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Exercises for DW & DM

Sheet 1 (until 21.05.2015)

Please drop your solution in the silver homework box (second floor where the IfIS is located) until Thursday, before the lecture (date is also mentioned above). You may answer in either German or English. **You are encouraged to work in teams of 2 students** (not more than 2), and send your solution as a team. Please mention in your email the **name of both students** together with the corresponding **inmatriculation numbers.**

Exercise 1 (14P)

Considering the R-Tree graphically represented through the MBR with a maximal node size of 3, in Annex 1, perform the following tasks:

a. Insert, in this order the following data (each of them will be represented as small red squares): ("08 Qtr2", "b"), ("08 Qtr2", "c"), ("09 Qtr1", "c"). Represent each step graphically, indicating the produced split. As split method, use the linear cost algorithm and as heuristics, the least enlargement criterion. (10P)
b. Draw the R-Tree according to the obtained graphical representation of the MBR, after performing exercise 1.a. (2P)
c. Graphically represent (as in the lecture) the following search ([08 Qtr_2, 08 Qtr_3], [a,c]) on both the MBR representation obtained from exercise 1.a, as well as on the R-Tree representation obtained from 1.b. (2P)

Exercise 2 (8P)

Consider data presented in Annex 2. Construct an UB-Tree index on the Time and Product dimensions, which should serve queries as 'How many cell phones did we sell in Q1 and Q2?' For the UB-Tree, consider a size of 5 records for a HDD block. Present the following:

a. The Z-curve and the corresponding Z-regions; (4P)
b. A mapping between the sale ids and the UB index IDs; (1P)
c. How many blocks do we need to access in order to answer the query on the UB Index and how many would we need without it? (3P)

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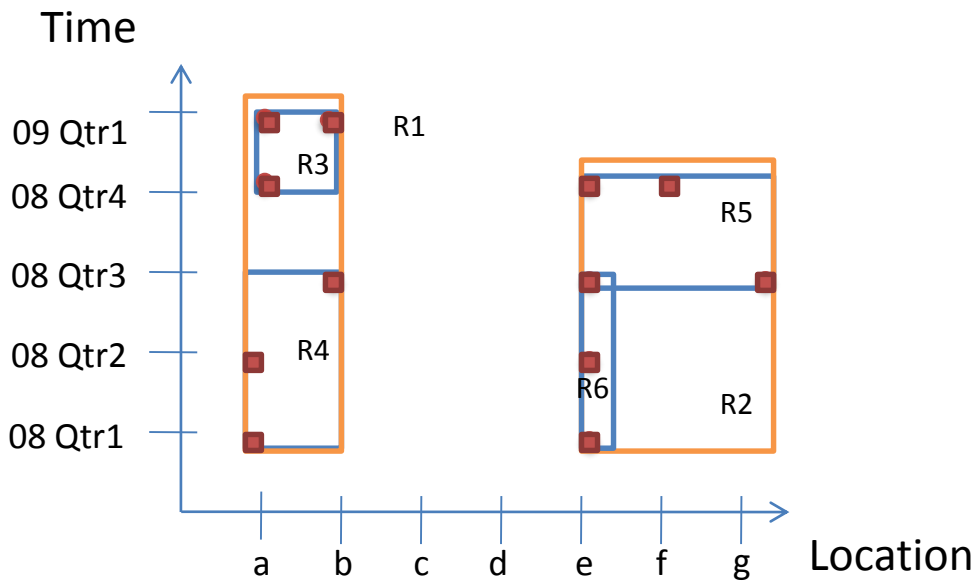
Annex 1:



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Annex 2:

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

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