7988870

CHALMERS

FÖRSÄTTSBLAD TENTAMEN / EXAMINATION COVER

Kurskod / Course code:	Provkod / Test code:	Tentamensdatum / Examination date:
D I T 0 3 4	1 0 1 0	2 0 2 5 - 0 6 - 1 1
Anonymt kodnummer / Anonymous code number:	D I T 0 3 4 0 0 2 7 S F G	
Kursnamn / Course name:	Systematisk Datahantering	

Ifylles av student / To be completed by the student

Behandlade uppgifter. Sätt kryss (X) / Solved assignment. Put an X.:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
☒	☒	☒	☒	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Antal inlämnade svarsblad. Sätt kryss (X) i rutorna / Number of submitted answer sheets. Put a/an X in boxes.

0	10	20	30	40	50	60	70	80	90		1	2	3	4	5	6	7	8	9
☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	+	☒	☐	☐	☐	☐	☐	☐	☐	☐

Ifylles av lärare / To be completed by the examiner

Poäng på uppgifter / Points per question										
1	2	3	4	5	6	7	8	9	10	Bonus
11	16	14	10	19						
11	12	13	14	15	16	17	18	19	20	Total
										70,0
										Heltal / integer 0,5

Datainläsning

Totalpoäng / Total points										
10	20	30	40	50	60	70	80	90	100	200
☐	☐	☐	☐	☐	☐	☒	☐	☐	☐	☐
+	0,5	1	2	3	4	5	6	7	8	9
	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Betygskala/ Grade scale	Betyg / Grade			
	U	3	4	5
TH	☐	☐	☒	☐
	U	G	VG	
UV/UG	☐	☐	☐	

Q 1.1: when we use join we combine table together

A) in inner join ⋈ we combine ~~tables~~ tables but removes Null information in both tables?

B) in full outer join ⟗ we dont remove tuples (information) So in queries we can find them but shows in final table with "Null" statment

& example

ID	grade uni	
1	4	gu
2	3	gu
3	Null	gu

t-ID	degree uni	
3	BSc	gu
2	PHD	gu
1	~~Null~~	gu

~~university~~ teacher

Student

→ if we use full outer join for query on the final result table (combination Student and teacher table by join) we can see the information degree teache. id = 1 and also ~~grade~~ grade of Student. id = 3 with NULL but in inner join it removes that information if final result table.

Inner join returns only rows with matching conditions even if the other attributes are Null

0

1

CHALMERS	Anonymous code / Anonym kod: 0027 - SFG	Points for question (to be filled in by teacher) / Poäng på uppgiften (ifylles av lärare)	Consecutive page no. / Löpande sid nr: 2
			Question no. / Uppgift nr: 1

9.1.2) ~~INSTRUCTOR.CourseID is not Primary key~~

i) ~~Cours~~ INSTRUCTOR.CourseTitle is also in COURSE entity

as we know one of the best database design is to Reduce redundency of Functional dependency ~~redundent~~.

to remove duplicate information and reduce database Storage

we can find coursetitle with foreign key (courseID) in INSTRuctorsowe dont need to

better design: COURSE (CourseID, Title, Department)

iii: INSTRUCTOR (InstructorID, office, courseID)

CourseID → COURSE.CourseID

ii)

it Violate NF2 ← NF3

becuse every ~~Relation~~ Attribut should have exact one relation with PK and not have it in diffent table

example

$x \rightarrow B$

$x \rightarrow A \quad A \rightarrow B$: it is redundant becuse Store duplicate information

4

Answer only one question on this page. Do not write on the back of this paper

1

Q1.3) Indices is a data structure that help to find information in database ~~more faster that~~ without full scaning. it is like a book indices that helps to find our specific information from it.
(Solve full scaning problem)
It added to parts of database and instead of search all database ~~we~~ searching just performs in a more straight and ~~smaller~~ part.

advantages → faster finding our information that search for
~~increase performance of queries of find~~ query optimization

disadvantages → store more space in database

5

1

CHALMERS	Anonymous code / Anonym kod: 0027-SFG	Points for question (to be filled in by teacher) / Poäng på uppgiften (ifylles av lärare)	Consecutive page no. / Löpande sid nr: 4
			Question no. / Uppgift nr: 1

Q 1.4) ① volume (bigdata has big database with diffe information that make hard to query and search on it or process)

what do they mean?

② veraity

③ velocity

④

⑤

Solution:

① volume → sharding → with sharding we can divided bigdata to smaller parts and prossess them sepertly or also parrallell.
and if one part face problem other parts can contin to work.

* I forgot thems of this V keyword but it is about consistensy and integrity *

2

11

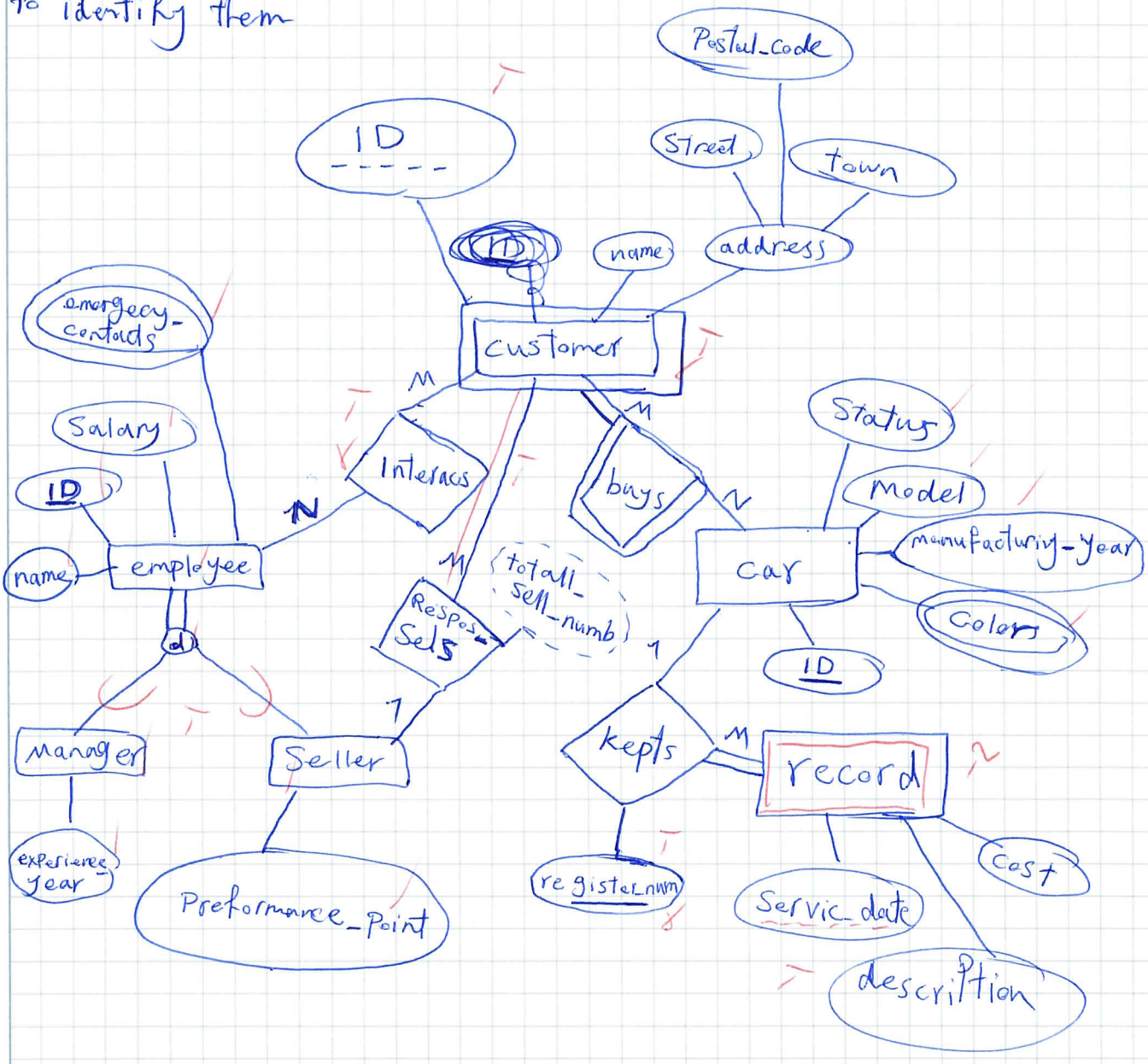
Answer only one question on this page. Do not write on the back of this paper

1

CHALMERS	Anonymous code / Anonym kod: 0027_SFG	Points for question (to be filled in by teacher) / Poäng på uppgiften (ifylles av lärare)	Consecutive page no. / Löpande sid nr: 5
			Question no. / Uppgift nr: 2

* address can have combination to be more accurate
Attribiut
* car need a unique ID for identifyes
* coustumer also can have a ID but ~~also need~~ it is weak entity and need register by buy a car (car is strong entity)
* we can as ~~ID~~ ~~for~~ unique ID for record but can use ~~car~~ ID of car that we added (Records cannot be exists without car)

it is better to ID for Employee be uniqu as Pk to identify them



16

Answer only one question on this page. Do not write on the back of this paper

1

Musician (Nickname , Name , country)

Vocalist (Nickname , VocalRange)
Nickname → Musician . Nickname

Instrumentalist (Nickname , Instrument)
Nickname → Musician . Nickname

Band (BandID , BandName , FormationYear)

Musician_joins_band (Singer , Band_id)
Singer → Musician . Nickname
~~Bandname → Band~~
Band_id → Band . BandID

Song (BandID , Name , Genre , Lyrics , Musician)
BandID → Band . id
~~Name~~ Musician → Musician . Nickname

Band_Plays_Song (Band , Song , Musician)
Band → Band . BandID
Song → Song . Name
Musician → Song . Musician

14

1

94.1) $\sigma_{department = 'computer\ science' \wedge department = 'engineering' \wedge credits > 7}(COURSE)$ (5)

94.2) COURSE-DIT $\leftarrow$ σ(course = 'DIT034' (COURSE ⋈ COURSE.id = TEACHES.id TEACHES))

this is can be taken from TEACHES anyway.

what do you use it for?

Π firstname, last_name (σ year > 2020 $\wedge$ year < 2025 (COURSE-DIT ⋈ COURSE-DIT.id = PROFESSOR.id (PROFESSOR))) (2)

what is the ID here?

1

CHALMERS	Anonymous code	Points for question (to be filled in by teacher)	Consecutive page no. Löpande sid nr 8
	Anonym kod 0027-SFG	Poäng på uppgiften (ifylles av lärare)	Question no. Uppgift nr 4

Q ~~4.5~~ 4.3

needs COURSE relation to get the title

2

π title (σ firstname = "Molly" $\wedge$ Lastname = "Davis"
(STUDENT) $\bowtie$ STUDENT.id = ENROLLMENT.Student
(ENROLLMENT) $\bowtie$ (σ(first_name = "Philip" $\wedge$
Last_name = "leitner" (PROFESSOR))

grade?

Answer only one question on this page. Do not write on the back of this paper

CHALMERS	Anonymous code / Anonym kod: 0027 - SFG	Points for question (to be filled in by teacher) / Poäng på uppgiften (ifylles av lärare)	Consecutive page no. / Löpande sid nr: 9
			Question no. / Uppgift nr: 4

1

Q 4.4)

~~count(STUDENT.id) σ(Studen~~

1

Lind_holmen_Proffessor ← σ(office = 'Lindholmen'(Professor))

not needed

R ← (Student) ⋈ STUDENT.id = ENROLLMENT.Student

(ENROLLMENT) ⋈ ENROLLMENT.course = ~~TEACHES.course~~ Lind_holm_Proffessor.course

~~TEACHES~~ (Lind_holmen_Proffessor)

needs join with TEACHES

does not exist in this relation

?

R F count(STUDENT.id) (~~STUDENT~~ STUDENT)

Answer only one question on this page. Do not write on the back of this paper

95.1)

```
CREATE TABLE ENROLLMENT(
  id VARCHAR(50) PRIMARY key Not NULL,
  Student VARCHAR(50) not null,
  course VARCHAR(50) Not Null,
  Semester VARCHAR(50) Not null,
  year INT not null,
  grade VARCHAR(10) not null,
  Student AS FORIGEN key Refferences STUDENT(id)
  Course AS FORIGEN key Refferences COURSE(id)
  Constraint_year check (year <= 2025),
  constraint_course check (course like 'H%' v 'V%')
```

4

check notation

is this the name of the constraint?

1

95.2) Select C.department, Count (E.id) From COURSE AS C join ENROLLMENT AS E on E.course = C.id join STUDENT AS S on E.student = S.id where S.firstname = 'Andy' and S.Last_name = 'Davis'

Group by C.department

order by C.department ASC ;

(5)

95.3) count(c.id) From COURSE C join ENROLLMENT E on C.id = E.course join STUDENT S on E.student = S.id where S.first_name = 'Bonnie' and S.last_name = 'Anderson' and E.year = 2023 ;

No need

4

95.4

Select S.firstnam, S.lastname from Student AS S join ENROLLMENT AS E on S.id = E.student join COURSE AS C on E.course = C.id

Group by C.department

HAVING count (E.course) >= 1 ;

should count the department (distinct)

4

17 +2