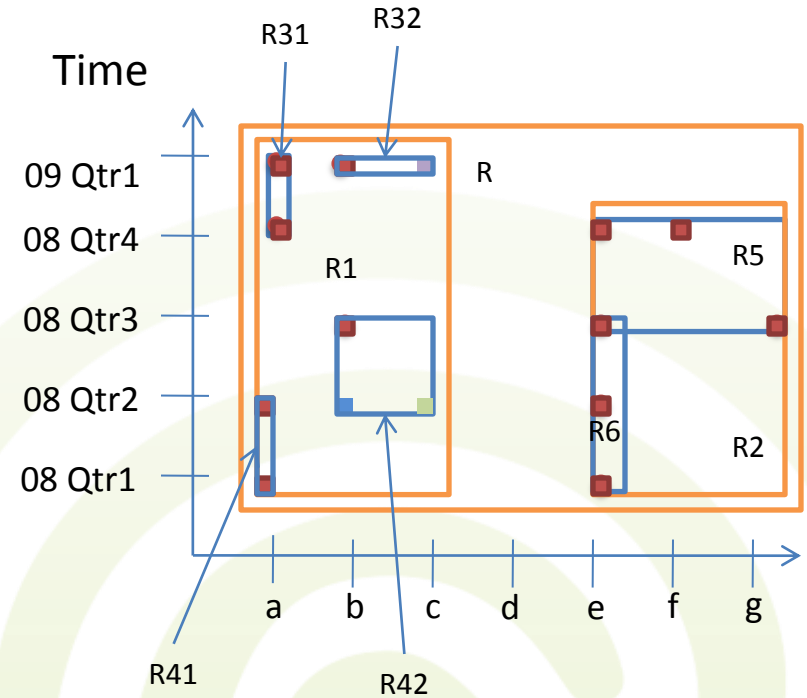
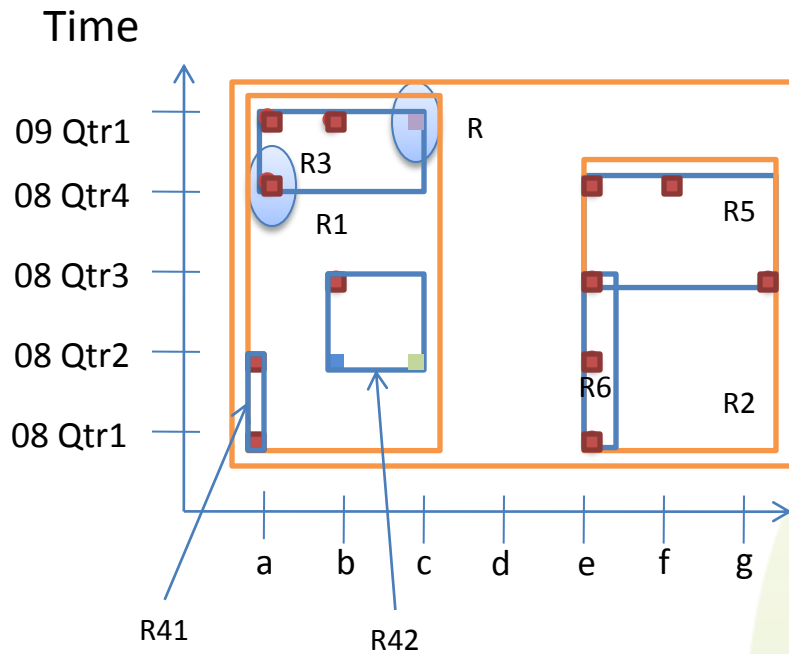


5. Indexes

- Exercise I.a

M = 3;

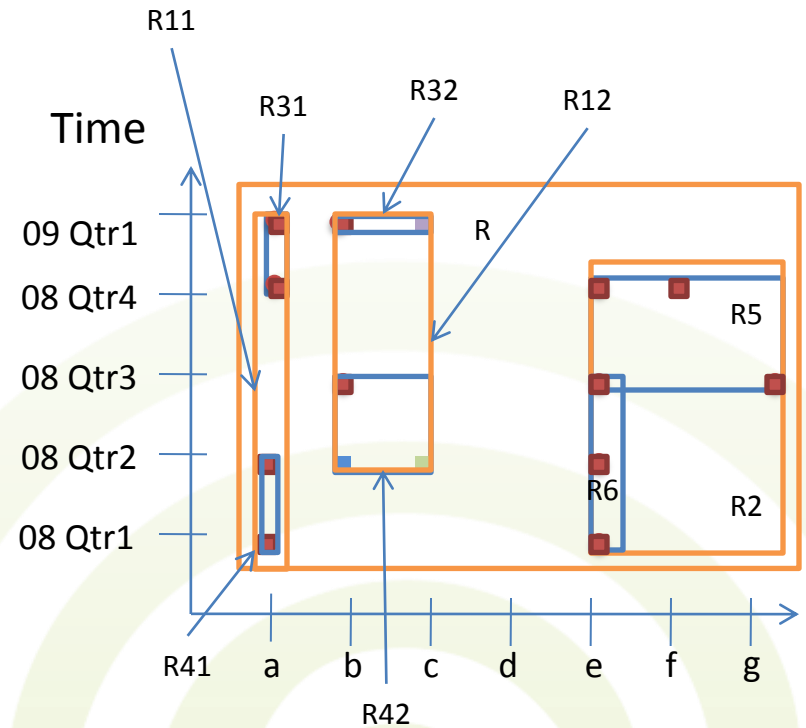
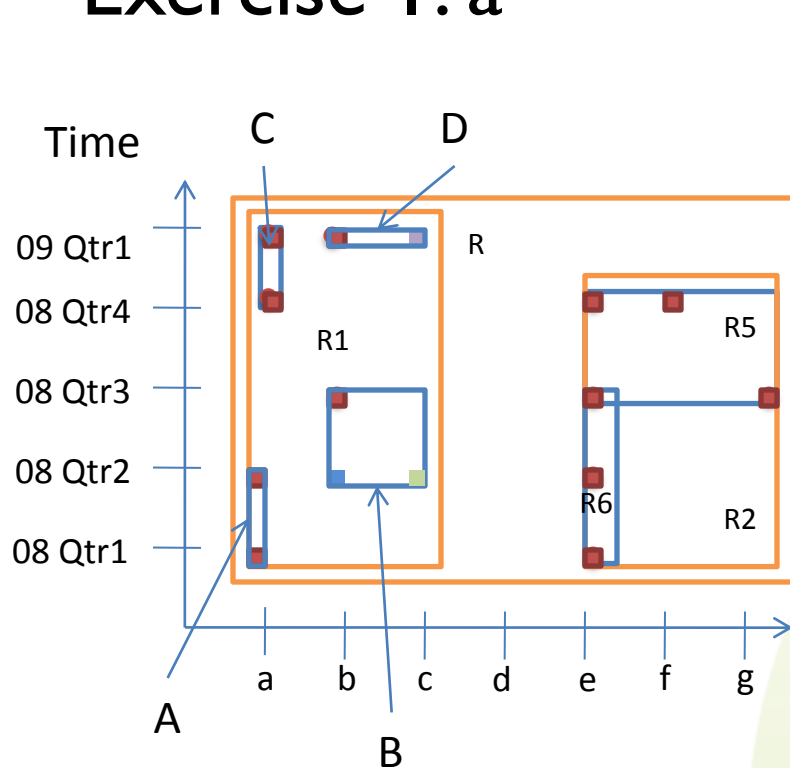
Insert: ("09 Qtr1", "c")





5. Indexes

- Exercise I.a

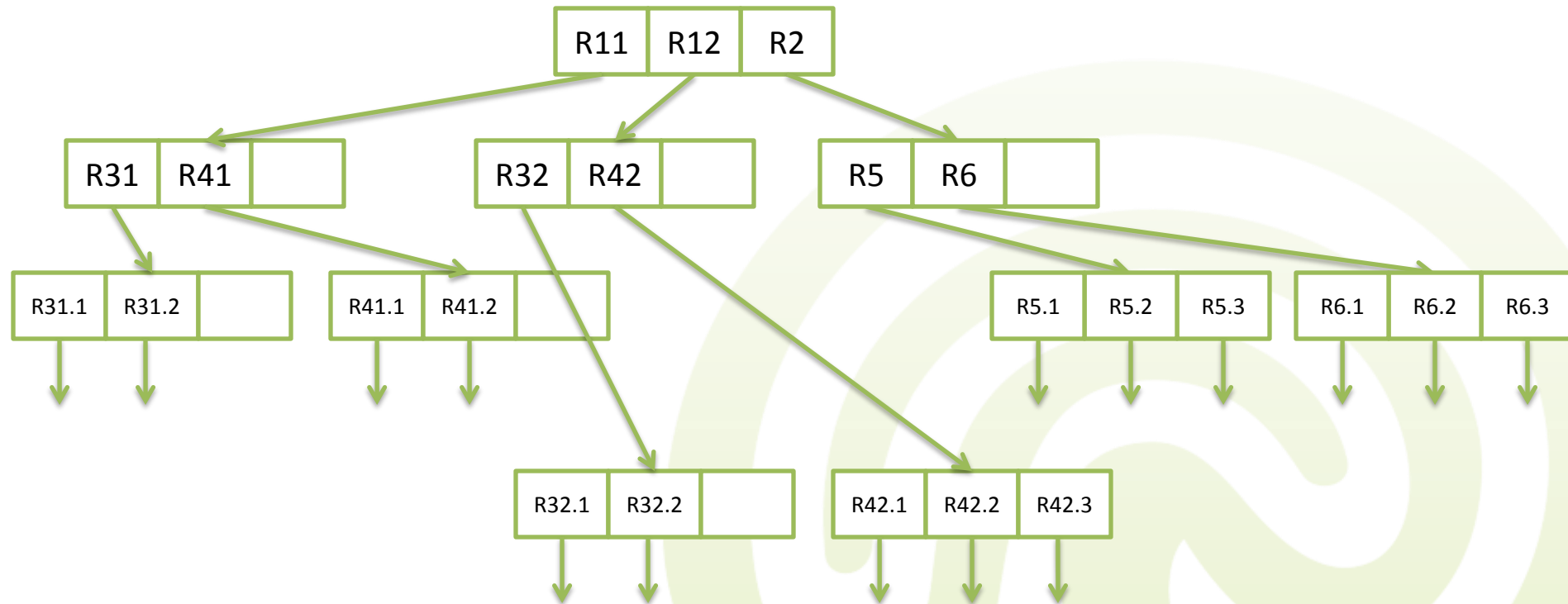


On X, highest minimum rectangles are B and D = 'b', and lowest maximum are A and C = 'a'
On Y, highest minimum rectangle is D = '09Qtr1', and lowest maximum is A = '08Qtr2'
 $D_x = 1/3$; $D_y = 3/5$; \Rightarrow D and A will create the new split nodes



5. Indexes

- Exercise I. b

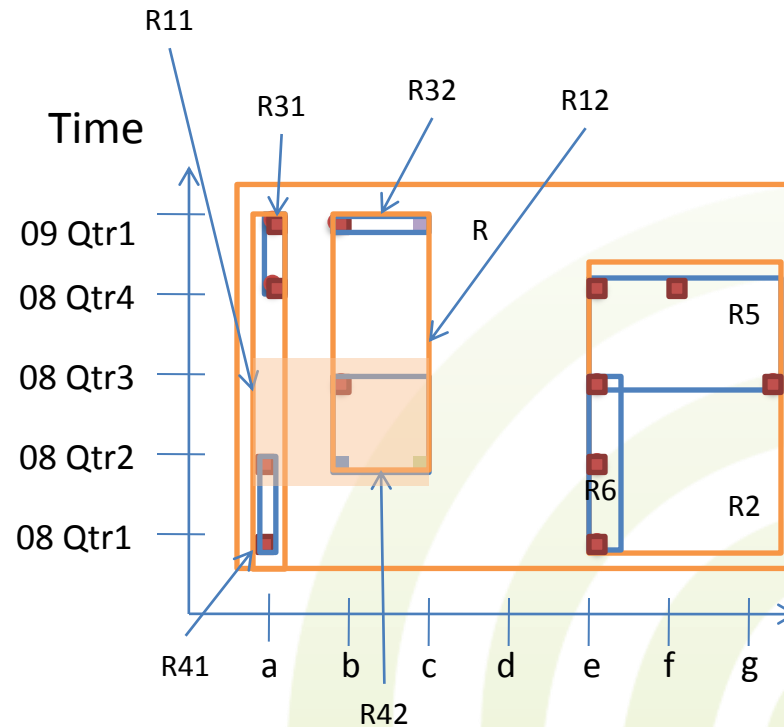




5. Indexes

- Exercise 1.c

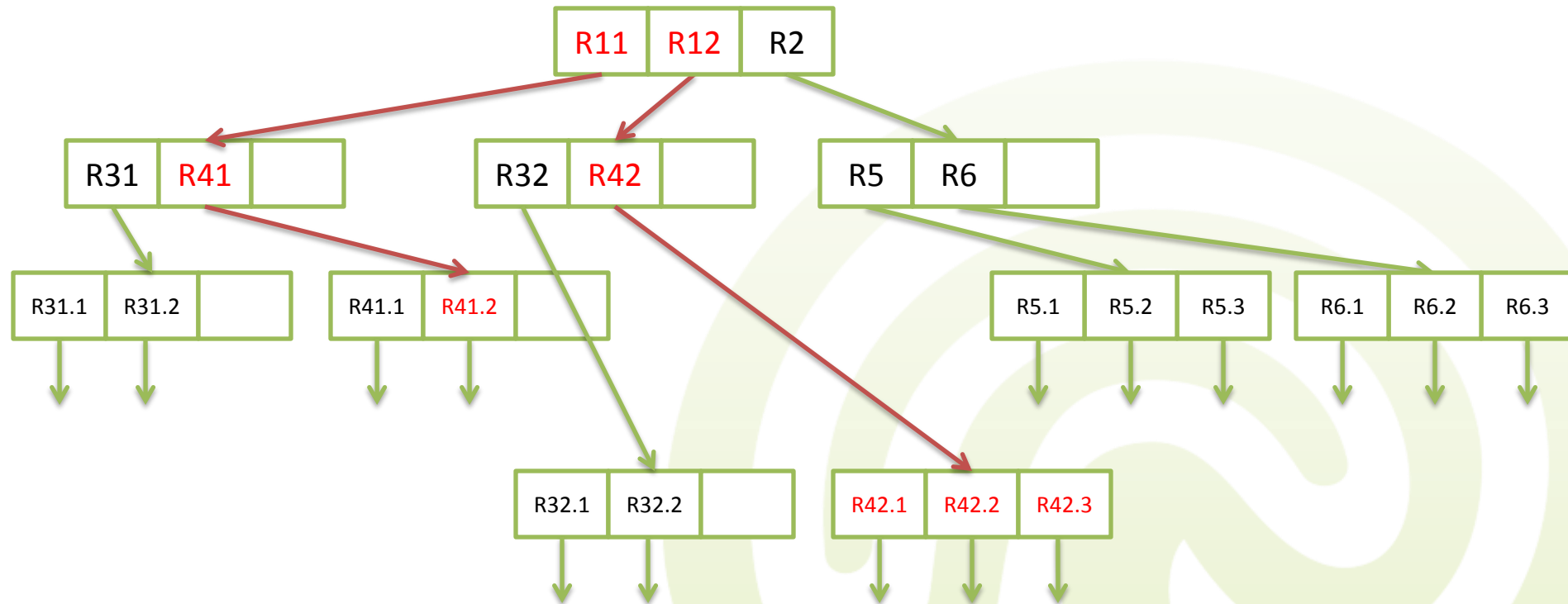
Search: $([08 \text{ Qtr}_2, 08 \text{ Qtr}_3], [a,c])$





5. Indexes

- Exercise I. c





5. Indexes

ID	Qty	ID_Prod	ID_Date
1	...	5	1
2		2	1
3		3	1
4		2	2
5		1	3
6		3	2
7		8	1
8		7	1
9		5	2
10		6	1
11		5	3
12		3	3
13		2	3
14		8	4
15		6	2
16		7	2
17		5	4
18		3	4
19		4	1
20		2	4
21		1	4

ID	Product	Group	Category
1	Nokia N8	Cell Phones	Electronics
2	BlackBerry Bold	Cell Phones	Electronics
3	BlackBerry Storm	Cell Phones	Electronics
4	Apple Iphone	Cell Phones	Electronics
5	Samsung UE46	TV	Electronics
6	Panasonic TX50	TV	Electronics
7	Philips 46PFL	TV	Electronics
8	Panasonic TX46	TV	Electronics

ID	Qtr	Year
1	Q1	2010
2	Q2	2010
3	Q3	2010
4	Q4	2010



5. Indexes

- Exercise 2

- Start by building the Z-Curve with the indexes of the dimensions through interleaving

- We have 2 dimensions, Products with 8 products ordered by category and group, and Time, with 4 quarters
- Cell [0][0] represents product with id 1 sold in the first quarter, and so on
- Since Nokia N8 was not sold in Q1 the field is empty, but that is the first element on the Z curve

	0	1	2	3	4	5	6	7
0		1	4	5	16	17	20	21
1		3	6			19	22	23
2	8		12	13		25		
3	10	11	14		26			31



5. Indexes

- Exercise 2
 - On selection of mobile phones over first 2 quarters, one needs to read just [0;3] on Products and [0;1] on Time
 - In our 2D space this is from [0][0] to [1][3]
 - On Z-Curve this is from $\text{interleave}(0,0)$ which is 0, to $\text{interleave}(1,3)$ which is 7
 - So we need to read from 0 to 7 since our region (block) is of size 5, we need to read exactly 2 regions/blocks
 - With no index we need to read everything

	0	1	2	3	4	5	6	7
0		1	4	5	16	17	20	21
1		3	6			19	22	23
2	8		12	13		25		
3	10	11	14		26			31