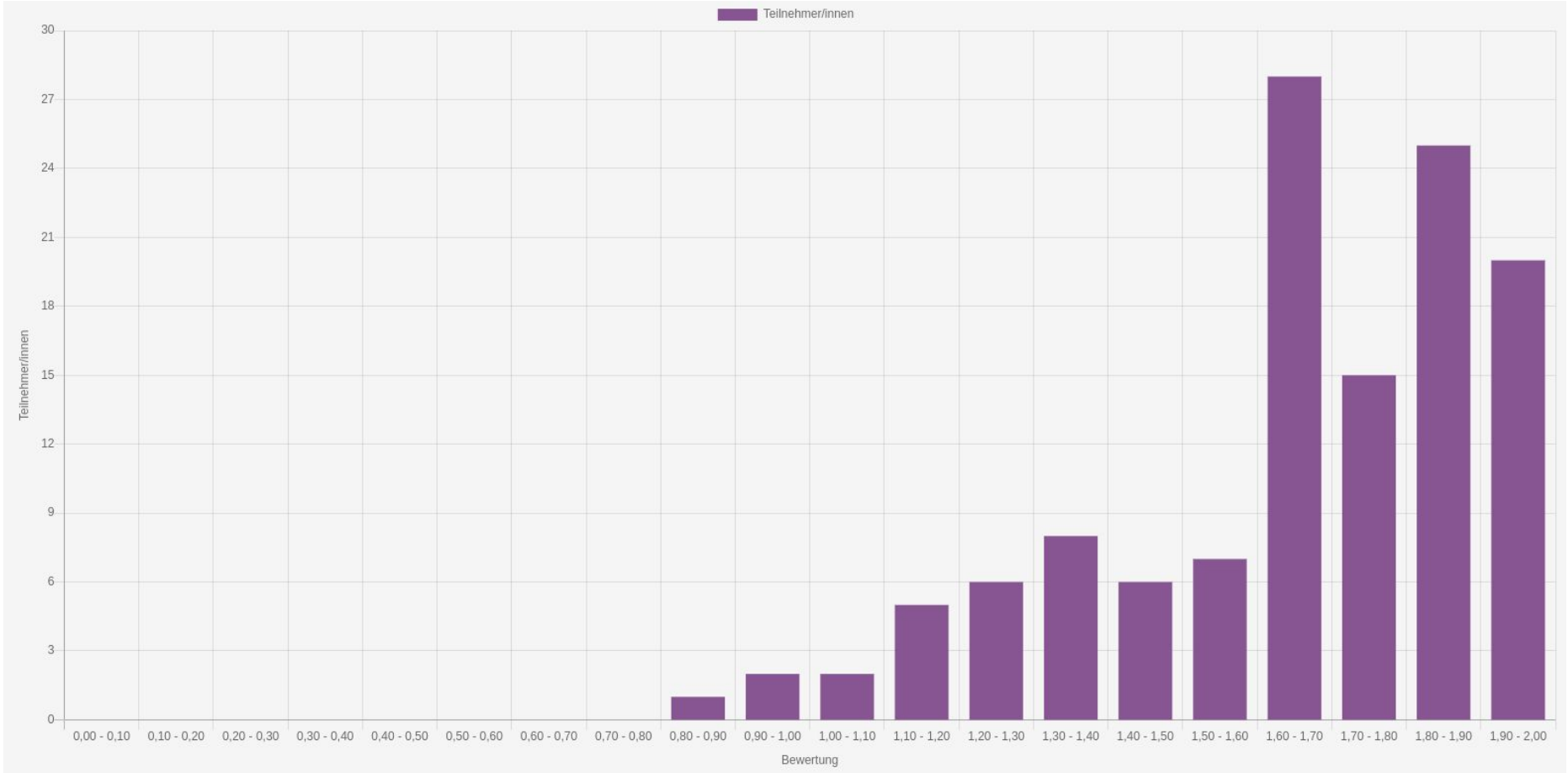
Database Technology

Exercise 8: Review


Teilnehmer/innen
30
27
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Teilnehmer/innen
0,00 - 0,10
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0,70 - 0,80
0,80 - 0,90
0,90 - 1,00
1,00 - 1,10
1,10 - 1,20
1,20 - 1,30
1,30 - 1,40
1,40 - 1,50
1,50 - 1,60
1,60 - 1,70
1,70 - 1,80
1,80 - 1,90
1,90 - 2,00
Bewertung

Q1: Isolation means a transaction executes as if it is the only transaction.

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Please choose an answer:

- True
- Not correct

Q2: Precedence graphs can be used for consistency checks at runtime.

Precedence graphs can be used for consistency checks at runtime.

Please choose an answer:

- True
- Not correct

Q3: Do the following operation conflict or not?

Let T1 and T2 be two transactions that are contained in an interleaved schedule.

Let A and B be two different database elements.

Do the following operations conflict or not? Select the appropriate option.

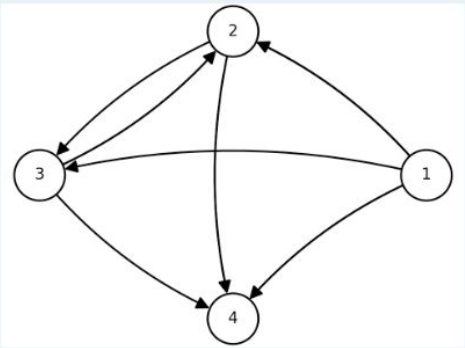
R1(A) and R2(B) **No**

Q4: What is the precedence graph?

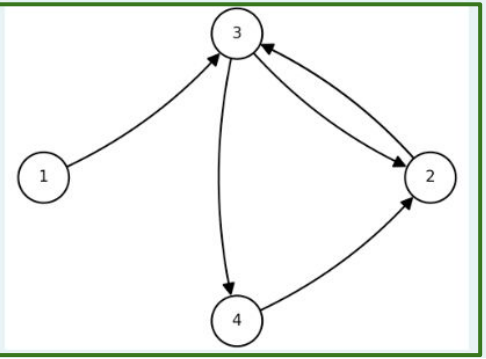
Consider the following schedule: W2(C), W1(A), R3(B), W4(B), R2(C), W3(C), R3(A), W2(B)

Select the matching precedence graph.

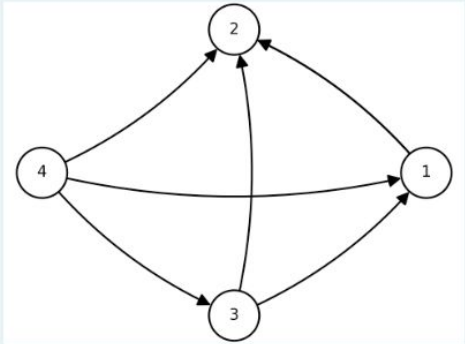
A



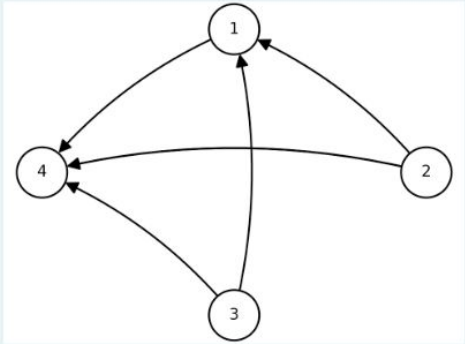
B.



C



D



Q5: Is the schedule conflict serializable?

The following schedule is conflict-serializable:

W1(C), R4(A), W4(B), R3(B), W1(B), R2(C), W2(B), R2(C)

Please choose an answer:

- True
- Not correct

Q6: 2PL leads to lower parallelization and throughput?

Strict 2PL leads to lower parallelization and lower throughput.

Select one:

- True
- False

Q7: Is the schedule 2PL compatible?

The following schedule is strict 2PL compatible: R1(A), R2(C), R3(B), W1(A), R1(B), W2(A), W3(B), R3(B)

Select one:

- True
- False

Q8: Lock compatibility

Consider that in addition to the **shared (S)** and **exclusive (X)** locks, your database system has two more locks:

(1) **Increment (I)** - increments a database element by a constant, and

(2) **Multiplication (M)** - multiplies a database element by a constant.

Fill out the appropriate value for the drop-downs in the compatibility matrix:

(N.A. stands for not applicable for the question assigned to you. Only the drop-down in the table is graded.)

	Shared (S)	**Exclusive (X)**	**Increment (I)**	**Multiplication (M)**
Shared (S)	Yes	No	N.A.	N.A.
Exclusive (X)	No	No	N.A.	N.A.
Increment (I)	N.A.	N.A.	N.A.	No
Multiplication (M)	N.A.	N.A.	No	N.A.

Q9: Transaction time and commit

Consider that you have three transactions, T_1, T_2, and T_3 that operate on three database elements A, B, and C. The timestamps of the transactions are as follows: T_1 = 250, T_2 = 275, T_3 = 175, while the initial values of the read and write timestamps of the three database elements is 0.

Consider the following schedule: R1(B), R2(A), R3(C), W1(B), W1(A), W2(C), W3(A)

The goal of the exercise is to maintain a table of operations in the schedule and the action(s) taken once the operation is executed. A few entries in the table have already been filled.

Fill out the missing values in the table below following the algorithm in the Complete Book (Page 937, Section 18.8.4 The Rules for Timestamp-Based Scheduling):

Operation	Action
R1(B)	RT(B)=250
R2(A)	RT(A)=275
R3(C)	RT(C)=175
W1(B)	WT(B)= 250 , C(B)= False
W1(A)	ROLLBACK
W2(C)	WT(C)= 275 , C(C)= True
W3(A)	ROLLBACK

Assumptions:

1. The last occurrence of a transaction in the schedule **also includes the commit request** to the scheduler (e.g., for a schedule R3(A), R1(B), W2(C), W1(C) -> T_1 will attempt to commit along with the request R1(B), T_2 will attempt to commit along with the request W2(C), and T_3 will attempt to commit along with the request R3(A)). Familiarize yourself with the action taken by the scheduler once a transaction tries to commit following the algorithm.
2. RT(X) refers to the read timestamp of a database element X
3. WT(X) refers to the write timestamp of a database element X
4. C(X) refers to the commit bit of a database element X

Q10: Transaction isolation:

A transaction executing in Snapshot Isolation (SI) reads data from a snapshot of the committed data as of the time the transaction started.

Select one:

- True
- False