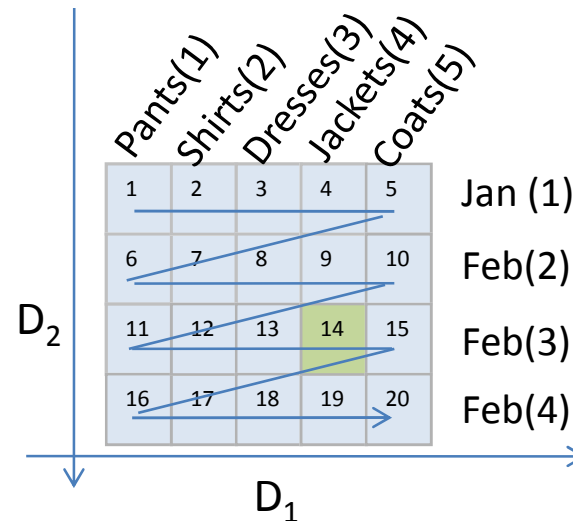




# 6. Optimization

Solutions

- Exercise 1.1+1.2
  - Linearization
  - Why is order important?

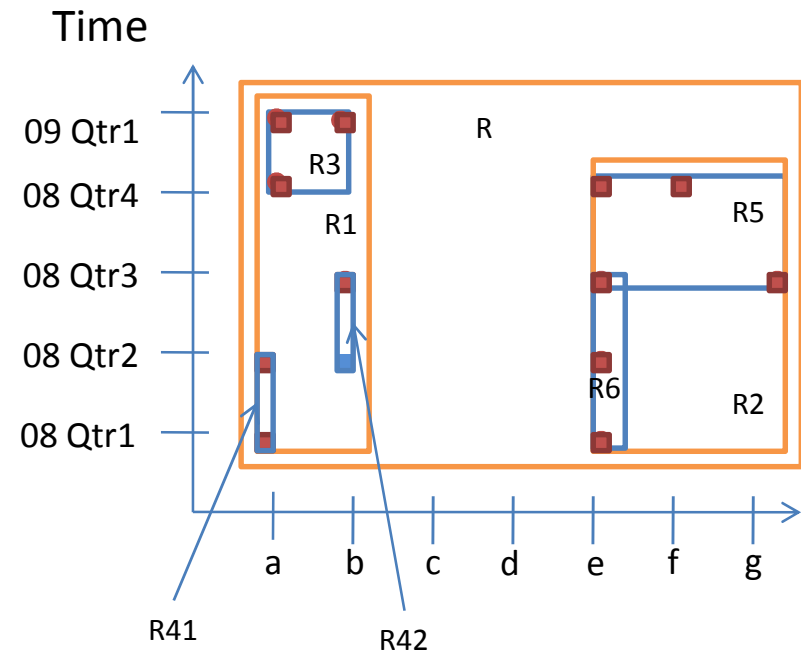
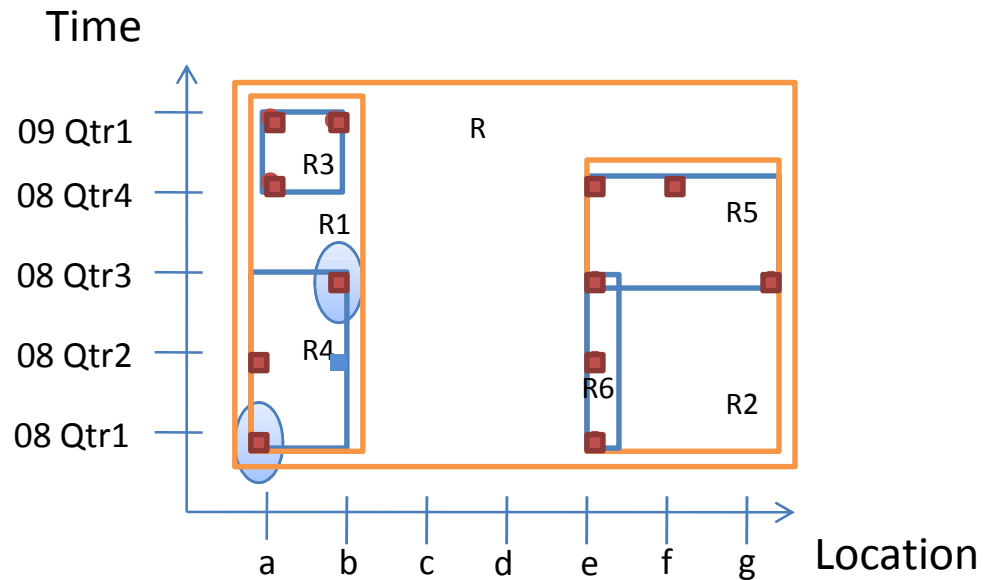




# 6. Optimization

Solutions

- Exercise 2. a

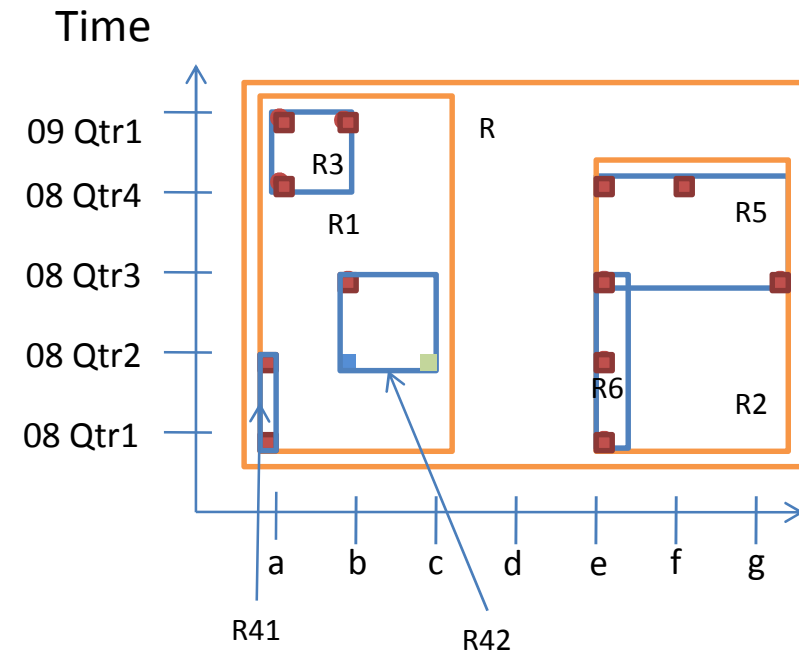
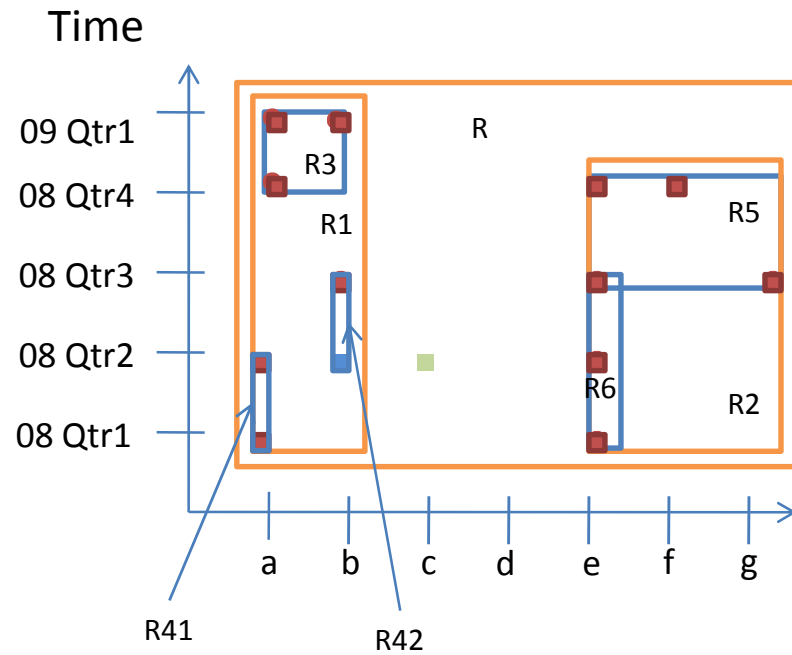




# 6. Optimization

Solutions

- Exercise 2. a

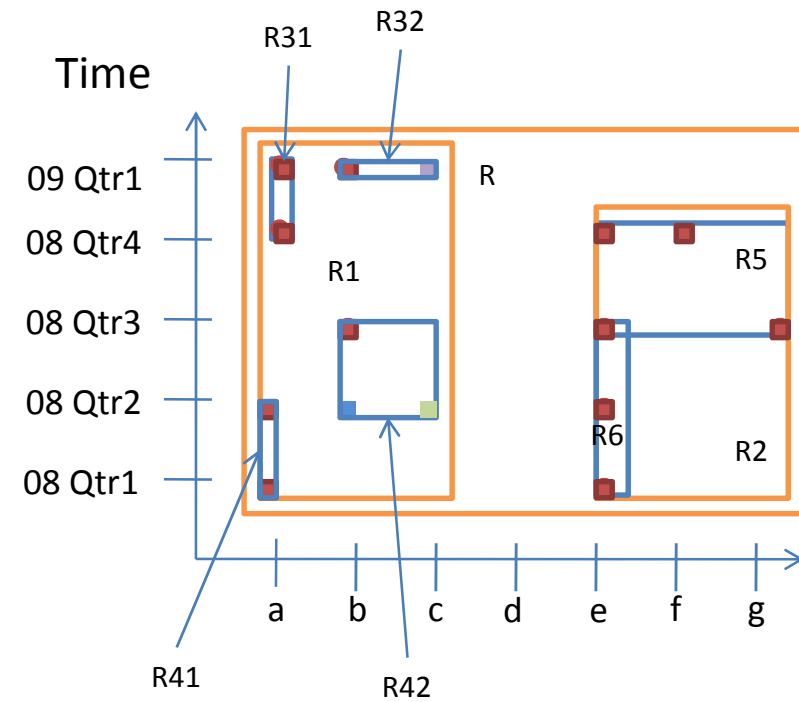
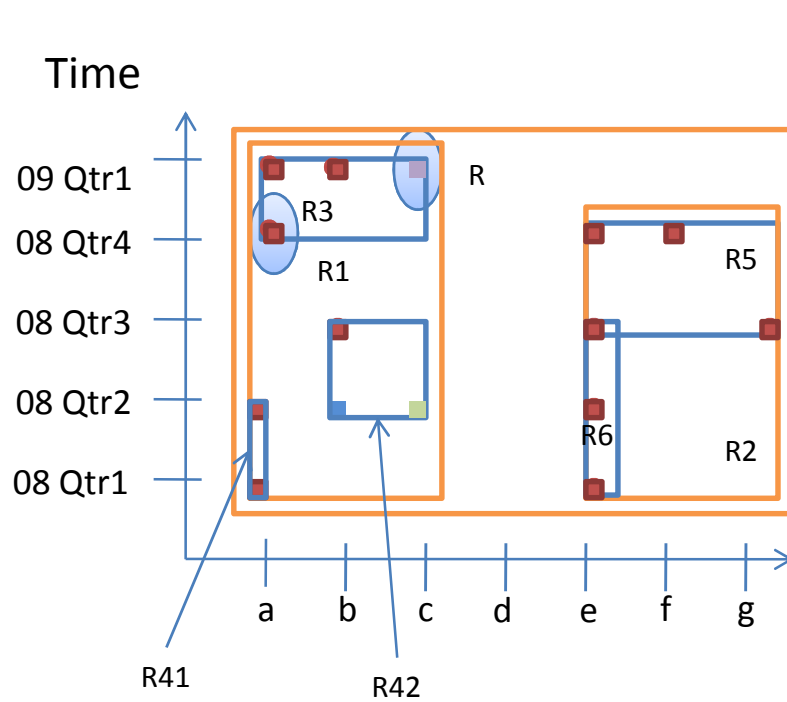




# 6. Optimization

Solutions

- Exercise 2. a

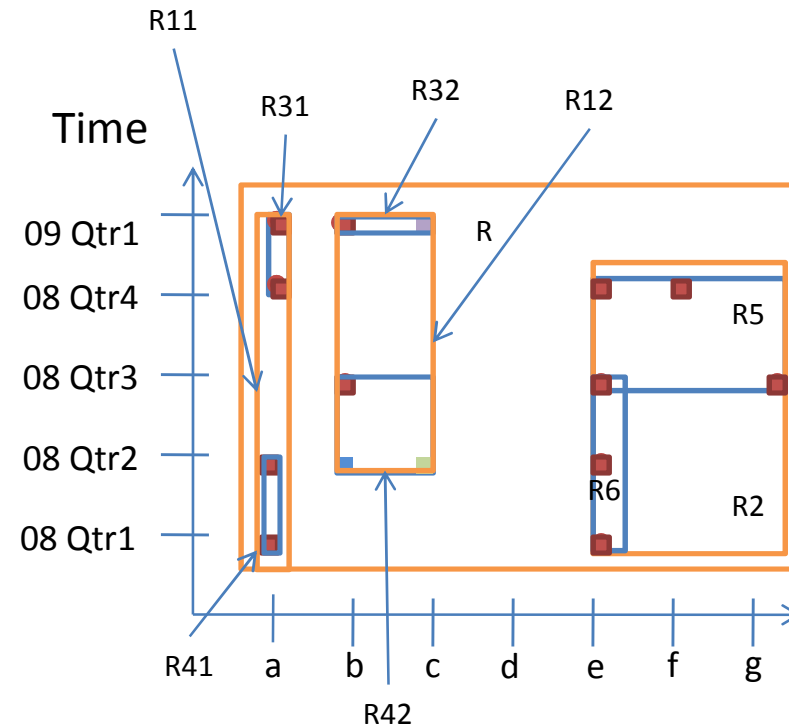
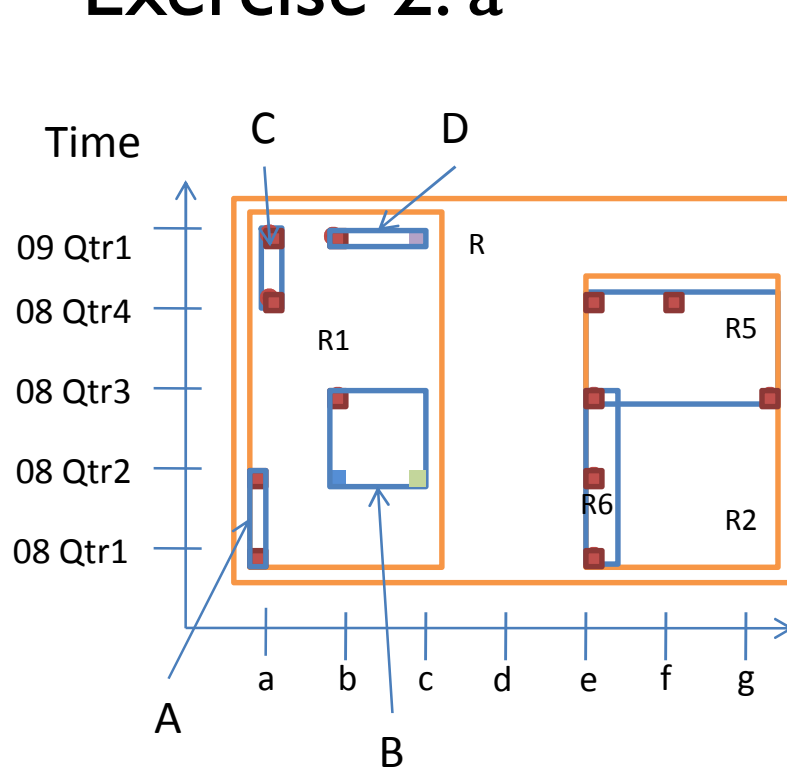




# 6. Optimization

Solutions

- Exercise 2. a



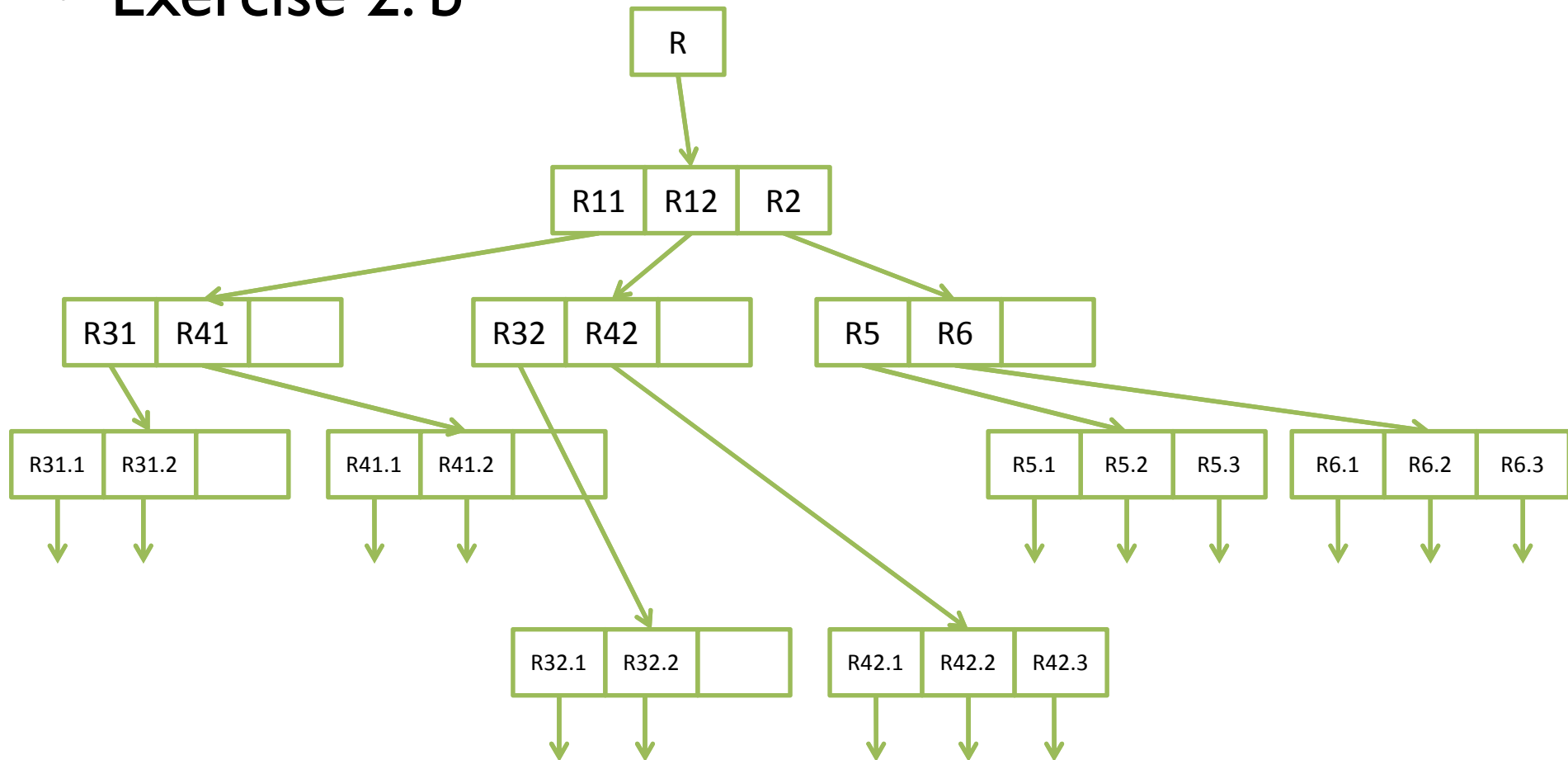
On X, highest minimum rectangles are B and D = 'b', and lowest maximum are A and C = 'a'  
On Y, highest minimum rectangle is D = '09Qtr1', and lowest maximum is A = '08Qtr2'  
 $D_x = 1/3$ ;  $D_y = 3/5$ ;  $\Rightarrow$  D and A will create the new split nodes



# 6. Optimization

Solutions

- Exercise 2. b

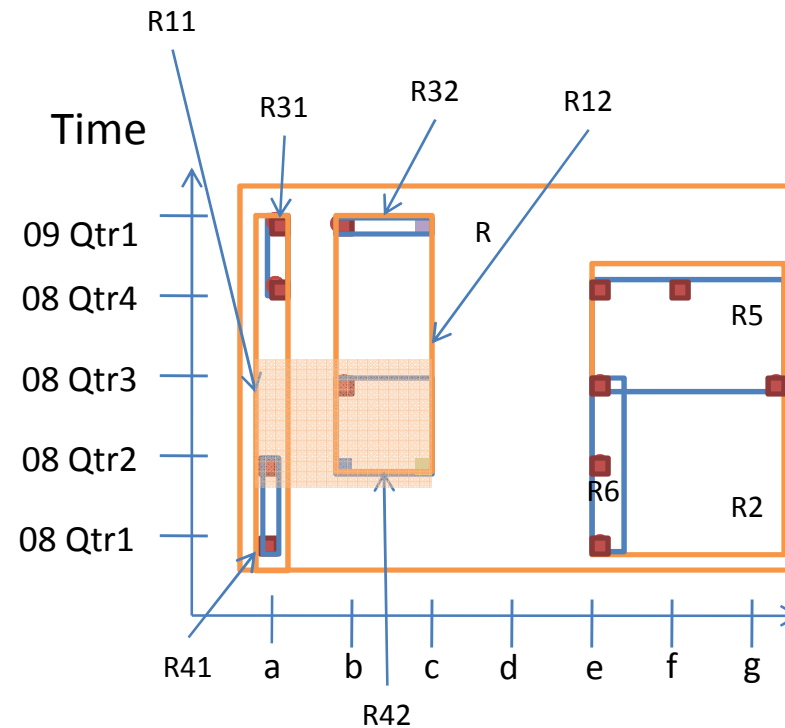




# 6. Optimization

Solutions

- Exercise 2. c

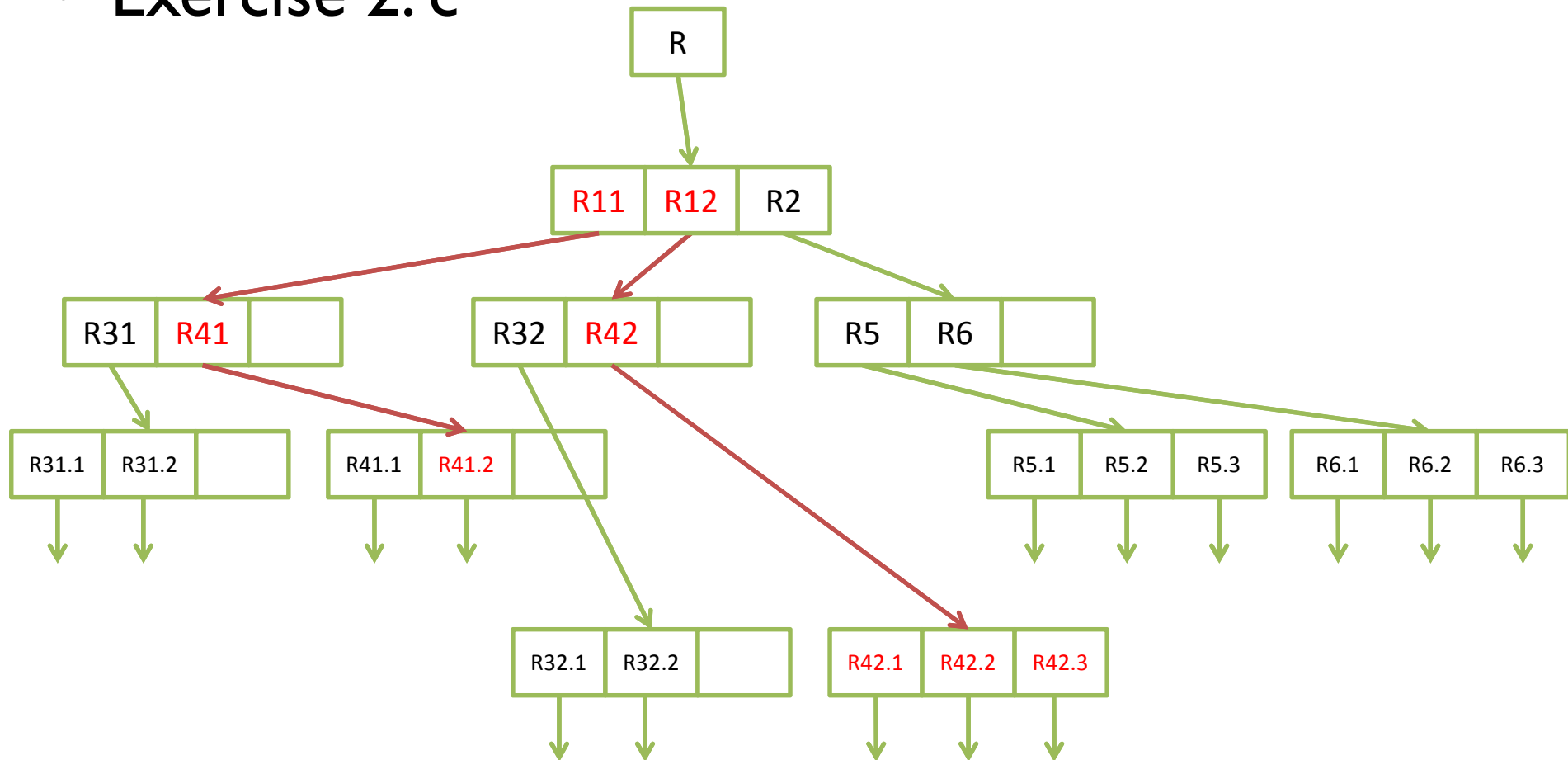




# 6. Optimization

Solutions

- Exercise 2. c



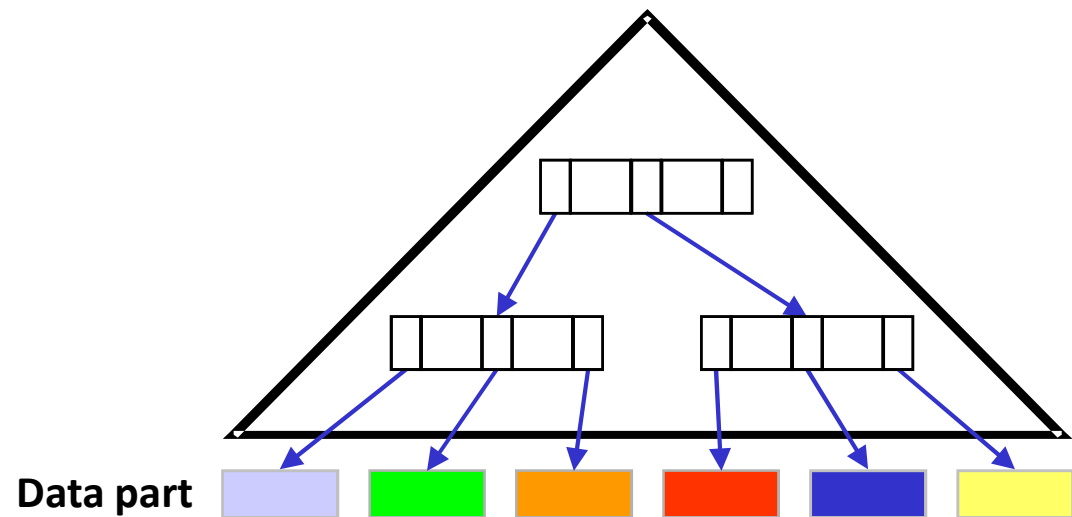
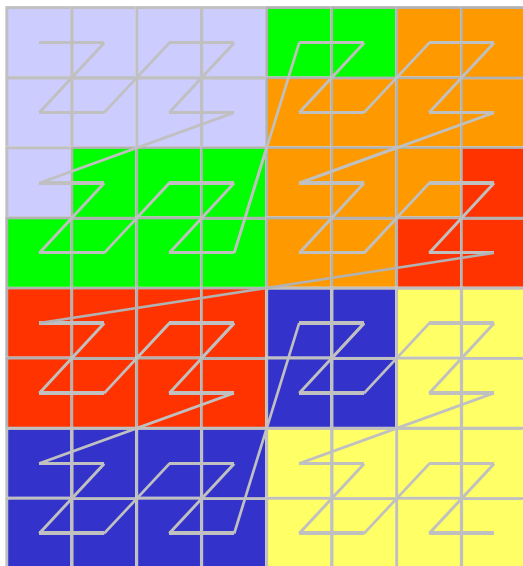




# 6. Optimization

*Solutions*

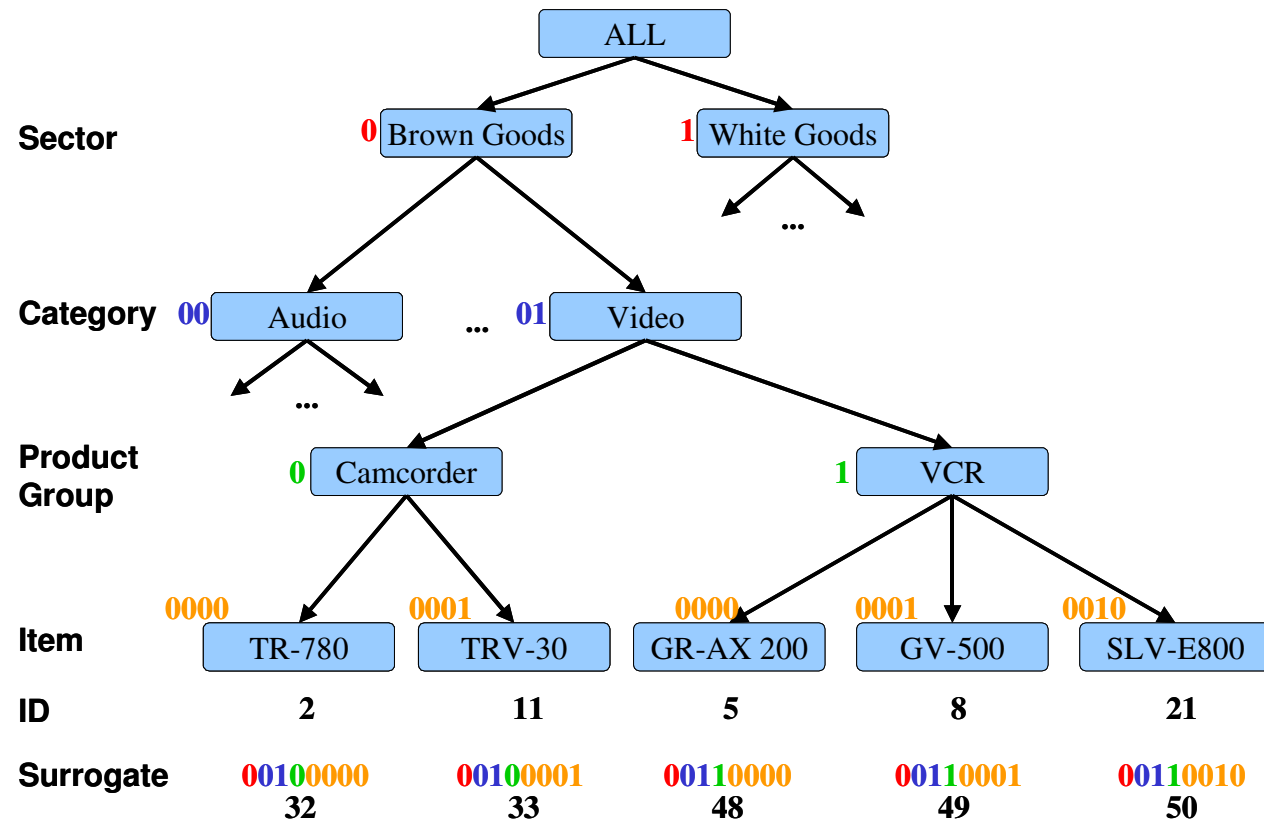
- Exercise 3.1
  - UB-Trees





# 6. Optimization

- Exercise 3.1
  - Multidimensional Hierarchical Clustering (MHC)





# 6. Optimization

Solutions

- Exercise 3.2

- Multi-component BI:

- $x = 4 * y + z$ , where  $0 \leq y \leq 2$ , and  $0 \leq z \leq 3$ , called  $\langle 3,4 \rangle$  basis encoding

Month	Dec	Nov	Oct	Sep	Aug	Jul	Jun	Mai	Apr	Mar	Feb	Jan
M	$A_{11}$	$A_{10}$	$A_9$	$A_8$	$A_7$	$A_6$	$A_5$	$A_4$	$A_3$	$A_2$	$A_1$	$A_0$
5	0	0	0	0	0	0	1	0	0	0	0	0

- $5 = 4 * 1 + 1$

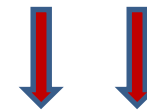
X	Y			Z			
M	$A_{2,1}$	$A_{1,1}$	$A_{0,1}$	$A_{3,0}$	$A_{2,0}$	$A_{1,0}$	$A_{0,0}$
5	0	1	0	0	0	1	0



# 6. Optimization

Solutions

- Exercise 3.2
  - Range encoded BI



Month	Dec	Nov	Oct	Sep	Aug	Jul	Jun	Mai	Apr	Mar	Feb	Jan
M	$A_{11}$	$A_{10}$	$A_9$	$A_8$	$A_7$	$A_6$	$A_5$	$A_4$	$A_3$	$A_2$	$A_1$	$A_0$
0	1	1	1	1	1	1	1	1	1	1	1	1
3	1	1	1	1	1	1	1	1	1	0	0	0
5	1	1	1	1	1	1	1	0	0	0	0	0
11	1	0	0	0	0	0	0	0	0	0	0	0

- Persons born in March:  $((\text{NOT } A_1) \text{ AND } A_2)$