

Review Part2 of NStdDBS

Prof. Dr. M. Böhlen

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Task 1: Assume relation *dept* as shown below. Determine the results of $\tau_{20}^B(dept)$, $\rho_{11}^B(dept)$, and $\rho_{11}^T(\tau_{20}^B(dept))$. Define ρ_t^T .

dept

Emp	Dept	T
Jake	Ship	$\{(5,10), \dots, (5,15), \dots, (9,10), \dots, (9,15), (10,5), \dots, (10,20), \dots, (14,5), \dots, (14,20), (15,10), \dots, (15,15), \dots, (19,10), \dots, (19,15)\}$
Jake	Load	$\{(now,10), \dots, (now,15)\}$
Kate	Ship	$\{(now,15), \dots, (now,30)\}$

Task 2: Assume the concrete temporal relation CheckOut below. Assume the semantics is defined in terms of the BCDM. What are possible results of **SELECT COUNT(*) FROM CheckOut**?

CheckOut

CustID	TapeNum	T
C101	T1234	[3,5]
C102	T1245	[5,7]
C102	T1234	[9,12]
C102	T1245	[19,20]
C102	T1245	[21,22]

Task 3: Assume BCDM relations *r* and *s* with *n* and *m* tuples, respectively. Determine the possible cardinality ranges of the results of the following operations:

$$\pi_x(r), \quad \sigma_c(r), \quad r \times s, \quad r \cup s, \quad r - s$$

Task 4: Assume the BCDM relation *r* below. Determine the result of $\pi_x(r)$.

r

X	Y	T
1	A	$\{(5,7), (6,3)\}$
1	B	$\{(5,8)\}$
1	C	$\{(10,10), (5,7)\}$
2	A	$\{(5,7)\}$

Task 5: Assume the BCDM relations $r1$ and $r2$ below. Give an algebraic definition of the bitemporal Cartesian product $\times^B$. Determine the result of $r1 \times r2$.

r2			r2		
X	Y	T	U	V	T
1	A	{ (5,7), (6,3) }	1	C	{ (6,3), (11,9) }
1	B	{ (5,8) }	2	A	{ (5,7) }
1	C	{ (6,3), (11,9) }			

Task 6: Construct a real world example where intervals are important and cannot easily be captured by time points.