

Week 2 Workshop





Housekeeping

Please attend the lab that for had registered for and the lab signul had possible of indised and sweps are not all dwell unless there is a special Tellips consideration and an approval.

- From Week 2 to Week 11, weekly online quiz is always due 23:59 pm.
 Thursday after you watch the online lectures.
- After Lab Lingou still I are any questions of sales about the lab environment, please bring your questions to the online drop-in sessions (Aug 6, Fri 3-5 pm) in Week 2.
- an optional exercise website is available for our course https://es.anu.edv.ab/dab/bench/db-preferses/COCET
- Make effective use of Wattle discussion forum.
 - We strongly encourage you to ask your questions on the forum, and everyone in the class can benefit from the discussions and answers.
 - You should not post any solutions/results/ideas/interpretations related to assessment items (including assignments, quizzes, tests, exams).



Thanks for your feedback!





Assignment Project Exam Help



https://en.wikipedia.org/wiki/ https://en.wikipedia.org/wiki/
Anna_Kiesenhofer Terence_Tao



Assignment Project Exam Help

A set is a collection of distinct elements.

https://powcoder.com

Add WeChat powcoder



Assignment Project Exam Help

- A set is a collection of distinct elements.
- cologian power oder.com

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- A set is a collection of distinct elements.
- cologian power oder.com
- Distinct: each element can not be in the set more than once.
 e.g. AAAB is was ast Charles allow to have duplicat pelements.



- A set is a collection of distinct elements.
- cologian power oder.com
- Distinct: each element can not be in the set more than once.
 e.g. AAAB is was ast Charles allow to have duplicat pelements.
- Cardinality: the cardinality of a set is the number of elements of the set.



Tuple – Example

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• A tuple is an **ordered** list of *n* elements.

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Tuple – Example

Assignment Project Exam Help

• A tuple is an **ordered** list of *n* elements.

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• ordered: the elements in a tuple have an order. e.g., $(A, B) \neq (B, A)$

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Tuple – Example

Assignment Project Exam Help

• A tuple is an **ordered** list of *n* elements.

https://powcoder.com

• ordered: the elements in a tuple have an order. e.g., $(A, B) \neq (B, A)$

The same element can be in a tuple more than once.

The same element can be in a tuple more than once.
 e.g., (A, A, B)is a tuple.



Assignment Project Exam Help

A set of tuples is a collection of distinct tuples.

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Assignment Project Exam Help

- A set of tuples is a collection of distinct tuples.
- - the tuple in this set may over oder. com
 each tuple can not be in the set more than once.

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- A set of tuples is a collection of distinct tuples.
- Set
 - the tiple is set the can not be in the set more than once.
- Tuple:
 - the elements in a tuple have an order Add WeChat powcoder



- A set of tuples is a collection of distinct tuples.
- Set:
 - the tipe of the can not be in the set more than once.
- Tuple:
 - the elements in a tuple have an order
 - VeChat powcoder
- Question 1: {(A,B),(A,C)} = {(A,C),(A,B)}:



- A set of tuples is a collection of distinct tuples.
- Set:
 - the tipe of the can not be in the set more than once.
- Tuple:
 - the elements in a tuple have an order VeChat powcoder
- Question 1: {(A,B),(A,C)} = {(A,C),(A,B)}:



- A set of tuples is a collection of distinct tuples.
- Set:
 - the tipe of the can not be in the set more than once.
- Tuple:
 - the elements in a tuple have an order
 - WeChat powcoder
- Question 1: $\{(A,B),(A,C)\} = \{(A,C),(A,B)\}$? Yes!



- A set of tuples is a collection of distinct tuples.
- Set:
 - transparent tran
- Tuple:
 - the elements in a tuple have an order
- WeChat powcoder
- Question 1: {(A,B),(A,C)} = {(A,C),(A,B)} ? Yes!
- Questino 2: $\{(A,B),(A,C)\} = \{(B,A),(A,C)\}$?



- A set of tuples is a collection of distinct tuples.
- Set:
 - transparent tran
- Tuple:
 - the elements in a tuple have an order
- WeChat powcoder
- Question 1: {(A,B),(A,C)} = {(A,C),(A,B)} ? Yes!
- Questino 2: $\{(A,B),(A,C)\} = \{(B,A),(A,C)\}$?



Assignment Project Exam Help

- A set of tuples is a collection of distinct tuples.
- Set:
 - tratifier this set a contract of the can not be in the set more than once.
- Tuple:
 - the elements in a tuple have an order

WeChat powcoder

- Question 1: {(A,B),(A,C)} = {(A,C),(A,B)} ? Yes!
- Questino 2: $\{(A,B),(A,C)\} = \{(B,A),(A,C)\}$? No!



Cartesian product – Examples

Assignment to the complete complete the complete complete

What is the Cartesian product of Class × Room?

https://powcoder.com

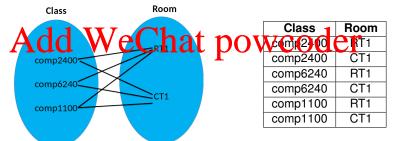
Add WeChat powcoder



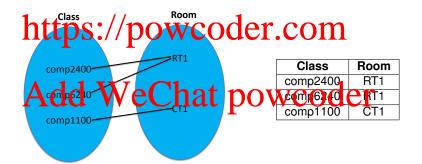
Cartesian product – Examples

Assignment to the complete complete the complete complete

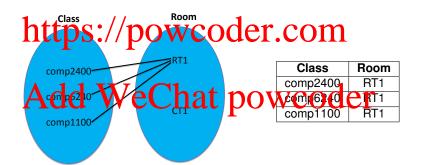
- What is the Cartesian product of Class × Room?
- Class \times Room = {(c,r)|c \in Class, $r \in$ Room} = { don 240 SR7/1), comp240, C11 (dono 240, C71), (comp1100, R71), (comp1100, C71)}













Assignment Project Exam Help Class = {comp2400, comp6240, comp1100}

- *Room* = {*RT*1, *CT*1}
- Class t Report— { (composition of the composition of the composition
- $R_1 = \{(comp2400, RT_1), (comp6240, RT1), (comp1100, CT1)\}$
- \bullet R_2 (composition) $AT = \{(composition, RT), (composition, RT)\}$
- What is the relationship of R_1 and R_2 with $Class \times Room$?



Assignment Project Exam Help Class = {comp2400, comp6240, comp1100}

- *Room* = {*RT*1, *CT*1}
- Class k Report— { (compodess C Compode, RT 1), (comp2400, CT 1), (comp6240, RT 1), (comp1100, RT 1), (comp1100, CT 1)}
- $R_1 = \{(comp2400, RT_1), (comp6240, RT1), (comp1100, CT1)\}$
- R2 (comp2400, AT 1), (comp6240, RT), (comp1160, AT)
- What is the relationship of R_1 and R_2 with $Class \times Room$?

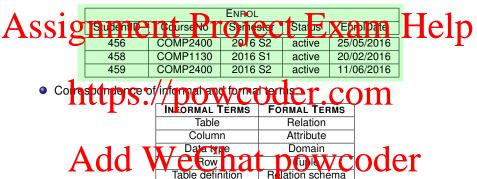
Answer: R_1 , R_2 are the subsets of $Class \times Room$. R_1 , R_2 and $Class \times Room$ are all sets of tuples.



Assignment in Project to Exams Help and Relation Database State



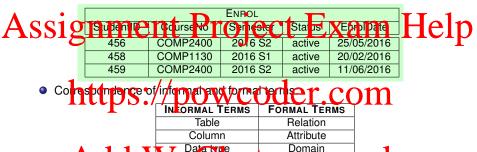






Add

Relation v.s. Table (Example)

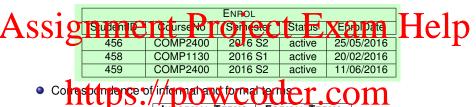


Relation schema

How many tuples and attributes does the table ENROL have?

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_			
	Table	Relation	
	Column	Attribute	
7 1 1 7	7 Data type	Domain	_ 1
Add V	Row	[u]le// C	oaer
1 1000	Table definition	Relation schema	

How many tuples and attributes does the table ENROL have?
 3 tuples and 5 attributes.



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00	456	COMP2400	29 6 S2	active	25/05/2016	P
	458	COMP1130	2016 S1	active	20/02/2016	
	459	COMP2400	2016 S2	active	11/06/2016	

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	Table	Relation	
	Column	Attribute	
7 11 1	7 Data type	Domain	_ 1
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	Table definition	Relation schema	

- How many tuples and attributes does the table ENROL have?
 3 tuples and 5 attributes.
- In the relational data model, the order of tuples in a relation is important but the order of the attributes in a relation is not important?



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	458	COMP1130	2016 S1	active	20/02/2016	
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	Table	Relation	
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	Table definition	Relation schema	

- How many tuples and attributes does the table ENROL have?
 3 tuples and 5 attributes.
- In the relational data model, the order of tuples in a relation is important but the order of the attributes in a relation is not important?
 No.



Relation Schema - Example

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Consider a relation schema ENROL

THINK DESCRIPTION OF THE CONTROL OF THE CONTROL





Relational Database Schema – Example

Assignment Project Exam Help

• a set of relation schemas $S = \{R_1, \dots, R_m\}$, and

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	ENTICE					
	StudentID	CourseNo	Semester	Status	EnrolDate	
	Ottadontib	000100110	0011100101	Otatao	Linoibato	



Relational Database State - Example

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ENROL						
StudentID	CourseNo	Semester	Status	EnrolDate		
456	COMP2400	2016 S2	active	25/05/2016		
458	COMP1130	2016 S1	active	20/02/2016		
459	COMP2400	2016 S2	active	11/06/2016		



Relational Database State – Example

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ullet there is just one relation for each relation schema in ${\mathcal S}$



Relation





Relational Database State – Example

Assignment Project Exam Help

ullet there is just one relation for each relation schema in S





 Can there be multiple relations that correspond to the same relation schema in a relational database state?



Relational Database State – Example

Assignment Project Exam Help

ullet there is just one relation for each relation schema in S



Relation



 Can there be multiple relations that correspond to the same relation schema in a relational database state?
 No.



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(Ashmolean Museum @ the University of Oxford www.ashmolean.org/)



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Associated in the attributes of relation schema first a superkey if it in quely project Exam Help

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Association of the attributes prelation schema fits a superkey if it in quely project Exam Help

A superkey K is called a **candidate** key if no proper subset of K is a superkey.

https://powcoder.com



As Schedie and General Project Exam Help

A superkey K is called a candidate key if no proper subset of K is a superkey. That is, if you take any of the attributes out of K, then it is not enough to uniquely identify tuples.

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As Side at file and the attributes in relation schema fits a superkey if intuitioned project Exam Help

A superkey K is called a candidate key if no proper subset of K is a superkey. That is, if you take any of the attributes out of K, then it is not enough to uniquely identify tuples.

• The triangle of the same of

one of the candidate keys.

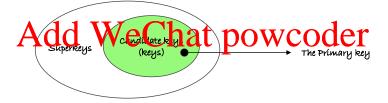


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 A superkey K is called a candidate key if no proper subset of K is a superkey. That is, if you take any of the attributes out of K, then it is not enough to uniquely identify tuples.

The triple of the cardidate levels and the cardidate levels are the cardinate levels are the car

one of the candidate keys.



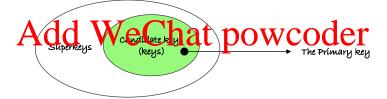


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A superkey K is called a candidate key if no proper subset of K is a superkey. That is, if you take any of the attributes out of K, then it is not enough to uniquely identify tuples.

The rina by is on set of the cardidate keys and firmary key is

one of the candidate keys.



Every candidate key must be a superkey in the same relation schema?

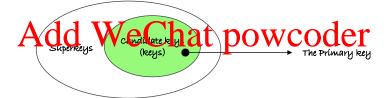


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A superkey K is called a candidate key if no proper subset of K is a superkey. That is, if you take any of the attributes out of K, then it is not enough to uniquely identify tuples.

• The Title y Svis on Show the cand de Keys and the mary key is

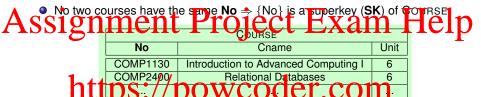
one of the candidate keys.



Every candidate key must be a superkey in the same relation schema?
 Yes.



Superkey – Example





Superkey – Example

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No Cname Unit

COMP1130 Introduction to Advanced Computing I 6

COMP2400 Relational Databases 6

No Computing I 6

COMP2400 Relational Databases 6

 No two students have the same StudentID ⇒ {StudentID} is a SK of STUDENT.

No two students have the same Email → {Email} is a SK of STUDENT.

		STUDEN	
StudentID	Name	DoB	Email
456	Tom	25/01/1988	tom@gmail.com
458	Peter	23/05/1993	peter@gmail.com
459	Fran	11/09/1987	frankk@gmail.com



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\smile				
	StudentID	Name	DoB	Email
	456	Tom	25/01/1988	tom@gmail.com
1.44.	458/ /	Peter	23/05/199	peter@gmail.com
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Assignment Project Exam Help

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ĺ	n	Ľ	3	_	1	7		\mathbf{D}	C) \	V	V	C	I		X		ľ		r			I		1	1	1	

What are all SKs of STUDENT?



Assignment Project Exam Help

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458/	/_	Pe	ter	_2	3/0	5/1	995		р	eter	@gı	ma	il.c	on	1
			W	V (16			C		T	T	1

What are all SKs of STUDENT?

For StudentlDfor any subset of attributes which includes StudentlDfor any subset of attributes which includes Email, e.g., {StudentlDfor EstudentlDfor any StudentlDfor any Stud



Assignment Project Exam Help

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1) [/	/ /		0	X		X	V	V	C	1)	C	ľ		C.	(1			

What are all SKs of STUDENT?

For STUDENT, a SK can be any subset of attributes which includes StudentID or any subset of attributes which includes Email e.g., {Strong III} (StudentID) ame} {StudentID (Inval) COCCI

What are candidate keys of STUDENT?



Assignment Project Exam Help

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What are all SKs of STUDENT?

For STUDENT, a SK can be any subset of attributes which includes StudentID or any subset of attributes which includes Email, e.g., {Strong IID (StudentID) ame} (StudentID) (S

What are candidate keys of STUDENT?

For STUDENT, {StudentID} and {Email} are two candidate keys.



Assignment Project Exam Help

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What are all SKs of STUDENT?

For STUDENT, a SK can be any subset of attributes which includes StudentlD or any subset of attributes which includes Email, e.g., {StudentlD, StudentlD, ame} {StudentlD, D, ame} {StudentlD, D, ame}

- What are candidate keys of STUDENT?
 For STUDENT, {StudentID} and {Email} are two candidate keys.
- What about the primary key of STUDENT?



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What are all SKs of STUDENT?

For STUDENT, a SK can be any subset of attributes which includes StudentlDfor any subset of attributes which includes Email, e.g., {StrongflDfCStuventlDfName}} {StudentlDfName} {StudentlDfName}

- What are candidate keys of STUDENT?
 For STUDENT, {StudentID} and {Email} are two candidate keys.
- What about the primary key of STUDENT?
 For STUDENT, the primary key can be chosen as either {StudentID} or {Email}.



Superkey – Example

Assignment Project Exam Help

 No two enrolments have the same StudentID, the same CourseNo in the same Semester ⇒ {StudentID, CourseNo, Semester} is a SK of ENROL.

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	StudentID	CourseNo	Semester	Status	EnrolDate
	456	COMP2400	2016 S2	active	25/05/2016
٨	458	€OMP1130	2016 S1	active	20/02/2016
A	(459 V)	/COM P240)	2(16 32)	a stive	(1)) 6/1 (48)
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Assignment Project Exam Help

	StudentID	CourseNo	Semester	Status	EnrolDate
_	456	COMP2400	2016 S2	active	25/05/2016
ht	4-458 • /	COMP1130 7	~2016 Si	active	20/02/2016
111	LDS./		COUL	71.U	OIII



Assignment Project Exam Help

	StudentID	CourseNo	Semester	Status	EnrolDate
_	456	COMP2400	2016 S2	active	25/05/2016
h	+ ++458 • /	COMP1130 7	~20165	active	20/02/2016
	hrps.//		COUL		

What are all SKs of ENROL?



Assignment Project Exam Help

	Semester Status	EnrolDate
456 COMP2400	2016 S2 active	25/05/2016
1+1-458 • / GQMP1+30 , C	2016 Sactive	20/02/2016
IIIIDS.// DOWC		

What are all SKs of ENROL?

For ENROL, a SK can be any subset of attributes which includes all Student D (durse N) are semester get at the Course No. Semester, Student D, Course No. Semester, Status J, ...



Assignment Project Exam Help

	StudentID	CourseNo	Semester	Status	EnrolDate
_	456	COMP2400	2016 S2	active	25/05/2016
ht	428 • /	COMP1130 7	~20165	active	20/02/2016
111	(D2./		Couc	/I.U	OIII

What are all SKs of ENROL?

For ENROL, a SK can be any subset of attributes which includes all Student D (durse Novare semester), Student D (durse Novare semester), Student D, Course No, Semester, Status), ...

What are candidate keys of ENROL?



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	StudentID	CourseNo	Semester	Status	EnrolDate
	456	COMP2400	2016 S2	active	25/05/2016
ht	4-458 • /	COMP1130 7	~2016 Si	active	20/02/2016
111			COUL	71.U	

What are all SKs of ENROL?

For ENROL, a SK can be any subset of attributes which includes all Student D (durse No. 2) (em. 5) (3) (10) (Course No. 2) (Student D (Course No. 2)

What are candidate keys of ENROL?
 For ENROL, {StudentID. CourseNo, Semester} is the only candidate key.

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Assignment Project Exam Help

	StudentID	CourseNo	Semester	Status	EnrolDate
_	456	COMP2400	2016 S2	active	25/05/2016
ht	4-458 • /	COMP1130 7	~2016 Si	active	20/02/2016
	UDS. /				

What are all SKs of ENROL?

For ENROL, a SK can be any subset of attributes which includes all Student D (course Ny a see Septe g., Student D (course No. Semester, Status), ...

- What are candidate keys of ENROL?
 For ENROL, {StudentID, CourseNo, Semester} is the only candidate key.
- What about the primary key of ENROL?



Assignment Project Exam Help

	StudentID	CourseNo	Semester	Status	EnrolDate
	456	COMP2400	2016 S2	active	25/05/2016
ht	4-458 • /	COMP1130 7	~2016 Si	active	20/02/2016
111			COUL	71.U	

What are all SKs of ENROL?

For ENROL, a SK can be any subset of attributes which includes all Student D (curse No. 2) fem Senegge, Student D (curse No. 2) Semester, Student D, Course No. 2) Semester, Status S. . . .

- What are candidate keys of ENROL?
 For ENROL, {StudentID, CourseNo, Semester} is the only candidate key.
- What about the primary key of ENROL?
 For ENROL, the primary key can only be {StudentID, CourseNo, Semester}.



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ROOM(roomNo, hotelNo, type, price) with the primary key {roomNo, hotelNo},

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BOOKING(guestNo, hotelNo, date, roomNo).



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ROOM(roomNo, hotelNo, type, price) with the primary key {roomNo, hotelNo},

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- BOOKING(guestNo, hotelNo, date, roomNo).
- Some additional constraints are as follows:



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ROOM(roomNo, hotelNo, type, price) with the primary key {roomNo, hotelNo}.

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- BOOKING(guestNo, hotelNo, date, roomNo).
- Some additional constraints are as follows:





A S SAC SIND ON THE ADDRESS OF THE PORTION OF THE P

ROOM(roomNo, hotelNo, type, price) with the primary key {roomNo, hotelNo}.

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- BOOKING(guestNo, hotelNo, date, roomNo).
- Some additional constraints are as follows:





A S SAC SINCE IT TO LATE BOOKING from the fortowing schema of the late base half in a cational LBMX: A THE PHOTEL (hotelNo, hotelName, city) with the primary key {hotelNo}.

ROOM(roomNo, hotelNo, type, price) with the primary key {roomNo, hotelNo}.

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- BOOKING(guestNo, hotelNo, date, roomNo).
- Some additional constraints are as follows:

A booking childs made to one day only a guest can make several buckings that hat the different days.

A guest cannot make two or more bookings in the same hotel for the same day.



ASSACE INCOME (all base had in a city) with the primary key {hotelNo}, hotelName, city) with the primary key {hotelNo}.

ROOM(roomNo, hotelNo, type, price) with the primary key {roomNo, hotelNo}.

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- BOOKING(guestNo, hotelNo, date, roomNo).
- Some additional constraints are as follows:

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- A guest cannot make two or more bookings in the same hotel for the same day.
- 4 A guest can make two or more bookings in different hotels for the same day.



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ROOM(roomNo, hotelNo, type, price) with the primary key {roomNo, hotelNo}.

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A booking cannot be in joint names. In other words a booking can only be held in the name of one quest.



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- A guest can make several bookings in a hotel for different days.
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 A guest cannot make two or more bookings in the same hotel for the
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- A booking cannot be in joint names. In other words a booking can only be held in the name of one guest.
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 - Is {guestNo, date} a SK? No because of (4).



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Assignment of the control of the con

- A guest can make several bookings in a hotel for different days.
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- Thus {guestNo, hotelNo, date} a minimal SK and hence a candidate key.



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- A guest can make several bookings in a hotel for different days.
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- A guest can make several bookings in a hotel for different days.
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 Yes, it is a SK because of (3) and (5) and no proper subset of {hotelNo, date, roomNo} is a SK, hence {hotelNo, date, roomNo} is a candidate key.



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- A guest can make several bookings in a hotel for different days.
- A guest is not allowed to make more than one booking for the same day even in the different hotels.
- The transfer of the first transfer of the words too ing can only be held in the name of one guest.
- Is {guestNo, hotelNo, date} a minimal SK and hence a candidate key?.



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- A quest can make several bookings in a hotel for different days.
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SS LABORING (quest No., hotel No.) date, room No.) 4. Exam Help

- A guest can make several bookings in a hotel for different days.
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SS BOOKING (quest No., hotel No.) date, room No.) 4. Exam Help

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- A to the name of one guest.
- Is {guestNo, hotelNo, date} a minimal SK and hence a candidate key?.

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- A guest can make several bookings in a hotel for different days.
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The transfer of the first transfer of the world proving can only be held in the name of one guest.

- Is {guestNo, hotelNo, date} a minimal SK and hence a candidate key?.
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 - As (guest No.) that el Mo (a Sk? Morpe cause of (2). COCET is (guest No.) date of a Sk? respectation of (3).
- Thus {guestNo, hotelNo, date} is no longer a minimal SK and hence a candidate key.



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- Thus {guestNo, hotelNo, date} is no longer a minimal SK and hence a candidate key.
- Now {guestNo, date} is a minimal SK and hence a candidate key.
- Note that {hotelNo, date, roomNo} is also a minimal SK and hence a candidate key.



Assume that a relation sciPra R(A:B-C-D) hat only two candidates the later than t

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Assume that a relation screen Project Exam Help

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Assume that a relation screen Project Exam Help

• Is it possible that {A} /s a SK?

Answer: I prossible, o he wise {A,S} is not a candidate key (minimal SK).



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- If it possible that {B, D} is a SK? (tricky)



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 Answer: {B, D} cannot be a SK because {B, D} does not has any candidate key as its subset.



Assume that a relation screen R(A,B,C,D) hat only two candidate level p

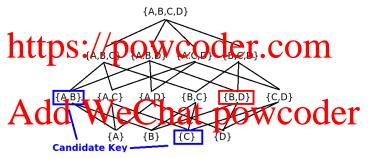
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Superkey, Candidate key and Primary key – Exercise

Assime that a relation is the part of each that a relation is the project Exam Help



• If it possible that {B, D} is a SK? (tricky)

Answer: $\{B, D\}$ cannot be a SK because $\{B, D\}$ does not has any candidate key as its subset.



Assignment Project Exam Help

(4) Domain constraints, Key constraints, Entity integrity constraints and Referential integrity constraints.





Assignment Project Exam Help

Domain constraints: every value in a tuple must be from the domain of its attribute.

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Assignment Project Exam Help

- Domain constraints: every value in a tuple must be from the domain of its attribute.

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- Key constraints: a bunch of keys (superkey, candidate key and primary key)
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- Domain constraints: every value in a tuple must be from the domain of its attribute.

 e.g
- Key constraints: a bunch of keys (superkey, candidate key and primary key)
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- Entity integrity constraints: no primary key value can be NULL.



Assignment Project Exam Help

- Domain constraints: every value in a tuple must be from the domain of its attribute.

 e.g
- Key constraints: a bunch of keys (superkey, candidate key and primary key)
 Add WeChat powcoder
- Entity integrity constraints: no primary key value can be NULL.



Assignment Project, ExamuHelp

- HOTEL(hotelNo, hotelName, city) with the primary key {hotelNo},
- PROOM(roomNo, hotelNo, type, price) with the primary key {roomNo,
- http://powcoder.com GuestNo, guestName, guestAddress) with the primary key {guestNo}.
- BOOKING(guestNo, hotelNo, date, roomNo).



Assignment Project, ExamuHelp

- HOTEL(hotelNo, hotelName, city) with the primary key {hotelNo},
- ROOM(roomNo, hotelNo, type, price) with the primary key {roomNo,
- GUEST (guestNo, guestName, guestAddress) with the primary key {questNo}.
- BOOKING(guestNo, hotelNo, date, roomNo).

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ROOM: [hotelNo] ⊆ HOTEL[hotelNo];



Assignment Project, ExamuHelp

- HOTEL(hotelNo, hotelName, city) with the primary key {hotelNo},
- ROOM(roomNo, hotelNo, type, price) with the primary key {roomNo,
- GUEST (guestNo, guestName, guestAddress) with the primary key {questNo}.
- BOOKING(guestNo, hotelNo, date, roomNo).

• An Andd We Chat powcoder

- ROOM: [hotelNo] ⊆ HOTEL[hotelNo];
- BOOKING: [hotelNo] ⊆ HOTEL[hotelNo],
 [guestNo] ⊆ GUEST[guestNo],
 [roomNo, hotelNo] ⊆ ROOM[roomNo, hotelNo].



Assignment Project, ExamuHelp

- HOTEL(hotelNo, hotelName, city) with the primary key {hotelNo},
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- GUEST (guestNo, guestName, guestAddress) with the primary key {questNo}.
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• An Andd We Chat powcoder

- ROOM: [hotelNo] ⊆ HOTEL[hotelNo];
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 [guestNo] ⊆ GUEST[guestNo],
 [roomNo, hotelNo] ⊆ ROOM[roomNo, hotelNo].



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 $Asse_{\text{proom: [hotelNo]}} \subseteq \text{HotelpotelNo]} \\ \text{[roomNo, hotelNo]} \subseteq \text{Room[roomNo, hotelNo]}.$

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Is it possible to make a booking in the BOOKING relation in the name of a person who is not listed in the GUEST relation?
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• Answer light ossible because MYSOVIN Courst No Color guestNo], i.e., the guestNo value of BOOKING must exist as a guestNo value of GUEST.



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- Is it possible to make a booking in the BOOKING relation in the name of a person, who is not listed in the GUEST relation?

 Answer light of the GUEST relation?

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- Is it possible to add a new room in the ROOM relation to a hotel that is not listed in the HOTE weater? Nat powcoder



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$Asset [location] \subseteq \text{Hotelitotelly CoestN-L-X-L-State} \\ [location] = \text{Hotelitotelly CoestN-L-X-L-State} \\ [roomNo, hotelNo] \subseteq \text{Room[roomNo, hotelNo]}.$

- Is it possible to make a booking in the BOOKING relation in the name of a person, who is not listed in the GUEST relation?

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- Is it possible to add a new hotel without any bookings or room information to the ACCOMMODATION database?



ROOM: [hotelNo] C HOTE POTE IN THE COLOR OF THE POTE IN THE POTE I [roomNo, hotelNo] ⊂ Room[roomNo, hotelNo].

- Is it possible to make a booking in the BOOKING relation in the name of a person, who is not listed in the GUEST relation? Answer: In prossible of calls & MBOONING QuestNot QUEST [guestNo], i.e., the guestNo value of BOOKING must exist as a guestNo value of GUEST.
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Answer: Possible because none of the attributes in HOTEL(hotelNo, hotelName, city) references to any attribute in ROOM, GUEST and BOOKING.



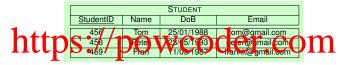
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StudentID	<u>CourseNo</u>	<u>Semester</u>	Status	EnrolDate						
456	COMP2400	2016 S2	active	25/05/2016						
456	COMP1130	2016 S1	active	20/02/2016						
459	COMP2400	2016 S2	active	11/06/2016						



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Peter

COMP1130	Introduction to Advanced Computing I	6
COMP2400	Relational Databases	6

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\mathbf{A}	S udent D	<u>reNo</u>	Sem is er	Saus	En o Date	der
1 10	456	COMP2400	2010 52	active	25/05/2016	uci
	458	COMP1130	2016 S1	active	20/02/2016	
	458	COMP2400	2016 S2	active	11/06/2016	

Question: Does the above database satisfy the foreign key of ENROL: [StudentID] ⊂ STUDENT[StudentID]?



Assignment Project Exam Help

458	Peter	23/05/1993	peter@gmail.com
459	Fran	11/09/1987	frankk@gmail.com
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https://powerseder.com COMP1130 Introduction to Advanced Computing I 6 COMP2400 Relational Databases 6

A 1	1 1	7 (1	ENROL			1
AAA	S udent D	(a) r eNo	Sem es er	Saus	En o Date	der
1 10	456	COMP2400	2010 52	active	25/05/2016	uci
	458	COMP1130	2016 S1	active	20/02/2016	
	458	COMP2400	2016 S2	active	11/06/2016	

Question: Does the above database satisfy the foreign key of ENROL: [StudentID] STUDENT[StudentID]?

Yes.



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23/05/1993

11/09/1987

peter@gmail.com

frankk@gmail.com

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-	COMP1	130	Introduction to Advanced Computing I					6			
	COMP2400		Relational Databases				6				

Peter

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Question: Does the above database satisfy the foreign key of ENROL: [CourseNo] ⊆ COURSE[No]?



Assignment Project Exam Help 456 25/01/1988 Tom tom@gmail.com 23/05/1993

11/09/1987

peter@gmail.com

frankk@gmail.com

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	COMP2	400	Relational Database			ses		6		

Peter

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$\mathbf{A}\mathbf{d}$	S uden D	Con eNo	Semes er	Salds	En/o/Date	der
110	456	COMP2400	2010-52	active	25/05/2016	uci
	458	COMP1130	2016 S1	active	20/02/2016	
	458	COMP3600	2016 S2	active	11/06/2016	

Question: Does the above database satisfy the foreign key of ENROL: [CourseNo] ⊆ Course[No]?

No. because COMP3600 does not exist as a No value in Course.



Assignment Project Exam Help 25/01/1988 tom@gmail.com Tom 23/05/1993

11/09/1987

peter@gmail.com

frankk@gmail.com

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Δ d	Suden D	<u>CorreNo</u>	Semes er	Status .	Enyo/Date	der
1 1 U	456	COMP2400	24132	active	25/05/2016	uci
	458	COMP1130	2016 S1	active	20/02/2016	
	458	COMP2400	2016 S2	active	11/06/2016	

Relational Databases

Question: Can we delete the first tuple in STUDENT?

Peter

Fran

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COMP2400



Assignment Project Fax Melp

	458	Peter	23/05/1993	peter@gmail.com
	459	Fran	11/09/1987	frankk@gmail.com
1 44				1

https://powereder.com COMP1130 Introduction to Advanced Computing I 6 COMP2400 Relational Databases 6



Question: Can we delete the first tuple in STUDENT?

No, because it will violate the foreign key of ENROL: [StudentID] \subseteq

STUDENT[StudentID]



Assignment Project Exam Help 456 25/01/1988 Tom tom@gmail.com 23/05/1993

11/09/1987

peter@gmail.com

frankk@gmail.com

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-	COMP113	30	Introd	duction	to Adva	nced (Comput	ing I	6		
	COMPON	20		Dαl	otional F	ataba	000		-		

Peter

Fran



Question: Can we delete the first tuple in ENROL?

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Assignment Project Exam Help 456 25/01/1988 tom@gmail.com Tom 23/05/1993

11/09/1987

peter@gmail.com

frankk@gmail.com

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	COMP2400	Relational Databas	es 6	

Peter

Fran

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Δ Δ	Ć	uden	₽.	V	Cour	<u>eNo</u>	ľ	Sem	es	<u>r</u>	P	atas	T	Enyc	Det	2		r
AU	U	456	▼.	▼-	COMP	400	1	20	13	,	ac	tive	7	2.//0!	201	U	'U	L
		458		Т	COMP	1130	П	201	6 S1	-	ac	tive		20/02	2/201	6		
		458			COMP	2400		201	6 S2		ac	tive		11/06	3/201	6		

Question: Can we delete the first tuple in ENROL? Yes.

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Assignment Project Exam Help

	458	Peter	23/05/1993	peter@gmail.com
	459	Fran	11/09/1987	frankk@gmail.com
4				4

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Question: Can we update COMP2400 to be COMP6240 in Course?



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11/09/1987

peter@gmail.com frankk@gmail.com

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TICL				_								ting I		4		

Peter

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COMP2400

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1 1 U	456	COMP2400	24632	active	V25/05/2018	uci
	458	COMP1130	2016 S1	active	20/02/2016	
	458	COMP2400	2016 S2	active	11/06/2016	

Relational Databases

Question: Can we update COMP2400 to be COMP6240 in Course? No, because it will violate the foreign key of ENROL: [CourseNo]⊂ Course[No].



Assignment Project Exam Help

400	10111	23/01/1900	torn@gmail.com
458	Peter	23/05/1993	peter@gmail.com
459	Fran	11/09/1987	frankk@gmail.com

https://powereder.com COMP130 Introduction to Advanced Computing I 6 COMP2400 Relational Databases 6

A 1	1 77	7 (11	ENROL			1
\mathbf{A}	S udent D	<u>Gor eNo</u>	Semes er	Saus	En o Date	der
1 10	456	COMP2400	2010 92	active	25/05/2016	uci
	458	COMP1130	2016 S1	active	20/02/2016	
	458	COMP2400	2016 S2	active	11/06/2016	

Question: Can we insert a new course COMP3600 Algorithms with 6 units in COURSE?



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	458	Peter	23/05/1993	peter@gmail.com
	459	Fran	11/09/1987	frankk@gmail.com
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A 1	1 77	7 (1	ENROL			1
\mathbf{A}	S udent D	<u>rangeNo</u>	Sem es er	Saus	En o Date	der
1 10	456	COMP2400	2010 92	active	25/05/2016	uci
	458	COMP1130	2016 S1	active	20/02/2016	
	458	COMP2400	2016 S2	active	11/06/2016	

Question: Can we insert a new course COMP3600 Algorithms with 6 units in COURSE?

Yes.



Assignment Project Exam Help

	458	Peter	23/05/1993	peter@gmail.com
	459	Fran	11/09/1987	frankk@gmail.com
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https://powchander.com COMP1130 Introduction to Advanced Computing I 6 COMP2400 Relational Databases 6

A 1	1 77	7 (1	ENROL			1
$\mathbf{A}\mathbf{a}$	S udent D	<u>ran eNo</u>	Sem es er	Saus	Enro Date	der
1 10	456	COMP2400	2010 92	active	25/05/2016	uci
	458	COMP1130	2016 S1	active	20/02/2016	
	458	COMP2400	2016 S2	active	11/06/2016	

Question: The foreign key StudentID in Enrol references StudentID in Student. The StudentID values in Enrol must be distinct?



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Peter

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1 10	456	COMP2400	2010 92	active	25/05/2016	uci
	458	COMP1130	2016 S1	active	20/02/2016	
	458	COMP2400	2016 S2	active	11/06/2016	

Question: The foreign key StudentID in Enrol references StudentID in Student. The StudentID values in Enrol must be distinct? No.



Foreign Key (referential integrity) – A Common Pitfall

Assignment Project Exam Help

ROOM(roomNo, hotelName, type, price) with the primary key {roomNo, hotelName},

BOOKING (guest No. date, room No. hotel Name).

1105./bow coder.com

	_ NOOM		
roomNo	hotelName	type	price
01	Sydney	twin	200
02	Sydney	single	100
A 1	Canben a	single /	150

T TOOM _					BOOKING					
roomNo	hotelName	type	price		au ant Na			hotelName		
				il	guestNo	date	roomNo	notelivame		
01	Sydney	twin	200	l r	D1	30/07/2018	02	Sydney		
02	02 Sydney		100	1 1				, ,		
61	- , ,	single		1	P2	31/07/2018	01 🚤	Canberra		
	Canber a	single	1 50	ن ا	4 40	O ***	\ \ \	0.40		
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Foreign Key (referential integrity) – A Common Pitfall

Assignment Project Exam Help

ROOM(roomNo, hotelName, type, price) with the primary key {roomNo, hotelName},

here in the common strain in t

	T TOOM T					Booking			
roomNo	hotelName	type	price	lŀ	auestNo	date	roomNo	hotel	
Λ1	Cudnou	twin	200	L	guestivo	uale	TOOTHING	Hotel	
UI	Sydney	twin		П	P1	30/07/2018	02	Svo	
02	Sydney	single	100	H	D2	31/07/2018	01	Can	
A 1	Canber 1	Single /	150	L	12	31/01/2010	01	Can	
		-			T 10	OTTI		0 1	

Now we add the following foreign key constraint:

BOOKING[roomNo, hotelName]⊆ROOM[roomNo, hotelName]

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Assignment Project Exam Help

ROOM(roomNo, hotelName, type, price) with the primary key {roomNo, hotelName},

BOOKING (guest No. date, roomNo. hotelName).

		_			
roomNo	hotelName	type	price		_
		1760	pee	guestNo	
01	Sydney	twin	200	-	=
00	, ,	ainala	100	P1	
02	Sydney	single	100	P2	Т
A 1	Canber a	Sinale /	7.50	12	_
				\+ •	_

BOOKING								
	guestNo	date	e roomNo hotelNa					
	P1	30/07/2018	02	Sydney				
	, P2	31/07/2018	7/2018 01 🙀					
r	of MATTION AND							

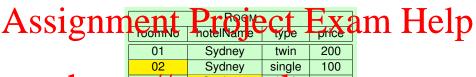
Now we add the following foreign key constraint:

- BOOKING[roomNo, hotelName]⊆ROOM[roomNo, hotelName]
- Is the above equivalent to: BOOKING[roomNo]⊆ROOM[roomNo], and BOOKING[hotelName]⊂ROOM[hotelName]?









https://powera_simple_150_m BOOKING guestNo date roomNo hotelName

A P1 30/07/2018 01 Sydney P2 W 39/07/2018 101 Sydney P2 W 39/07/2018 102 O Carliera P1

- The above relations satisfy the foreign keys:
 - BOOKING[roomNo]⊆ROOM[roomNo], and
 - BOOKING[hotelName]⊆ROOM[hotelName]



Assignment Project Exam Help

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	_				Е	BOOKIN					
	gu	estN	0		date	ro	oomNo	hotelNa	me		
A	1 1	P1	T	3 0	/07/20	18	01	Sydne	y	1	
\mathbf{A}		P2	W	3	7/20	19 27	027	Carbe	ra (1	6

- The above relations satisfy the foreign keys:
 - BOOKING[roomNo]⊆ROOM[roomNo], and
 - BOOKING[hotelName]⊆ROOM[hotelName]

but does not satisfy the foreign key:

BOOKING[roomNo, hotelName]⊆ROOM[roomNo, hotelName]



Assignment Project Exam Help

(v.s. Relation Schema + Integrity Constraints)

https://powcoder.com
Table

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Data Definition Language – Relation Schema

Assignment Project Exam Help

Create a relation schema ENROL

https://www.courseNo: STRING, Semester: STRING, String

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Data Definition Language – Relation Schema

Assignment Project Exam Help

Create a relation schema ENROL

```
PENROL
StudentID CourseNo Semester STRING, Semester: STRING, No. 1 CourseNo Semester STRING, Semester STRING, Semester String, Semester String, StudentID CourseNo Semester Status EnrolDate
```

• The AREATE TABLE statement is used to ereate a new relation exhema by specifying its name, its attributes and, optionally, its constrainte.

```
CREATE TABLE Enrol(StudentID INT, CourseNo VARCHAR(20), Semester VARCHAR(50), Status VARCHAR(50), EnrolDate DATE);
```



Assignment Project Exam Help

Create a relation schema ENROL

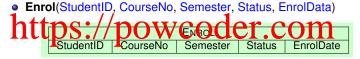
https://powereder.com StudentID CourseNo Semester Status EnrolData

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Assignment Project Exam Help

Create a relation schema ENROL

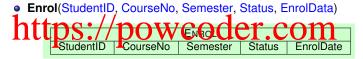


• Can we use the following **CREATE TABLE** statement to create the above relation scheme? We Chat powcoder CREATE TABLE **Enrol**(StudentID, CourseNo, Semester, Status, EnrolDate);



Assignment Project Exam Help

Create a relation schema ENROL



- Can we use the following **CREATE TABLE** statement to create the above relation scheme? We Chat powcoder CREATE TABLE **Enrol**(StudentID, CourseNo, Semester, Status, EnrolDate);
- No because the data type is required for each attribute.



Assignment Project Exam Help

 Enrol(StudentID: INT, CourseNo: STRING, Semester: STRING, Status: STRING, EnrolData: DATE)



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Assignment Project Exam Help

 Enrol(StudentID: INT, CourseNo: STRING, Semester: STRING, Status: STRING, EnrolData: DATE)



- Which of the following CREATE TABLE statements is/are correct?
 - REALT TABLE LENGTH STU GAT INT, COLYANG WARCHIRGO; Semester VARCHAR(50); Status VARCHAR(50); Enrollate DATE);
 - CREATE TABLE Enrol(StudentID INT, CourseNo VARCHAR(20), Semester VARCHAR(50), Status VARCHAR(50), EnrolDate DATE,);
 - © CREATE TABLE Enrol(StudentID INT, CourseNo VARCHAR(20), Semester VARCHAR(50), Status VARCHAR(50), EnrolDate DATE),



Assignment Project Exam Help

 Enrol(StudentID: INT, CourseNo: STRING, Semester: STRING, Status: STRING, EnrolData: DATE)



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 Enrol(StudentID: INT, CourseNo: STRING, Semester: STRING, Status: STRING, EnrolData: DATE)



• None of the following **CREATE TABLE** statements is correct.

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 Enrol(StudentID: INT, CourseNo: STRING, Semester: STRING, Status: STRING, EnrolData: DATE)



• None of the following **CREATE TABLE** statements is correct.





Assignment Project Exam Help

 Enrol(StudentID: INT, CourseNo: STRING, Semester: STRING, Status: STRING, EnrolData: DATE)



• None of the following **CREATE TABLE** statements is correct.



CREATE TABLE Enrol(StudentID INT, CourseNo VARCHAR(20), Semester VARCHAR(50), Status VARCHAR(50), EnrolDate DATE,);



Assignment Project Exam Help

 Enrol(StudentID: INT, CourseNo: STRING, Semester: STRING, Status: STRING, EnrolData: DATE)



None of the following CREATE TABLE statements is correct.



- © CREATE TABLE Enrol(StudentID INT, CourseNo VARCHAR(20), Semester VARCHAR(50), Status VARCHAR(50), EnrolDate DATE,);
- © CREATE TABLE Enrol(StudentID INT, CourseNo VARCHAR(20), Semester VARCHAR(50), Status VARCHAR(50), EnrolDate DATE),



Assignmenta Repoject Exam Help Enrol (Studentid): Int, Course for String, Semester: String, Status: String, EnrolData: DATE)

https://prew/Sandersau/Emple

The correct CREATE TABLE statement

CREATE TABLE Enrol(StudentID INT, CourseNo VARCHAR(20), Semante VARCHAR(A) Clark VARCHAR(50) Enrol(Charles)



Assignmenta Project Exam Help Enrol (StudentID: INT, Course No: STRING, Semester: STRING, Status: STRING, EnrolData: DATE)

https://prew/senderates

The correct CREATE TABLE statement

CREATE TABLE Enrol(StudentID INT, CourseNo VARCHAR(20), Semester VARCHAR(NO) (Status VARCHAR(50)) (Enrol ATE);

What about the following two CREATE TABLE statements?

create table **Enrol**(StudentID int, CourseNo varchar(20), Semester varchar(50), Status varchar(50), EnrolDate date); CREATE TABLE **enrol**(studentiD INT, courseno VARCHAR(20), semester VARCHAR(50), status VARCHAR(50), enroldate DATE);



Assignment Project Exam Help Enrol (Studentid): INT, Course lo: STRING, Semester: STRING, Status: STRING, EnrolData: DATE)

https://prevalence.edu/Centre Pstatuc Emplate

 PostgreSQL switches CREATE TABLE statements to lower case unless we use double quotes.

create table enrol/studentil int courses warehar(20 series en variable (30) series tarthar (60), enrolate cate);

u1024708=> \d enrol Table "public.enrol" Column Type	Modifiers
studentid integer courseno character varying(20 semester character varying(50 status character varying(50 enroldate date	;



Assignment Project Exam Help

• Can we create two relation schemas with the same name in the same database?

```
CREATE TABLE ENVOLUTION OF VARCHAR(30), Semester VARCHAR(50), Status VARCHAR(50), Enrolbate DATE); create table enrol(studentid int, courseno varchar(20), semester varchar(50), status varchar(50), enroldate date); Add Wechat powcoder
```



Assignment Project Exam Help

• Can we create two relation schemas with the same name in the same database?

```
CREATE TABLE Enrol(stree LIV INT Correspond VARCHAR(20), Semester VARCHAR(50), Status VARCHAR(50), Enrolbate DATE); create table enrol(studentid int, courseno varchar(20), semester varchar(50), status varchar(50), enroldate date);
```

No. With the Glow More The stat at powcoder

```
u1024708=> create table enrol(studentid int, courseno varchar(20),
u1024708(> semester varchar(50), status varchar(50), enroldate date);
ERROR: relation "enrol" already exists
```



Assignment Project Exam Help

```
u1024708=> CREATE TABLE Enrol(StudentID INT, CourseNo VARCHAR(20),
Semester VARCHAR(50), Status VARCHAR(50), EnrolDate DATE);
CREATE TAILLS

U1624708=> CREATE TAILE "Enrol"(StudentID INT, CourseNo VARCHAR(20),
Semester VARCHAR(50), Status VARCHAR(50), EnrolDate DATE);
CREATE TABLE
```

Add WeChat powcoder



Assignment Project Fxam Help

```
u1024708=> CREATE TABLE Enrol(StudentID INT, CourseNo VARCHAR(20),
Semester VARCHAR(50), Status VARCHAR(50), EnrolDate DATE);
CREATE TAILLY
u1624708=> CREATE TAILE "Enrol"(StudentID INT, CourseNo VARCHAR(20),
Semester VARCHAR(50), Status VARCHAR(50), EnrolDate DATE);
CREATE TABLE
```

Yes. Anroland "Environmentat powcoder"

```
List of relations
Schema | Name | Type | Owner
------
public | Enrol | table | u1024708
public | enrol | table | u1024708
```



Data Definition Language – Relational Database Schema

Assignment Project Exam Help

• a set of relation schemas $S = \{R_1, \dots, R_m\}$, and

https://powcoder.com

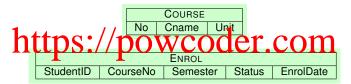
Add We Charpowcoder

ENROL						
StudentID	CourseNo	Semester	Status	EnrolDate		



Data Definition Language – Domain Constraints

Assignment Project Exam Help



CREATE TABLE TUDEN (Studentin INT, Name VARCHAR(50), DoB Date, Email VARCHAR(0)); We nationally DOWCOGET

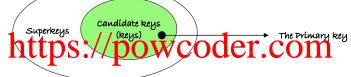
CREATE TABLE COURSE(No VARCHAR(20), Cname VARCHAR(50), Unit SMALLINT);

CREATE TABLE ENROL(StudentID INT, CourseNo VARCHAR(20), Semester VARCHAR(50), Status VARCHAR(50));



Data Definition Language – Key Constraints

Assignment Project Exam Help



• UNITE Chiquely devition ach oplain a table WCOGET Every superkey is UNIQUE. Should we specify UNIQUE for every superkey?

STUDENT					
StudentID	Name	DoB	Email		



Data Definition Language – Key Constraints

Assignment Project Exam Help

```
CREATE TABLE STUDENT

(StudentID INT,

Name VARCHAR (BO) OWCODER.COM

Email VARCHAR (100),

UNIQUE (StudentID),

AUNIQUE (Email),

UNIQUE (StudentID, Name),

UNIQUE (StudentID, DoB),

...

UNIQUE (StudentID, Name, DoB, Email));
```



Data Definition Language – Candidate Key

Assignment Project Exam Help

- UNIQUE: uniquely identify each tuple in a table.

 Specify uniquely for every candidate key.
- For example, {Student D} and {Email} are two candidate keys for STUDENT.

```
A(the till technique Chat powcoder Name Varchar (50))
```

DoB Date, Email VARCHAR(100), UNIQUE(StudentID), UNIQUE(Email));



Data Definition Language – Candidate Key

Assignment Project Exam Help StudentID CourseNo Semester **EnrolDate**

Status

· {shattps:se/speaks@odenecom

CREATE TABLE ENROL (StudentID INT ,

> Cours No V RCHAR 20) ensier Words 50 hat powcoder

Status VARCHAR(50). EnrolDate DATE,

UNIQUE(StudentID, CourseNo, Semester));



Assignment Project Exam Help

- PRIMARY KEY: Specify PRIMARY KEY the primary key.
- For example Student D and Variail De Votandidale keys for STUDENT, and {StudentID} is selected as the primary key.

A CSELDENT ACCIONAL POWCODER

```
DoB Date,
Email VARCHAR(100),
PRIMARY KEY(StudentID),
UNIQUE(Email));
```



Assignment Project Exam Help

EnrolDate

Status

· {shttps://powender.com

StudentID CourseNo Semester

CREATE TABLE ENROL

(StudentID INT ,

Acoustic Marcian Co) hat powcoder

Status VARCHAR(50), EnrolDate DATE.

PRIMARY KEY(StudentID, CourseNo, Semester));



Assignment Project Exam Help

• Cal we telect multiple primary keys for the same relation schema?

CREATE TABLE STUDENT

(StudentID INT,

Name VARCHAR(50),

Addison Varchar(50),

PRIMARY KEY(StudentID),

PRIMARY KEY(Email));



Assignment Project Exam Help

CREATE TABLE STUDENT

(StudentID INT,

Name VARCHAR(50),

Addob Var,

PRIMARY KEY(StudentID),

PRIMARY KEY(Email));

 No because multiple primary keys for the same relation schema are not allowed



Data Definition Language – Candidate Key

Assignment Project Exam Help

• Calveted multiple UNIQUE constraints of the same relation schema?

CREATE TABLE STUDENT

(StudentID INT,

Name VARCHAR(50),

Addisonate powcoder

UNIQUE(StudentID),

UNIQUE(Email));



Data Definition Language – Candidate Key

Assignment Project Exam Help

CREATE TABLE STUDENT

(StudentID INT,

Name VARCHAR(50),

Address Powcoder

UNIQUE(StudentID),

UNIQUE(Email));

 Yes because multiple candidate keys (or superkeys) for the same relation schema are allowed.



Assignment Project Exam Help • Entity integrity constraints: no primary key value can be NULL.

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Assignment Project Exam Help

Can the StudentID value be NULL?

```
CourseNo VARCHAR(20),
Semester VARCHAR(50),
Status VARCHAR(50),
Adding VARCHAR(50),
PRIMARY KEY (Student ID. CourseNo. Semester)):
```



Assignment Project Exam Help • Entity integrity constraints: no primary key value can be NULL.

Can the StudentID value be NULL?

```
CourseNo VARCHAR(20),
Semester VARCHAR(50),
Statue VARCHAR(50),
Adding VARCHAR(50),
PRIMARY KEY (Student ID. CourseNo. Semester):
```

• No. None of the columns listed in the primary key can be NULL.



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Assynerative Property Jeth Constitution of the NULL! Ject Exam Help

CREATE TABLE STUDENT

(StudentID INT,

Proper MAR PACOWCO der.com

Email VARCHAR(100),

UNIQUE(StudentID),

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CREATE TABLE STUDENT

(StudentID INT,

The property of the pro

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• In PostgreSQL, two NULL values are not considered equal. That means even in the presence of a unique constraint it is possible to store duplicate rows that contain a null value in at least one of the constrained columns.
But other SQL databases might not follow this rule and be careful when developing applications that are intended to be portable.



Data Definition Language – Referential Integrity

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columns) in one table must match the values appearing in some row of another table.

CREATE ARTEST SNT STORTH VIT R (ARCKY, Name ARTHAR (50), DOB Date, Email VARCHAR (400));

CREATE TABLE COURSE NO VARCHAR (20) PRIMARY KEY, Cname VARCHAR (50), Unit SMARAINFIC WeChat now coder

CREATE TABLE ENROL (StudentID INT, CourseNo VARCHAR(20), Semester VARCHAR(50), Status VARCHAR(50));

- Every StudentID appearing in ENROL must exist in STUDENT.
- Every CourseNo appearing in ENROL must exist in COURSE.



Data Definition Language – Foreign Key

CREATE TABLE STUDENT Project Exam Help DoB Date, Email VARCHAR(100)); TABLE SURSE DOWCO der. Com Cname VARCHAR(50), Unit SMALLINT): eChat powcoder StudentID INT. CourseNo VARCHAR(20), Semester VARCHAR(50), Status VARCHAR(50). FOREIGN KEY(StudentID) REFERENCES STUDENT(StudentID), FOREIGN KEY(CourseNo) REFERENCES COURSE(No));



Data Definition Language – Foreign Key

CREATE TABLE STUDENT Project Exam Help DoB Date, Email VARCHAR(100)); WCOO Does (StudentID) in primary key of STUDENT? Cname VARCHAR(50), Unit SMALLINT): eChat powcoder StudentID INT. CourseNo VARCHAR(20), Semester VARCHAR(50), Status VARCHAR(50). FOREIGN KEY(StudentID) REFERENCES STUDENT(StudentID), FOREIGN KEY(CourseNo) REFERENCES COURSE(No));



Data Definition Language – Foreign Key

CREATE TABLE STUDENT Project Exam Help DoB Date, Email VARCHAR(100)); primary key of STUDENT? Cname VARCHAR(50), Answer: In PostgreSQL, Unit SMALLINT): {StudentID} in STUDENT hust be dither the drimary key or form a unique StudentID INT. constraint. CourseNo VARCHAR(20), Semester VARCHAR(50), Status VARCHAR(50). FOREIGN KEY(StudentID) REFERENCES STUDENT(StudentID), FOREIGN KEY(CourseNo) REFERENCES COURSE(No));



Attribute Constraints – Foreign Key

Assigi Proper Parchar (20), ject Exam Help

Semester VARCHAR(50), Status VARCHAR(50),

FOREIGN KEY (StudentID) REFERENCES STUDENT (StudentID),

FOREIGN KEY (StudentID),

REFERENCES STUDENT (StudentID),

Can we define ENROL

CREATE TABLE STUDENT

StudentID INT PRIMARY KEY,

A Man Cardian Chat

Email VARCHAR(100));

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before STUDENT and

CREATE TABLE COURSE

(No VARCHAR(20) PRIMARY KEY, Cname VARCHAR(50), Unit SMALLINT);



Attribute Constraints – Foreign Key

Semester VARCHAR(50), Status VARCHAR(50),

h FOREIGN KEY (StudentID), REFERENCES STUDENT (StudentID), FOREIGN KEY/CDAGN WREERINGE TUBE OF THE STUDENT (STUDENT (STUDENT ID), FOREIGN KEY/CDAGN WREERINGE TUBE OF THE STUDENT (STUDENT ID), FOREIGN KEY/CDAGN WREERINGE TUBE OF THE STUDENT (STUDENT ID), FOREIGN KEY/CDAGN WREERINGE STUDENT ID), FOREIGN KEY/CDAGN WREERING WREERING STUDENT ID), FOREIGN KEY/CDAGN WREERING W

CREATE TABLE STUDENT

(StudentID INT PRIMARY KEY,

National ARCHAR(50)

Email VARCHAR(100));

CREATE TABLE COURSE

(No VARCHAR(20) PRIMARY KEY, Cname VARCHAR(50), Unit SMALLINT); Can we define ENROL before STUDENT and COURSE?

A SWAR OF NECT as

the foreign keys that reference STUDENT and COURSE.



A CREATE INTENDED AT THE SPECIFIC TO THE SPECIFICATION OF THE PROPERTY OF THE

In PostgreSQL, the index methods include B-tree, hash and others.

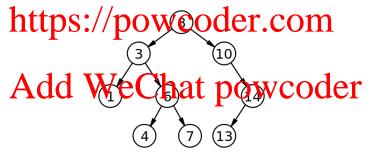


https://www.postgresql.org/docs/12/sql-createindex.html



ACREATE INPEX constituct Par independ the Enexification for the specification table.

How to use 'B-tree' (binary search tree) to construct an index?

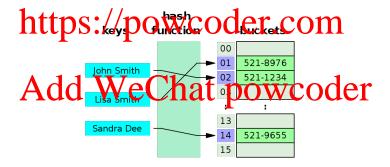


https://en.wikipedia.org/wiki/Binary_search_tree



A CREATE INDEX construction index on the specified columnts) of the specified that the project EX am Help

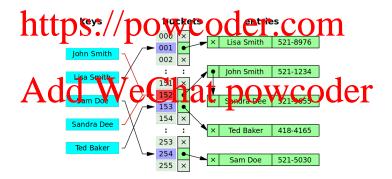
How to use 'Hash Function' to construct an index?





A CREATE INDEX construction index on the specified columnts) of the specified Hubble NT Project Exam Help

How to use 'Hash Function' to construct an index?





(credit cookie) René Descartes and the Cartesian Product

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https://en.wikipedia.org/wiki/Ren%C3%A9_Descartes



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Scientist: "contact" lenses

