

CHALMERS

EXAMINATION / TENTAMEN

Course code/kurskod	Course name/kursnamn			
DIT032	Data Management			
Anonymous code Anonym kod		Examination date Tentamensdatum	Number of pages Antal blad	Grade Betyg
735		2019-08-21	6	G

* I confirm that I've no mobile or other similar electronic equipment available during the examination.
Jag intygar att jag inte har mobiltelefon eller annan liknande elektronisk utrustning tillgänglig under examinationen.

Solved task Behandlade uppgifter	Points per task Poäng på uppgiften	Observe: Areas with bold contour are to completed by the teacher. Anmärkning: Rutor inom bred kontur ifylles av lärare.
No/nr		
1	✓ 10	
2	✓ 10	
3	✓ 8	
4	✓ 11	
5	✓ 12	
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Bonus poäng		
Total examination points Summa poäng på tentamen	57	

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Poäng på uppgiften
(ifylles av lärare)Question no.
Uppgift nr

1

7.1 ~~7~~

1.2) A weak entity in an ER model is an entity that does not have a primary key. They can have foreign keys that point to primary keys in other relations, but mostly weak entities are used to store attributes and describe a person / place / thing in an ER model. ~~7~~ ~~garbled keys~~ ~~no cases~~

1.3) Full table scans scan the whole table of a relation to find a specific row or value. Full table scans usually scan the table row by row which is time consuming.

example we want to find abc = '12Y' from the table below:

nr	abc	efg
1	11	72
2	34L	98
3	CB6	296
...
96	EM2	.
97	12Y	.
98	24	.
99	G12	.

✓
2

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Poäng på uppgiften

(ifylles av lärare)

Question no.

Uppgift nr

1

1.4) We want to avoid redundancies because they cause performance and stability issues.

~~Redundancies such as~~ disk space build up and data corruption cannot be fully avoided.

~~What can't be avoided?~~

1.5) Transactions are an atomic set of statements where all or none of the statements are

~~executed~~ ~~implemented~~. Transactions solve the problems of databases and their data being durable.

through out failures, being consistant, and concurrent.

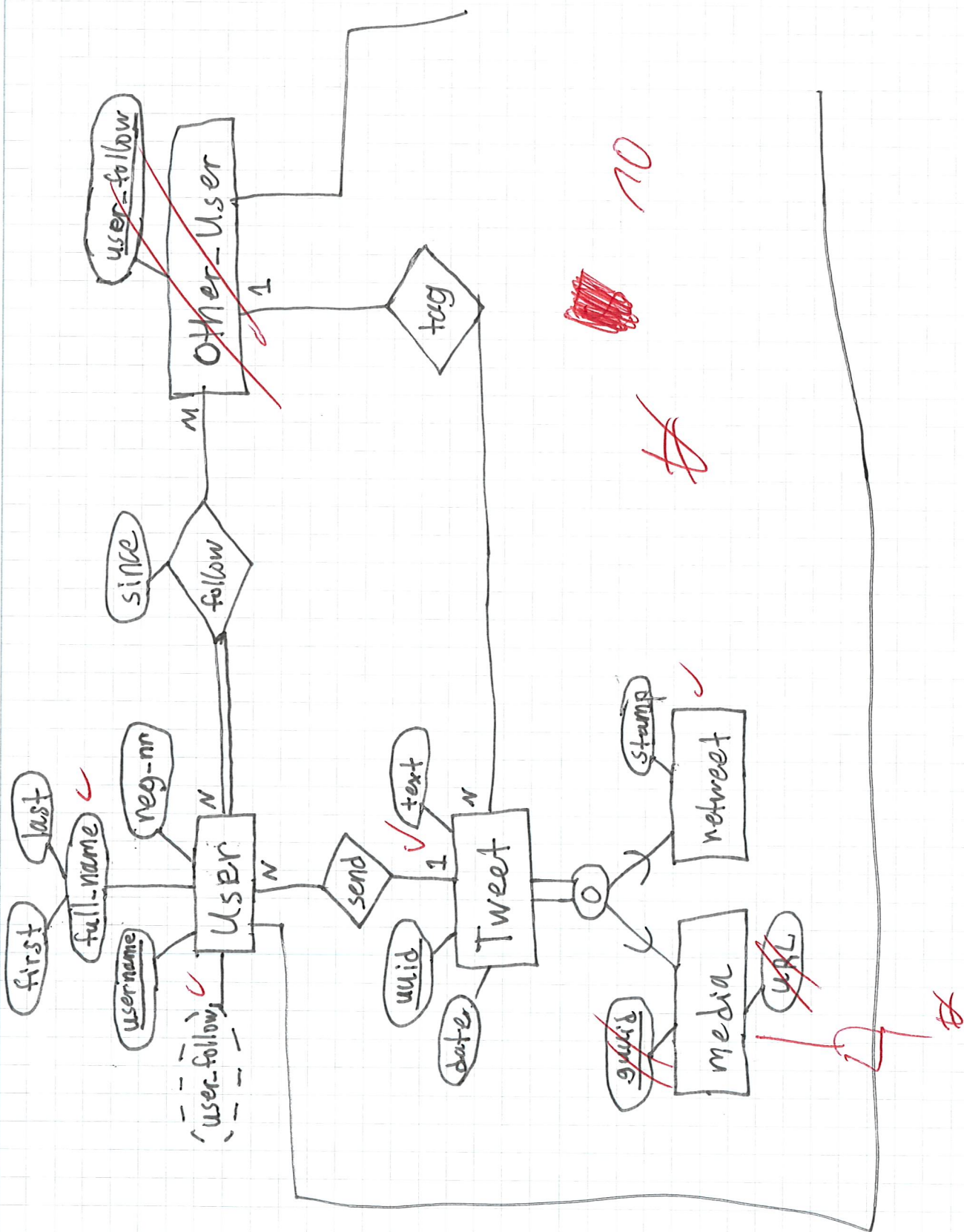
~~SQL?~~

1.6) Replecation is a system designed to assign tasks between nodes and manage data processing. It solves the problem with performance improving but it does not solve the problem of data fragmentation.

1.7) The CAP theorem usually requires 2 of the follow at the same time: consistancy, availability for updates, and partifion tolerance. Relational databases usually require ~~the first of those~~ two functions: consistancy and partition tolerancy.

~~3~~

1.8 ~~#~~



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Poäng på uppgiften
(ifylles av lärare)Question no.
Uppgift nr

3

PERSON(name, birthday)PERSON-IN-ADDRESS(person, city, street, nr, zip) - 7

person → PERSON.name

{city, street, nr, zip} → {address.city,
address.street, ~~address.nr~~, address.zip} - 7BOOK(ISBN, year, title, author)

*AK - 7

READER-READS-BOOK(book, person)

book → BOOK.ISBN - 7

Person → ...

J

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Poäng på uppgiften
(fylls av lärare)Question no.
Uppgift nr

4

4.1) π borrowed (σ library = 'GU lib' \wedge borrowed = 1
(BOOK_PLACED))

4

4.2)

LS \leftarrow SHELF \bowtie library = name LIBRARY

BP \leftarrow LS * BOOK_PLACED

natural join \rightarrow *consider shelf-nr*

BBP \leftarrow BOOK \bowtie isbn = book BP

π title (σ name = 'Gothenburg' (BBP))

3

4.3)

S \leftarrow π library (SHELF)

SBP \leftarrow SHELF \bowtie shelf-nr = shelf BOOK_PLACED

SB \leftarrow S \bowtie library = library SBP

π topic, shelf \bowtie COUNT book (SB)

2

4.4)

LB \leftarrow σ name = 'GU lib' (LIBRARY)

BP \leftarrow BOOK \bowtie isbn = book BOOK_PLACED

B \leftarrow BP \ominus LB

π title (σ borrowed = 0 (B))

2

5.1)

```
CREATE TABLE SHELF (
  library VARCHAR(30) NOT NULL,
  shelf-nr INT NOT NULL,
  topic VARCHAR(30) NOT NULL,
  PRIMARY-KEY (shelf-nr),
  FOREIGN-KEY(library) REFERENCES
    LIBRARY(name)
);
```

✓ 4

5.2) SELECT title, author FROM BOOK a b,
BOOK-PLACED as bp WHERE borrowed=0
AND since < '2019-01-01';

JOIN?! xxx 2

5.3) SELECT count(name) FROM LIBRARY GROUP BY
location;

JOIN 5

5.4) SELECT isbn FROM BOOK as b, BOOK-PLACED
as bp, SHELF as s WHERE (NOT IN (
SELECT topic FROM s WHERE topic = 'computer
science'));

1