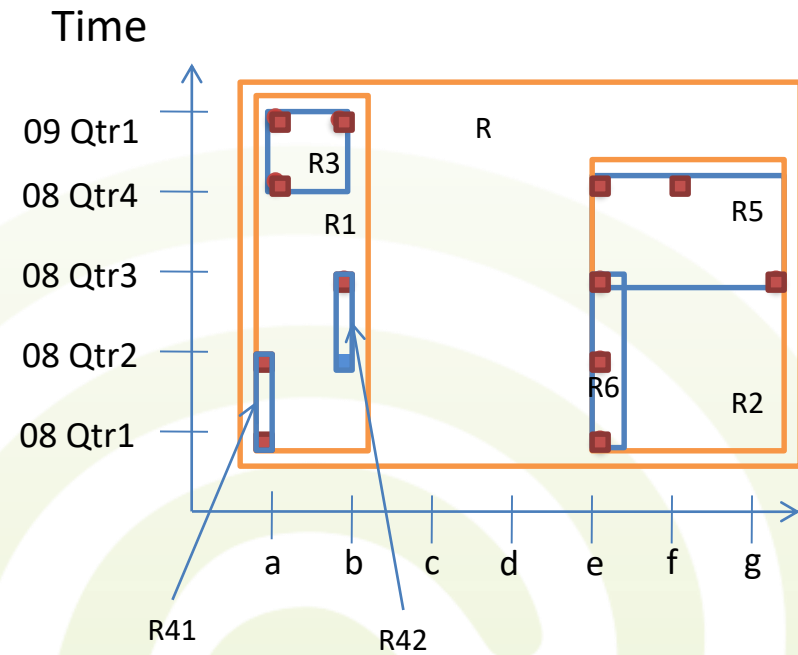
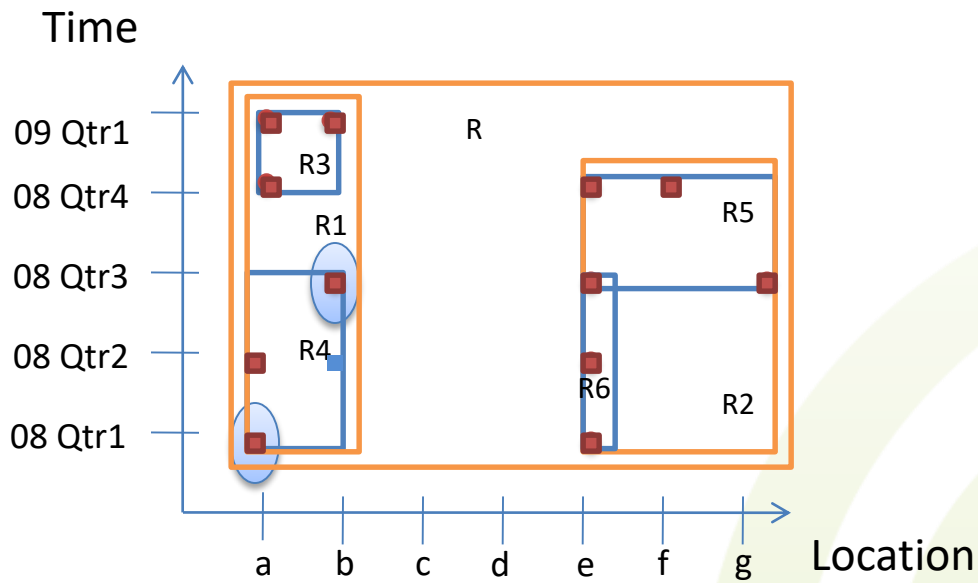




4. Indexes

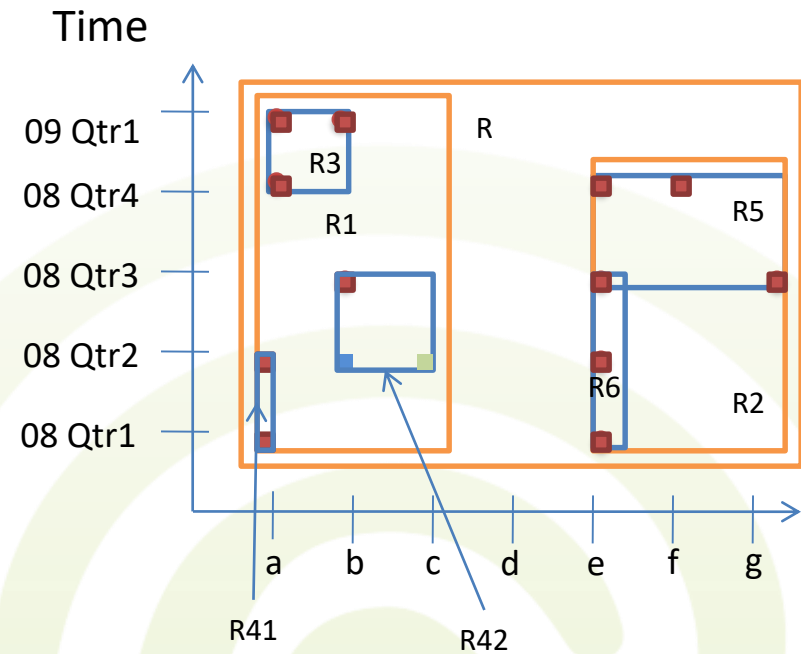
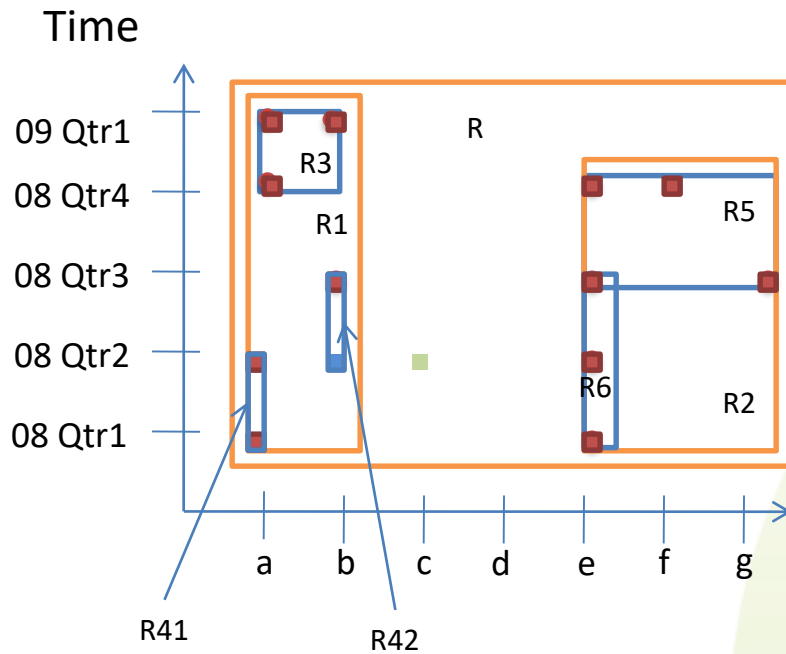
- Exercise 4. a





4. Indexes

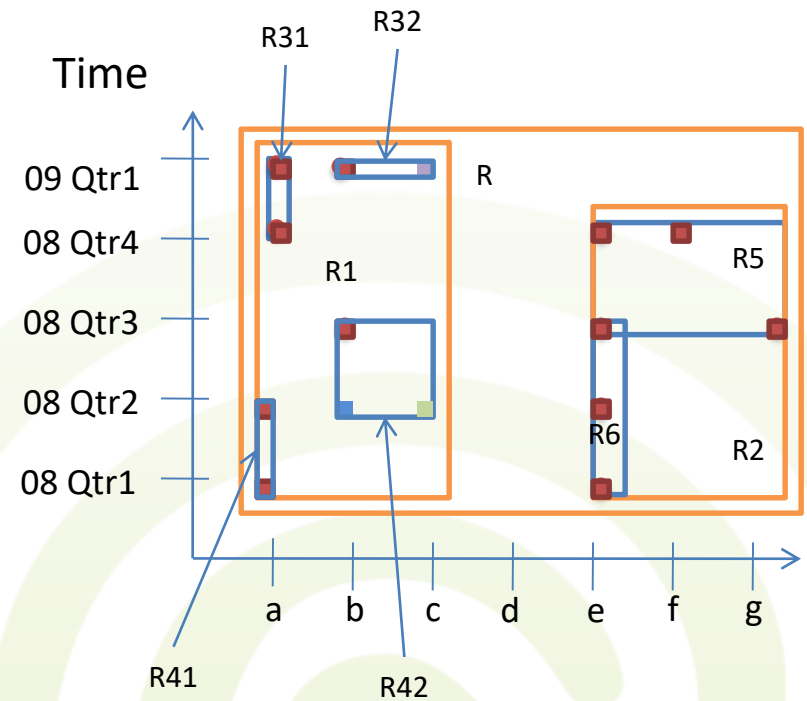
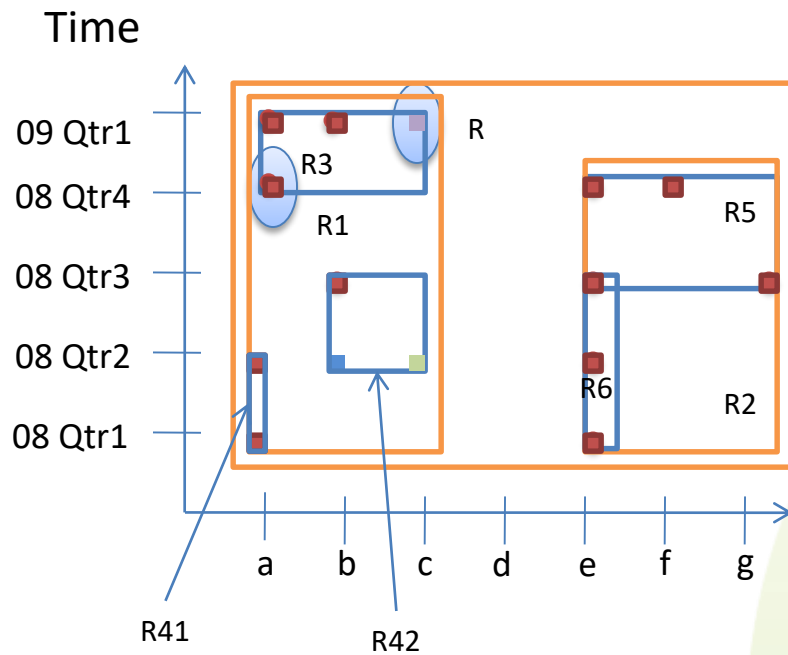
- Exercise 4. a





4. Indexes

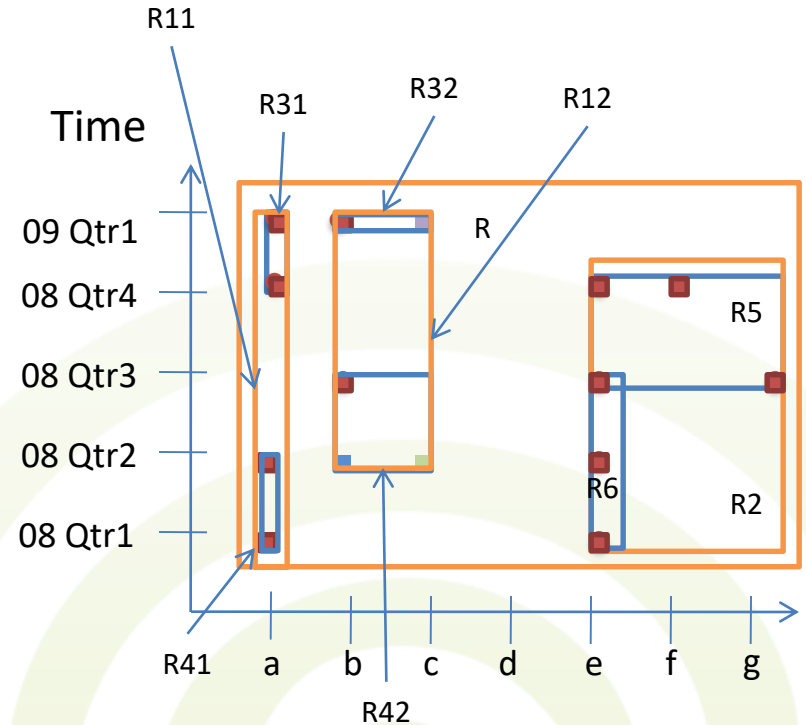
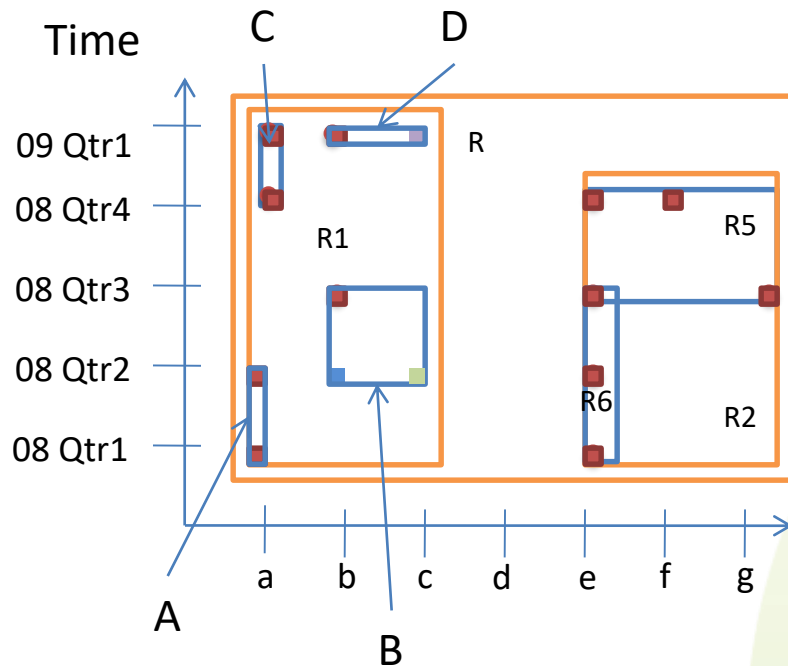
- Exercise 4. a





4. Indexes

- Exercise 4. a

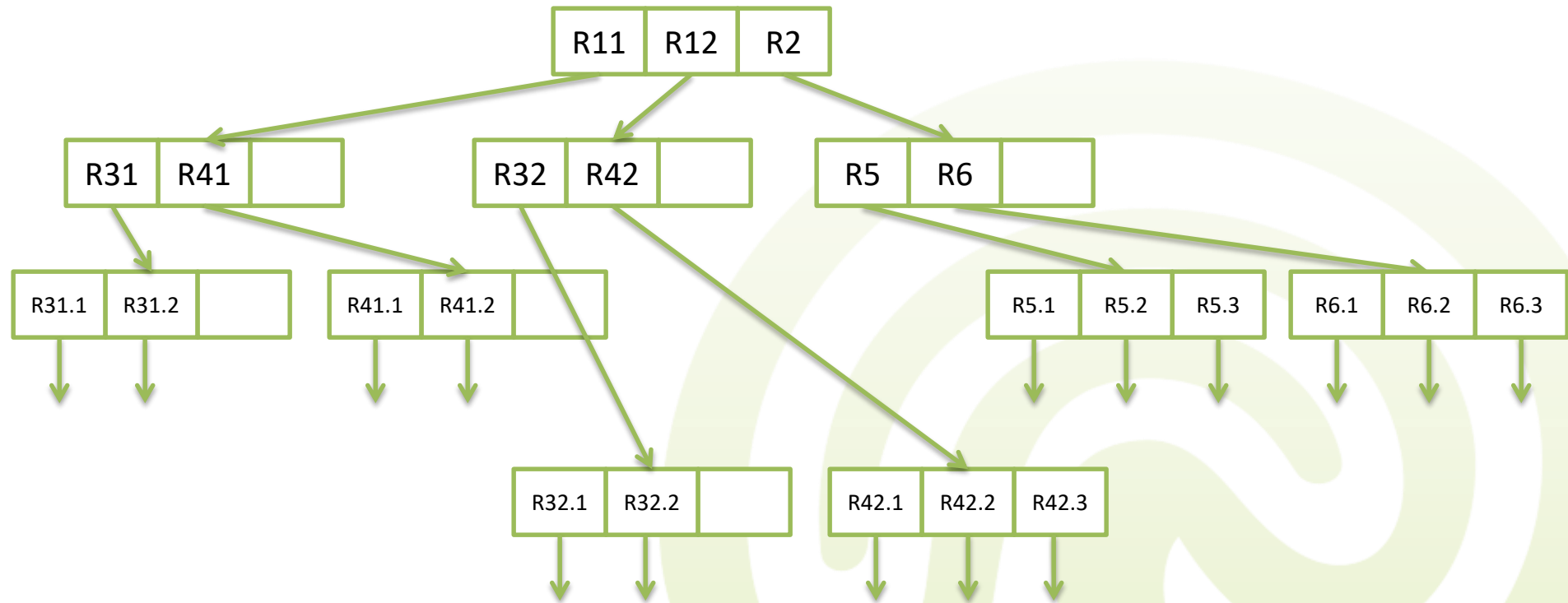


On X, highest minimum rectangles are B and D = 'b', and lowest maximum are A and C = 'a'
On Y, highest minimum rectangle is D = '09Qtr1', and lowest maximum is A = '08Qtr2'
 $D_x = 1/3$; $D_y = 3/5$; \Rightarrow D and A will create the new split nodes



4. Indexes

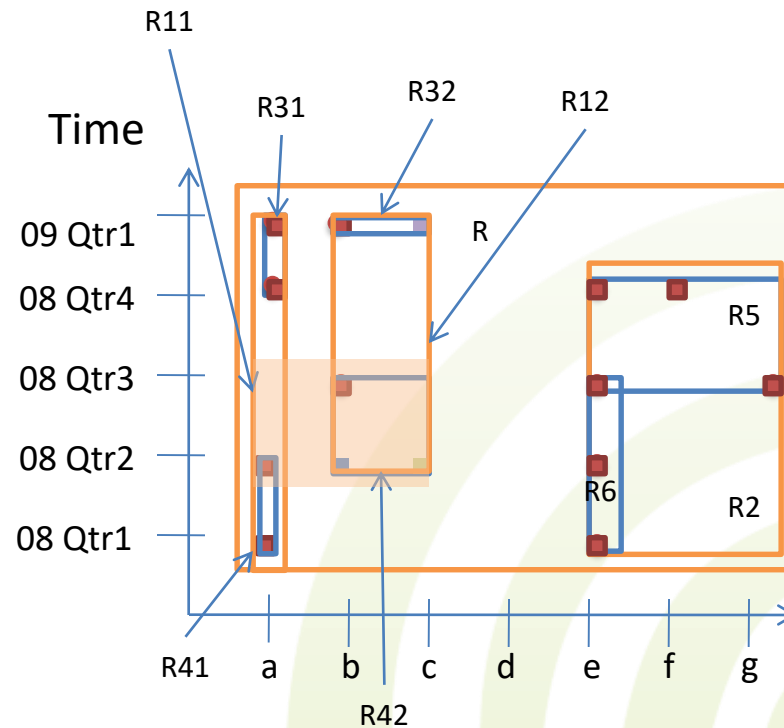
- Exercise 4. b





4. Indexes

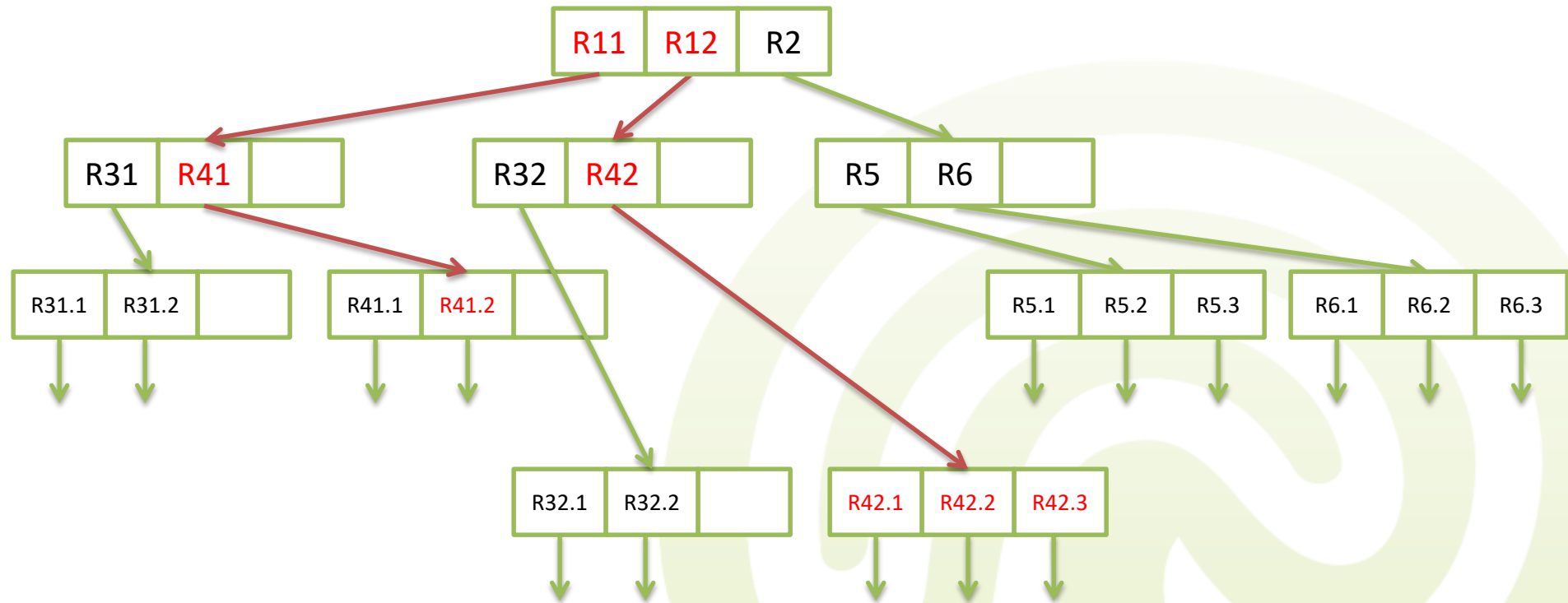
- Exercise 4. c





4. Indexes

- Exercise 4. c





4. Indexes

ID	Qty	ID_Prod	ID_Day
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



4. Indexes

- Exercise 5

- 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, hence the mapping!
- Since Nokia N8 was not sold in Q1 there is no mapping hence the empty field, 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			25		
3	10	11	14		26			31



4. Indexes

- Exercise 5
 - 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				25		
3	10	11	14		26			31	