

Assignment Project Exam Help



"Hold on. When we learned Roman numerals, X was 10. Now it's 6. What's going on around here?!"



Housekeeping

Assignment Project Exam Help

- The mark and feedback on Assignment 1 (SQL) is available on Wattle.
 - Refer to the sample solutions along with the common issues.

 Test purgue ies provided 2020 instead of movied movie



Housekeeping

Assignment Project Exam Help

- The mark and feedback on Assignment 1 (SQL) is available on Wattle.
 - Refer to the sample solutions along with the common issues.

 Test purgue is provided 2020 instead of movied movied
- The specification of Assignment 2 (Database Theory) will be available on Sep-23. The submission of the Wattle & Que 23:69 QVI (Tuesday Week 10)
 - Individual, no group work!
 - Do not post any idea/partial solution/result on Wattle.



SQL ⇒ **Relational Algebra**

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<u>Database users</u>

https://powcoder.com

```
FROM ... WHEAdd WeChat powcoder
```



SQL ⇒ Relational Algebra

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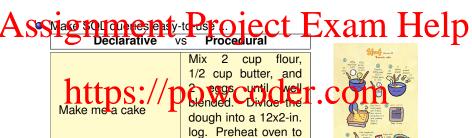
 $\begin{array}{c|c} \underline{\text{Database users}} & \underline{\text{Database systems}} \\ \hline \textbf{bttps://powcoderwooden} \\ \\ \underline{\text{SELECT ...}} \\ \underline{\text{FROM ...}} \\ \underline{\text{WHEAdd WeChat powcoder}} \\ \\ \vdots \\ \end{array}$



Assignment-Project Exam Help

https://powcoder.com

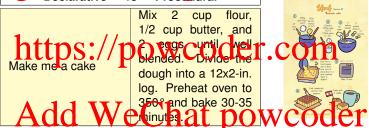




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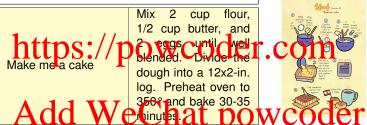
Assignment-Project Exam Help



RA bridges the gap between the declarative nature of SQL and the procedure nature of a computer system.



Assignment-Project Exam Help



RA bridges the gap between the declarative nature of SQL and the procedure nature of a computer system.

- Expressive: Each SQL query can be represented by a RA query.
- **Procedural:** Each RA query consists of step-by-step operations.



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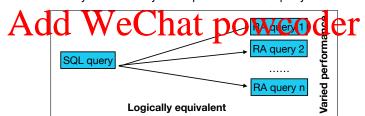
RA enables many different ways to implement a SQL query.



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https://poweoder.com

RA enables many different ways to implement a SQL query.





Arithmetic v.s. Algebra

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Arithmetic v.s. Algebra

What is the difference between "2+8=8+2" and "a+b=b+a"?

Help

Algebra: "a+b=b+a" is a general pattern.

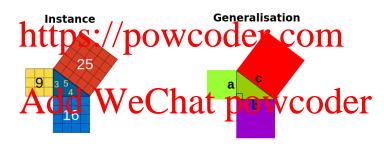
https://powcoder.com



Arithmetic v.s. Algebra

What is the difference between "2+8=8+2" and "a+b=b+a"? Help

SSA ignitude in the street of the stre



$$3^2 + 4^2 = 5^2$$

$$\begin{vmatrix} a^2 \\ + b^2 \end{vmatrix} = c^2$$



What is an "Algebra"?

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 Operands — variables or values from which new values can be constructed.

promisive values



What is an "Algebra"?

Assignment Project Exam Help

 Operands — variables or values from which new values can be constructed.

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Elementary algebra consisting of:

Areiens Wariables X, Y, Z, etc. powcoder



What is an "Algebra"?

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 Operands — variables or values from which new values can be constructed.

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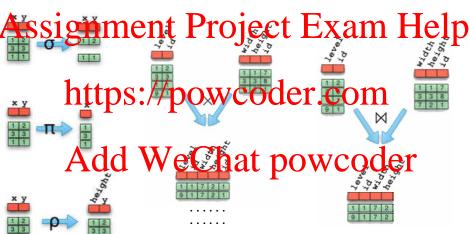
Elementary algebra consisting of:

Areitors Wariables X, Y, Z, etc. powcoder

- Relational algebra consisting of:
 - Operands relations R_1 , R_2 , R_3 , etc.
 - Operators $\{\sigma, \pi, \cup, \cap, \bowtie, \dots\}$



Relational Operators ¹





Summary of Relational Operators

A	Operator	Notation •	Meaning	
4	ssignme		ect Exam He	I
	Projection 1-44	$\pi_{A_1,\ldots,A_n}(R)$	choose columns	
	Union IIIDS./ Intersection Difference	$ \begin{array}{c} R \cap R_2 \\ R_1 \cap R_2 \\ R_1 - R_2 \end{array} $	oder.com set operations	
	Cartes an O Cuct Join Natural-join	$R_1 \bowtie_{\varphi} R_2$ $R_1 \bowtie R_2$	combine tables	
	Renaming	$ ho_{R'(A_1,,A_n)}(R) ho_{R'}(R) ho_{(A_1,,A_n)}(R)$	rename relation and attributes	



Selection Example

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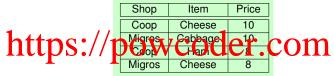
• What if we only want to know all the items with price less than 1 CHF?

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Selection Example

Assignment Project Exam Help

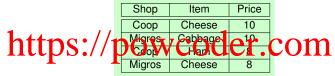


• What if we only want to know all the items with price less than 1 CHF? $\sigma_{\varphi}(R)$. Quice V, C . V



Selection Example

Assignment Project Exam Help



• What if we only want to know all the items with price less than 1 CHF? $\sigma_{\varphi}(R)$ QCice V, C \mathcal{L}_{φ} \mathcal{L}_{φ} \mathcal{L}_{φ} \mathcal{L}_{φ} \mathcal{L}_{φ} \mathcal{L}_{φ} \mathcal{L}_{φ}

Shop	Item	Price
Coop	Ham	8
Migros	Cheese	8



Projection Example

Assignment Project Exam Help

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Migros Cabbage, 10
Migros Cheese 10
Migros Cabbage, 10
Migros Cheese er.com

What if we only want to know all the available shops and items?



Projection Example

Assignment Project Exam Help

https://pess Cabbage 10
Migros Cabbage 10
Migros

What if we only want to know all the available shops and items?





Projection Example

Assignment Project Exam Help

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What if we only want to know all the available shops and items?

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Shop	lt e m	
Coop	Cheese	
Migros	Cabbage	
Coop	Ham	
Migros	Cheese	



Assignment Project Exam Help



• What if we only want to know all the available shops and items with the price less that colle? We can powcoder



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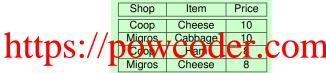


• What if we only want to know all the available shops and items with the price less that powcoder

 $\pi_{Shop,Item}(\sigma_{Price<9}(SELL))$



Assignment Project Exam Help



• What if we only want to know all the available shops and items with the price less that colle? We call the available shops and items with the price

 $\pi_{Shop,Item}(\sigma_{Price < 9}(SELL))$

Shop	Item	Price
Coop	Ham	8
Migros	Cheese	8

Shop	Item
Coop	Ham
Migros	Cheese



Assignment Project Exam Help

https://phigrosv Cheese 10
Migros Cabbage 10

https://phigrosv Cheese 10

Migrosv Cheese

• What if we only want to know all the available shops and items with the price less than a CHF3 WeChat powcoder



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• What if we only want to know all the available shops and items with the price less than a Chiff? What about Chice What Chice What about Chice What Chice What Chice What Chice What Chice What



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Migros Cabbage 10

https://phigrosv Chesse et.com

• What if we only want to know all the available shops and items with the price less than 3 CHF? Whether the price what had the contract powcoder

Shop	Item
Coop	Cheese
Migros	Cabbage
Coop	Ham
Migros	Cheese



Assignment Project Exam Help

Cheese

10

https://percyclander.com

Coop

• What if we only want to know all the available shops and items with the price less than CHF? What had to rice when the price what powcoder

Shop	Item
Coop	Cheese
Migros	Cabbage
Coop	Ham
Migros	Cheese

Error!
No price attribute available.



Selection and Projection – Properties

Assignmental Project Exam Help $\sigma_{\varphi_1}(\sigma_{\varphi_2}(R)) = \sigma_{\varphi_2}(\sigma_{\varphi_1}(R))$

https://powcoder.com



Selection and Projection – Properties

Assignmental Project Exam Help $\sigma_{\varphi_1}(\sigma_{\varphi_2}(R)) = \sigma_{\varphi_2}(\sigma_{\varphi_1}(R)) = \sigma_{\varphi_1 \wedge \varphi_2}(R).$

https://powcoder.com



Selection and Projection – Properties

Assignmental Project Exam Help $\sigma_{\varphi_1}(\sigma_{\varphi_2}(R)) = \sigma_{\varphi_2}(\sigma_{\varphi_1}(R)) = \sigma_{\varphi_1 \wedge \varphi_2}(R).$

• Projections are not commutative $\pi_{B_1,\ldots,B_m}(R)$ $P_{\pi_{A_1},\ldots,A_n}(R)$ $P_{\pi_{A_1},\ldots,A_n}(R)$ $P_{\pi_{A_1},\ldots,A_n}(R)$ $P_{\pi_{A_1},\ldots,A_n}(R)$ $P_{\pi_{A_1},\ldots,A_n}(R)$ $P_{\pi_{A_1},\ldots,A_n}(R)$ $P_{\pi_{A_1},\ldots,A_n}(R)$ $P_{\pi_{A_1},\ldots,A_n}(R)$ $P_{\pi_{A_1},\ldots,A_n}(R)$



Assignmental Project Exam Help $\sigma_{\varphi_1}(\sigma_{\varphi_2}(R)) = \sigma_{\varphi_2}(\sigma_{\varphi_1}(R)) = \sigma_{\varphi_1 \wedge \varphi_2}(R).$

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- Pairs of selection and projection are not commutative





Assignmental Project Exam Help $\sigma_{\omega_1}(\sigma_{\omega_2}(R)) = \sigma_{\omega_2}(\sigma_{\omega_1}(R)) = \sigma_{\omega_1, \wedge, \omega_2}(R).$

- $\begin{array}{c} \bullet \quad \text{Projections are not commutative} \\ \pi_{\mathcal{B}_1,\dots,\mathcal{B}_m}(\pi) \sum_{k=1}^{m} \sum_{k=1$
- Pairs of selection and projection are **not commutative** $\pi_{A_1} A_n (1, (1))$ Pairs of selection and projection are **not commutative** $\pi_{A_1} A_n (1, (1))$ Pairs of selection and projection are **not commutative** $\pi_{A_1} A_n (1, (1))$ Pairs of selection and projection are **not commutative** $\pi_{A_1} A_n (1, (1))$ Pairs of selection and projection are **not commutative** $\pi_{A_1} A_n (1, (1))$ Pairs of selection and projection are **not commutative** $\pi_{A_1} A_n (1, (1))$ Pairs of selection and projection are **not commutative** $\pi_{A_1} A_n (1, (1))$ Pairs of selection and projection are **not commutative** $\pi_{A_1} A_n (1, (1))$ Pairs of selection and projection are **not commutative** $\pi_{A_1} A_n (1, (1))$ Pairs of selection and projection are **not commutative** $\pi_{A_1} A_n (1, (1))$ Pairs of selection and projection are **not commutative** $\pi_{A_1} A_n (1, (1))$ Pairs of selection are **not commutative** $\pi_{A_1} A_n (1, (1))$ Pairs of selection are **not commutative** $\pi_{A_1} A_n (1, (1))$ Pairs of selection are **not commutative** $\pi_{A_1} A_n (1, (1))$ Pairs of selection are **not commutative** $\pi_{A_1} A_n (1, (1))$ Pairs of selection are **not commutative** $\pi_{A_1} A_n (1, (1))$ Pairs of selection are **not commutative** $\pi_{A_1} A_n (1, (1))$ Pairs of selection are **not commutative** $\pi_{A_1} A_n (1, (1))$ Pairs of selection are **not commutative** $\pi_{A_1} A_n (1, (1))$ Pairs of selection are **not commutative** $\pi_{A_1} A_n (1, (1))$ Pairs of selection are **not commutative** $\pi_{A_1} A_n (1, (1))$ Pairs of selection are **not commutative** $\pi_{A_1} A_n (1, (1))$ Pairs of selection are **not commutative** $\pi_{A_1} A_n (1, (1))$ Pairs of selection are **not commutative** $\pi_{A_1} A_n (1, (1))$ Pairs of selection are **not commutative** $\pi_{A_1} A_n (1, (1))$ Pairs of selection are **not commutative** $\pi_{A_1} A_n (1, (1))$ Pairs of selection are **not commutative** $\pi_{A_1} A_n (1, (1))$ Pair of selection are **not commutative** $\pi_{A_1} A_n (1, (1))$ Pai
- Selections will always keep the same number of columns?



Assignment Project Exam Help $\sigma_{\omega_1}(\sigma_{\omega_2}(R)) = \sigma_{\omega_2}(\sigma_{\omega_1}(R)) = \sigma_{\omega_1}(\sigma_{\omega_2}(R)).$

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- Selections will always keep the same number of columns? Yes.



Assignmental Project Exam Help $\sigma_{\omega_1}(\sigma_{\omega_2}(R)) = \sigma_{\omega_2}(\sigma_{\omega_1}(R)) = \sigma_{\omega_1 \wedge \omega_2}(R).$

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- Pairs of selection and projection are **not commutative** $\pi_{A_1} A_n (\mathbf{d}_{\mathcal{A}})) \mathbf{W} (\pi_{\mathbf{A}_n}(\mathbf{d}_{\mathcal{A}})) \mathbf{des} \mathbf{ptower} \mathbf{det}$
- Selections will always keep the same number of columns? Yes.
- Projections will always keep the same number of rows?



Assignmental Project Exam Help $\sigma_{\omega_1}(\sigma_{\omega_2}(R)) = \sigma_{\omega_2}(\sigma_{\omega_1}(R)) = \sigma_{\omega_1, \wedge, \omega_2}(R).$

- $\begin{array}{c} \bullet \quad \text{Projections are } \underset{\pi_{B_1,\ldots,B_m}}{\text{not commutative}} \\ \pi_{B_1,\ldots,B_m}(\pi) & \stackrel{\bullet}{\text{projections}} \\ \end{array}$
- Pairs of selection and projection are **not commutative** $\pi_{A_1} A_n (\mathbf{d}_{\mathcal{A}})) \mathbf{W} (\pi_{\mathbf{A}_n}(\mathbf{d}_{\mathcal{A}})) \mathbf{des} \mathbf{ptower} \mathbf{det}$
- Selections will always keep the same number of columns? Yes.
- Projections will always keep the same number of rows? No (may introduce duplicates and have to be eliminated).



Assignmental Project Exam Help $\sigma_{\omega_1}(\sigma_{\omega_2}(R)) = \sigma_{\omega_2}(\sigma_{\omega_1}(R)) = \sigma_{\omega_1, \wedge, \omega_2}(R).$

- $\begin{array}{c} \bullet \quad \text{Projections are } \underset{\pi_{B_1,\ldots,B_m}}{\text{not commutative}} \\ \pi_{B_1,\ldots,B_m}(\pi) & \stackrel{\bullet}{\text{projections}} \\ \end{array}$
- Pairs of selection and projection are **not commutative** $\pi_{A_1} A_n (\mathbf{d}_{\mathcal{A}})) \mathbf{W} (\pi_{\mathbf{A}_n}(\mathbf{d}_{\mathcal{A}})) \mathbf{des} \mathbf{ptower} \mathbf{det}$
- Selections will always keep the same number of columns? Yes.
- Projections will always keep the same number of rows? No (may introduce duplicates and have to be eliminated).



Assignment Project La Exam Help

• Union, denoted as $R_1 \cup R_2$, results in a relation that includes all tuples either in R_1 or in_1R_2 . Duplicate tuples are eliminated.

Puttingson der **Declay** A_1 **COCLE IT a Clation It la** includes all tuples that are in both R_1 and R_2 .

• Difference, denoted as R_1-R_2 , results in a relation that includes all Auples that a win R but in R_2 powcoder



Assignment Project La Exam Help

• Union, denoted as $R_1 \cup R_2$, results in a relation that includes all tuples either in R_1 or in_1R_2 . Duplicate tuples are eliminated.

Nutricion der **Declas** M_1 **COCLE** if a **Cation that** includes all tuples that are in both R_1 and R_2 .

• Difference, denoted as $R_1 - R_2$, results in a relation that includes all August that a vir R_1 to the property of the power of

- Type compatibility: R_1 and R_2 must have the same type, i.e.,
 - the same number of attributes, and
 - the same domains for the attributes (the order is important).



Assignment Fix am Help

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	333	STAT2001	120	
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https://		ECONAU2	120	\mathbf{OH}
	333	BUSN2011	130	

What is the result for

$$R_1 = \pi_{StudentiD}(\sigma_{CourseNo='COMP2400'}(STUDY)) ? \pi_{StudentiD}(\sigma_{CourseNo='FCOI2102'}(STUDY))?$$

$$R_2 = \pi_{StudentID}(\sigma_{CourseNo='ECON2102'}(STUDY))$$



Assignment Profest Exam Help

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	333	BUSN2011	130	

What is the result for



$$R_2 = \pi_{StudentID}(\sigma_{CourseNo='ECON2102'}(STUDY))$$

StudentID 111



Assignment Project Exam Help

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,	333	STAT2001	120	
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	333	BUSN2011	130	

• What is the result for π_{Stude} $\pi_{$

 $R_1 \cap R_2$

StudentID 111

$$R_2 = \pi_{StudentID}(\sigma_{CourseNo='ECON2102'}(STUDY))$$



Assignment Project Exam Help COMP2400

120

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What is the result for TSWANGEROW COTET



Assignment Project Exam Help COMP2400

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What is the result for WeChatpowcoder

 $\pi_{StudentID}(R_1 \cap R_2)$

 $R_2 = \sigma_{CourseNo='ECON2102'}(STUDY)$



Assignment Project Exam Help

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What is the result for

π_{Sturanto Content Co}

 $\pi_{StudentID}(R_1 \cap R_2)$

EMPTY!

 $R_2 = \sigma_{CourseNo='ECON2102'}(STUDY)$



Cartesian Product, Join and Natural Join

Assignment Project Exam Help combinatorial fashion.

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Cartesian Product, Join and Natural Join

Assignment Project Exam Help combinatorial fashion.

Joint to Reis introduced as the combination of Cartesian product and scheepen. That is

$$R_1 \bowtie_{\varphi} R_2 = \sigma_{\varphi}(R_1 \times R_2).$$

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Cartesian Product, Join and Natural Join

Assignment Project Exam Help combinatorial fashion.

Join the Rois introduced as the combination of Cartesian product and selection. That is

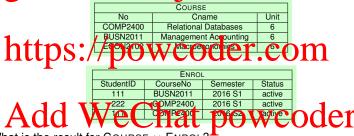
$$R_1 \bowtie_{\omega} R_2 = \sigma_{\omega}(R_1 \times R_2).$$

- Natural Juin 1 122 Chart of Quality comparisons of attributes that have the same name in both relations.
 - Project out one copy of the attributes that have the same name in both relations.



Cartesian Product – Example

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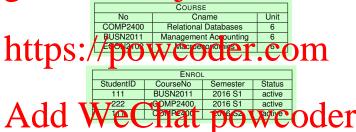


What is the result for Course × Enrol?



Cartesian Product – Example

Assignment Project Exam Help



What is the result for COURSE × ENROL?

Course \times Enrol will have 9 (=3 \times 3) tuples and 7 (=3+4) attributes.



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COMP2400	Relational Databases	6
BUSN2011	Management Accounting	6
ECON2102	Macroeconomics	6

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Assignment Project Exam Help

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BUSN2011	Management Accounting	6
ECON2102	Macroeconomics	6

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No	Cname	Unit	StudentID	CourseNo	Semester	Status
COMP2400	Relational Databases	6	222	COMP2400	2016 S1	active
COMP2400	COMP2400 Relational Databases		111	COMP2400	2016 S2	active
BUSN2011	Management Accounting	6	111	BUSN2011	2016 S1	active



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No No	✓ Cname	Unit
COMP2400	Relational Databases	6
BUSN2011	Management Accounting	6
ECON2102	Macroeconomics	6

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StudentID	CourseNo	Semester	Status
111	BUSN2011	2016 S1	active
222	COMP2400	2016 S1	active
111	COMPAND	2016 52	activo

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Assignment Project Exam Help

No	Cname	Unit
COMP2400	Relational Databases	6
BUSN2011	Management Accounting	6
ECON2102	Macroeconomics	6

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No	Cname
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BUSN2011	Management Accounting



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No	Cname	Unit
COMP2400	Relational Databases	6
BUSN2011	Management Accounting	6
ECON2102	Macroeconomics	6

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BUSN20	I1 Mana	6					
ECON21	02 M	acroeconor	nics	6			

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Stu	dentID	CourseNo	Semester	Status	ΙΤ
	111	BUSN2011	2016 S1	active	
	222	COMP2400	2016 S1	active	

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If there are no matching attributes in two tables for NATURAL JOIN, Course \bowtie Enrol will become Course \times Enrol which outputs 9 (=3×3) tuples and 7 (=3+4) attributes.



Assignment Project Exam Help

Courseivo	Oname	Ullit
COMP2400	Relational Databases	6
BUSN2011	Management Accounting	6
ECON2102	Macroeconomics	6

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StudentID	CourseNo	Semester	Status	
111	BUSN2011	2016 S1	active	
222	COMP2400	2016 S1	active	
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Assignment Project Exam Help

Courseino	Uname	Unit
COMP2400	Relational Databases	6
BUSN2011	Management Accounting	6
ECON2102	Macroeconomics	6

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Stı	dent	ID		C	our	seN	lo			Sei	me	ester	. [S	tatus	s	1		
	111			Βl	ISN	120	11			20	16	S1		а	ctive)	1		
	222		(CC	MF	24	00)		20	16	S1		а	ctive)	1		

• what the dealt we can be at power of the control of the control

CourseNo	Cname	Unit	StudentID	Semester	Status
COMP2400	Relational Databases	6	222	2016 S1	active
COMP2400	Relational Databases	6	111	2016 S2	active
BUSN2011	Management Accounting	6	111	2016 S1	active



Assignment Project Exam Help

COMP2400	Relational Databases	6
BUSN2011	Management Accounting	6
ECON2102	Macroeconomics	6

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	111			Т	В	US	SN	20	11			20	16	S	1	Т	а	ctiv	e				
222			Т	COMP2400		2016 S1		Т	active		П												

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Assignment Project Exam Help

COMP2400	Relational Databases	6
BUSN2011	Management Accounting	6
ECON2102	Macroeconomics	6

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StudentID	CourseNo	Semester	Status	
111	BUSN2011	2016 S1	active	
222	COMP2400	2016 S1	active	
111	COMPONO	0010 00	a atius	

• What the cult was new coder

CourseNo	Cname	Unit	StudentID	Semester	Status
COMP2400	Relational Databases	6	111	2016 S2	active
BUSN2011	Management Accounting	6	111	2016 S1	active



Assignment Project Exam Help

COMP2400	Relational Databases	О
BUSN2011	Management Accounting	6
ECON2102	Macroeconomics	6

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$/\mathbf{n}$	EN (O	MAC	CO
Stude ht D	Course No	Se necter	Status
411	BUSN2011	2016 S1	active
222	COMP2400	2016 S1	active
111	COMP2400	2016 S2	active

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Assignment Project Exam Help

Management Accounting

Macroeconomics

2016 S2

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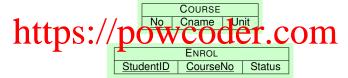
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COMP2400

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Course						
CourseNo	Cname	Unit				
COMP2400	Relational Databases	6				
BUSN2011	Management Accounting	6				
ECON2102	Macroeconomics	6				

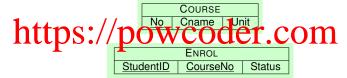


Assignment Project Exam Help



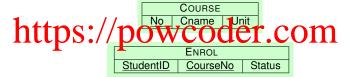
• List the entail of surjects who have entolled in courses and the CourseNo of these courses.





- List the entail of stulients who have enfolled in courses and the CourseNo of these courses.
 - \bullet $\pi_{Email,CourseNo}(\sigma_{Student.StudentID=Enrol.StudentID}(STUDENT \times ENROL))$

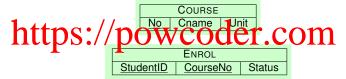




- List the entail of students who have enfolled in courses and the CourseNo of these courses.

 - $2 \pi_{Email,CourseNo}(STUDENT \bowtie_{Student.StudentID} = Enrol.StudentID = ENROL)$





- List the entail of students who have enfolled in courses and the CourseNo of these courses.
 - \bullet $\pi_{Email,CourseNo}(\sigma_{Student.StudentID=Enrol.StudentID}(STUDENT \times ENROL))$
 - $abla \pi_{Email,CourseNo}(STUDENT \bowtie_{Student.StudentID=Enrol.StudentID} ENROL)$





- List the exhall of suitents who have enrolled in courses and the CourseNo of these courses.
 - 10^{-1} $\pi_{Email,CourseNo}(\sigma_{Student.StudentID=Enrol.StudentID}(STUDENT \times ENROL))$
 - ② π_{Email}, CourseNo</sub>(STUDENT ⋈Student.StudentID=Enrol.StudentID ENROL)

 - Φ (π_{Email}, C_{ourseNo}(STUDENT)) ⋈ ENROL



Join – More Examples

Assignment Project Exam Help



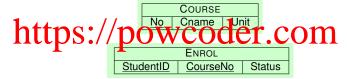
- List the entail of students who have enfolled in courses and the CourseNo of these courses.
 - \bullet $\pi_{Email,CourseNo}(\sigma_{Student.StudentID=Enrol.StudentID}(STUDENT \times ENROL))$
 - ② π_{Email},CourseNo</sub>(STUDENT ⋈_{Student}.StudentID=Enrol.StudentID ENROL)

 - Φ (π_{Email}, CourseNo</sub>(STUDENT)) ⋈ ENROL Incorrect!
 - $\mathbf{0} \pi_{\mathit{Email}}(\mathsf{STUDENT}) \bowtie \pi_{\mathit{CourseNo}}(\mathsf{ENROL})$



Join – More Examples

Assignment Project Exam Help



- List the entail of stulients who have entolled in courses and the CourseNo of these courses.
 - \bullet $\pi_{Email,CourseNo}(\sigma_{Student.StudentID=Enrol.StudentID}(STUDENT \times ENROL))$
 - ② π_{Email},CourseNo</sub>(STUDENT ⋈_{Student}.StudentID=Enrol.StudentID ENROL)

 - Φ (π_{Email,CourseNo}(STUDENT)) ⋈ ENROL Incorrect!
 - $\pi_{\it Email}({\sf STUDENT}) owtie \pi_{\it CourseNo}({\sf ENROL})$ Incorrect!



Assignment Projector Examinibile Ppnames, or both.

https://powcoder.com



Assignment Projector Examinibile p names, or both.

Repaining is denoted as $P_{P_{R'}(A_1,...,A_n)}$ Proposition of the relation name to P_{R} and the attribute names to P_{R} , P_{R}



Assignment Projector Examinibile p names, or both.

- Repairing is denoted as $p_{R'(A_1,...,A_n)}$ Proposition of the relation name to R and the attribute names to $A_1,...,A_n$,
 - $\rho_{R'}(R)$: renaming the relation name to R' and keeping the attribute A are concluded that powcoder



Assignment Projector Examinible lp names, or both.

Repairing is denoted as $p_{R'(A_1,...,A_n)}$ Proposition of the relation name to R and the attribute names to $A_1,...,A_n$,

• $\rho_{R'}(R)$: renaming the relation name to R' and keeping the attribute harmest network that $P(A_1, \dots, A_n)$ and keeping the attribute harmes to $P(A_1, \dots, A_n)$ and keeping the attribute harmes to $P(A_1, \dots, A_n)$ and keeping

• $\rho_{(A_1,...,A_n)}(R)$: renaming the attribute hames to $A_1,...,A_n$ and keeping the relation name unchanged.



Assignment Projection Envantrible lep names, or both.

Repaining is denoted as $p_{R'(A_1,...,A_n)}$ Propagation of the attribute names to $A_1,...,A_n$,

• $\rho_{R'}(R)$: renaming the relation name to R' and keeping the attribute

- $\rho_{(A_1,...,A_n)}(R)$: renaming the attribute names to $A_1,...,A_n$ and keeping the relation name unchanged.
- Renaming is useful for giving names to the relations that hold the intermediate results.



Assignment tio Peroject Exam Help STUDENT={StudentID, Name, DoB}

Find pairs of students who have the same birthday. Show their names.

https://powcoder.com
StudentID	Name	DoB	
457	Lisa	18-Oct-1993	
Add	West	Mike	16-May-1990
Add	West	Made	Dol-Was Oder

What about the following choices?



Assignment tio Peroject Exam Help STUDENT={StudentID, Name, DoB}

• Find pairs of students who have the same birthday. Show their names.

https://powcoder.com
StudentID Name DoB

457 Lisa 18-Oct-1993

Add W 458 1 Mike 16-May-1990

- What about the following choices?
 - \bullet $\pi_{Name,Name}(\sigma_{DoB=DoB}(STUDENT \times STUDENT))$



Assignment Project Exam Help

STUDENT

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Assignment Project Exam Help

STUDENT × STUDENT						
StudentID	Name	DoB	StudentID	Name	DoB	
457	_Lisa	18-Oct-1993	457	Lisa	18-Oct-1993 -	
4.7 is / 48- ct-199		58 1	Mike	16 May 1990	Δr	
 4700	Lisa	18-4 ct-1993	58	Pe er V	18-Od-1998	
458	Mike	16-May-1990	457	Lisa	18-Oct-1993	_
458	Mike	16-May-1990	458	Mike	16-May-1990	
458	Mike	16-May-1990	458	Peter	18-Oct-1993	
458	Peter	18-Oct-1993	457	Lisa	18-Oct-1993	
458	Peter	18-Oct-1993	458	Mike	16-May-1990	
458	Peter	18-Oct-1993	458	Peter	18-Oct-1993	



Assignment Project Exam Help

STUDENT × STUDENT						
StudentID	Name	DoB	StudentID	Name	DoB	
457	_Lisa	18-Oct-1993	457	Lisa	18-Oct-1993 -	
47	is.	48- ct-199	58 1	Mike	16 May 1990	Δr
 4700	Lisa	18-4 ct-1993	58	Pe er V	18-Od-1998	
458	Mike	16-May-1990	457	Lisa	18-Oct-1993	_
458	Mike	16-May-1990	458	Mike	16-May-1990	
458	Mike	16-May-1990	458	Peter	18-Oct-1993	
458	Peter	18-Oct-1993	457	Lisa	18-Oct-1993	
458	Peter	18-Oct-1993	458	Mike	16-May-1990	
458	Peter	18-Oct-1993	458	Peter	18-Oct-1993	

Incorrect!



Assignment Project Exam Help

https://powcoder.com



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Assignment Project Exam Help



Add WeChat powcoder

Incorrect!



Assignment Project Exam Help

STUDENT

https://pda.pub.com



Assignment Project Exam Help

Add Weiss hat 18-Oct-1993 Coder

(STUDENT ⋈ STUDENT)



Assignment Project Exam Help

Incorrect!



Assign properties Preciect Exam Help

Find pairs of students who have the same birthday. Show their names.



What about the following choices?



Assign propertion Preciect Exam Help StudentID, Name, DoB}

Find pairs of students who have the same birthday. Show their names.



- What about the following choices?
 - $\bullet \ \pi_{\textit{R}_{1}.\textit{Name},\textit{R}_{2}.\textit{Name}}(\sigma_{\textit{R}_{1}.\textit{DoB}=\textit{R}_{2}.\textit{DoB}}(\rho_{\textit{R}_{1}}(\textit{STUDENT}) \times \rho_{\textit{R}_{2}}(\textit{STUDENT})))$



Assign propertion Preciect Exam Help StudentID, Name, DoB}

Find pairs of students who have the same birthday. Show their names.



- What about the following choices?
 - $\pi_{R_1.Name,R_2.Name}(\sigma_{R_1.DoB=R_2.DoB}(\rho_{R_1}(STUDENT) \times \rho_{R_2}(STUDENT)))$ Almost correct!



Assignment tio President Exam Help

• Find pairs of students who have the same birthday. Show their names.



- What about the following choices?
 - $\pi_{R_1.Name,R_2.Name}(\sigma_{R_1.DoB=R_2.DoB}(\rho_{R_1}(STUDENT) \times \rho_{R_2}(STUDENT)))$ Almost correct!
 - $\pi_{Name,Name'}(STUDENT \bowtie \rho_{S(StudentID',Name',DoB)}(STUDENT))$



Assign properties Preciect Exam Help

Find pairs of students who have the same birthday. Show their names.



- What about the following choices?
 - $\pi_{R_1.Name,R_2.Name}(\sigma_{R_1.DoB=R_2.DoB}(\rho_{R_1}(STUDENT) \times \rho_{R_2}(STUDENT)))$ Almost correct!
 - π_{Name, Name'} (STUDENT ⋈ ρ_{S(StudentID', Name', DoB)} (STUDENT))
 Almost correct!



Assignment Project ExaminaHelp

(1). π_{R_1} . Name, R_2 . Name (σ_{R_1} . StudentID $< R_2$. StudentID (σ_{R_1} . DoB= R_2 . DoB ($\begin{array}{c|cccc}
h_{R_1}(STUDENT) \times \rho_{R_2}(STUDENT)) \\
h_{R_2}(STUDENT) \times \rho_{R_2}(STUDENT)) \\
h_{R_2}(STUDENT) \times \rho_{R_2}(STUDENT) \\
h_{R_2}(STUDENT) \times \rho_{R_2}(S$

• If evaluating our queries over the following relation, what will be the result?

STUDEN						
StudentID	Name	DoB				
457	Lisa	18-Oct-1993				
458	Mike	16-May-1990				
459	Peter	18-Oct-1993				



Assignment specification Help

https://passudentilD Name DoB

StudentilD Name DoB

Oct. 1983

Peter 18-Oct. 1993



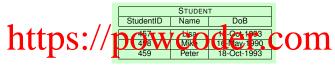
Assignment specification Help



$ ho_{R_1}(STUDENT) imes ho_{R_2}(STUDENT)$						
R ₁ .StudentID R ₁ .Name		R ₁ .DoB	R ₂ .StudentID	R ₂ .Name	R ₂ .DoB	
457	457 L ta 18-0 ct-1998 457		_Lisa_	18-Oct-1993		
— 57	Lis a	1 6- ct-1993	458	V (F	16 V ay 1 30	
457	Lisa	18-Oct-1993	458	Peter	16-Oct-1993	
458	Mike	16-May-1990	457	Lisa	18-Oct-1993	
458	Mike	16-May-1990	458	Mike	16-May-1990	
458	Mike	16-May-1990	458	Peter	18-Oct-1993	
458	Peter	18-Oct-1993	457	Lisa	18-Oct-1993	
458	Peter	18-Oct-1993	458	Mike	16-May-1990	
458	Peter	18-Oct-1993	458	Peter	18-Oct-1993	



Assignment speciet Exam Help



$R' = \sigma_{R_1.DoB=R_2.DoB}(\rho_{R_1}(STUDENT) \times \rho_{R_2}(STUDENT))$						
R ₁ .StudentID R ₁ .Name		R_1 .DoB R_2 .Studer		R ₂ .Name	R ₂ .DoB	
457	Lla	48-7 ct-199	457	TLisay (#8-Oct 1998 -	
4 57	Lis	18-C ct-1993	459	Velo r	18 (ct. [93	
458	Mike	16-May-1990	458	Mike	16-May-1990	
459	Peter	18-Oct-1993	457	Lisa	18-Oct-1993	
459	Peter	18-Oct-1993	459	Peter	18-Oct-1993	



Assignment speciet Exam Help



$R' = \sigma_{R_1.DoB=R_2.DoB}(\rho_{R_1}(STUDENT) \times \rho_{R_2}(STUDENT))$						
R ₁ .StudentID	R ₁ .Name	R ₁ .DoB	R ₂ .StudentID	R ₂ .Name	R ₂ .DoB	
457	Lla	48-7 ct-199	457	TLisay (48-Oct 1988 -	
4 57	Lis	18-Cct-1993	459	Velyr	18 (ct. [93	
458	Mike	16-May-1990	458	Mike	16-May-1990	
459	Peter	18-Oct-1993	457	Lisa	18-Oct-1993	
459	Peter	18-Oct-1993	459	Peter	18-Oct-1993	

π_{R_1} . Name , R_2 . Name $(\sigma_{R_1}$. StudentID $<$ R_2 . StudentID (R')					
R ₁ .Name	R ₂ .Name				
Lisa	Peter				

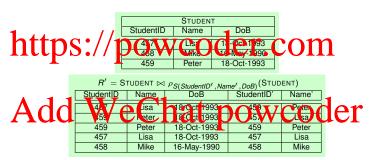


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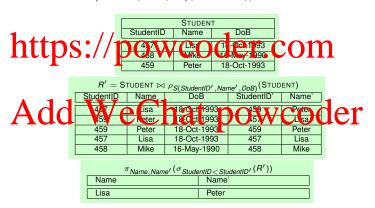


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Assignment & Position ject Exam Help





Relational Algebra (RA) - example

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Which awards are there in USA? List these award names.

https://powcoder.com



Relational Algebra (RA) – example

Assignment Project Exam Help

Which awards are there in USA? List these award names.

https://powcoder.com

Which relation schema(s) will be used?

• AWARD(award_name, institution country)
primar((y): {ward_name})nat powcoder



Relational Algebra (RA) – example

Assignment Project Exam Help

Which awards are there in USA? List these award names.

https://powcoder.com

Which relation schema(s) will be used?

• AWARD (award_name, institution country)

prilar (v): {Ward_name} nat powcoder

 $\pi_{\mathsf{award_name}}(\sigma_{\mathsf{country}='\mathsf{USA'}}(\mathsf{AWARD}))$



Relational Algebra (RA) - example

Assinginment by rojec the arm of the p movie is comedy) which were produced in 1994.

https://powcoder.com



Relational Algebra (RA) - example

Assignment Project Exam Help movie is comedy) which were produced in 1994.

Which relation schema(s) will be used?

• More than Discountion Dear White Chair Continue Thair primary key : {title, production_vear}



Assinging the project the arm of the provide is comedy) which were produced in 1994.

Which relation schema(s) will be used?

• McVettue Dr. Solvetion Deer County, Outper Praje County primary key : {title, production_vear}

 $\substack{ \text{$\pi_{\text{title}}(\sigma_{(\textit{production_year}=1994)} \land (\textit{major_genre}='\textit{comedy'}) \text{(MOVIE))} \\ \textbf{Add WeChat powcoder} }$



movie is comedy) which were produced in 1994.

Which relation schema(s) will be used?

• McVettue Dr. Solvetion Deer County, Outper Praje County primary key : {title, production_vear}

 $\pi_{\text{title}}(\sigma_{\text{(production_year}=1994)} \land (major_genre='comedy')(\text{MOVIE}))$

Is the following ha also encethat powcoder

 $\pi_{\text{title}}(\sigma_{production_vear=1994}(\text{MOVIE})) \cap \pi_{\text{title}}(\sigma_{major_genre='comedv'}(\text{MOVIE}))$



movie is comedy) which were produced in 1994.

Which relation schema(s) will be used?

• More than Deprocessing the school of the sch primary key : {title, production_vear}

 $\pi_{\text{title}}(\sigma(production_year=1994) \land (major_genre='comedy') (MOVIE))$

Is the following RA also encertait powcoder

 $\pi_{\text{title}}(\sigma_{production_vear=1994}(\text{MOVIE})) \cap \pi_{\text{title}}(\sigma_{major_genre='comedv'}(\text{MOVIE}))$

It is not correct. Consider two movies, Robot (1994, action), Robot (2001, comedy).



Assignment Project Exam Help List the dis, first names, and last names of the persons who played at least one role in the movies produced in 1995.

https://powcoder.com



Assignment Project Exam Help List the das, first names, and last names of the persons who played at least one role in the movies produced in 1995.

Which relation schema(s) will be used?

- McVe(ttla, production pear, county, Ontine hajo Court)
 primary key: {title, production_year}
- PERSON(id, first_name, last_name, year_born)
 primary_text: 10 7 0 1 0 0 4
- Rose(ra, title, production_year, description credits)
 primary key: {title, production_year, description}
 foreign keys: [title, production_year] ⊆ MOVIE[title, production_year]
 [id] ⊆ PERSON[id]



Assignment and last piece of the parameter part of the parameter parameter at least one role in the movies produced in 1995.

https://powcoder.com



Assiegn, first leads, and last nines of the person has placed part least one role in the movies produced in 1995.

Which of the following RAs are correct?

- π_{RCL} Id tilst name/last name And Gio Qua Co St Roll in the Shiring (ROLE × PERSON))
- πROLE.id, first_name, last_name (σ production_year=1995 (ROLE ⋈ROLE.id=PERSON.id PERSON))
- ullet π_{id} first card ast have Enducy 1.2.1.5 (DENVISON CET)
- πid, first_name, last_name (σ_{production_year=1995} (MOVIE ⋈ ROLE ⋈ PERSON))
 All the above RAs are correct. The last RA is also correct although the natural join of MOVIE is not needed.



ALS STEP INTERIOR and Interior of the parallel of the parallel

https://powcoder.com



ALSS regulations and in the produced in 1995.

Which about the following RAs?

• #id fist tail St. nand ON WW - 95 CHE PERSON)



ALS STEAD IN THE AND LOCATED AT LEAST ONE FOLIA TO LEAST ONE FOLIA TO LANGUAGE TO LEAST ONE FOLIA TO LANGUAGE TO L

Which about the following RAs?

• Tid fist taile St. name Powwwe-99 Cheff Press Off The X PERSON)

We need to specify id (from ROLE or PERSON) under π



ALS STEED IN THE DATE AND INCOME OF THE PARKETS WITH PARKET PARKETS AND PARKETS AND PARKETS OF THE PARKETS WITH PARKETS AND PARKETS AND PARKETS OF THE PARKETS WITH PARKETS AND PARKETS OF THE PARKETS WITH PARKETS

Which about the following RAs?

• #id fist raine Sst. name O O WWW @ 99 CHE PEGS O FINE X

We need to specify id (from ROLE or PERSON) under π

 $\overset{\bullet}{\text{Add}}\overset{\text{rid, fist_name last name}}{\text{Vector}}(\overset{\sigma_{\textit{productol}}}{\text{powcoder}})_{\textit{year}=1995}(\text{ROLE} \bowtie_{\text{ROLE}.id=\text{PERSON}}))$



ALS STEED IN THE DATE AND INCOME OF THE PARTITION OF PARTIES IN 1995.

Which about the following RAs?

• #id fist raine Sst. name O O WWW @= 99 CHET PEGS O TIPE X

We need to specify id (from ROLE or PERSON) under π

• πid, that name last name (σρησιστός year=1995 (ROLE ⋈_{ROLE, id=PERSON, IV} PERSON))
We need to specify id (the filter LECTOR LET SPA) under πCOCCT



ALSS regularity and list proceed the paragray of parel p at least one role in the movies produced in 1995.

Which about the following RAs?

• Tid fist raine Set name Power 1990 Person (TIPE × PERSON))

We need to specify id (from ROLE or PERSON) under π

- #id, tiest_name last name (**Oproved) year=1995 (ROLE ⋈ROLE.id=PERSON IV PERSON))
 We need to specify it (from Roll 1 to the Person IV PERSON))
- π id, first_name, last_name $(\sigma_{production_year=1995}(ROLE \bowtie PERSON))$



ALSS regularity and list proceed the paragray of parel p at least one role in the movies produced in 1995.

Which about the following RAs?

• Tid fist taile Set name Power - 9 Cheffees Offee X

We need to specify id (from ROLE or PERSON) under π

- #id, that name last name (**oproductor, year=1995 (ROLE MROLE.id=PERSON.TV PERSON))
 We need to specify id (from ROLE COLET)
- $\pi_{\rm id}$, first_name, last_name ($\sigma_{\it production_\it year=1995}$ (ROLE \bowtie PERSON)) There is no need to specify id under π



ALSS regulation at a plat process of the paragray of parel p at least one role in the movies produced in 1995.

Which about the following RAs?

• Tid fist rain St. name O O WW - 99 CHE PERSON))

We need to specify id (from ROLE or PERSON) under π

- ** #id, that name last name (** productor year=1995 (** ROLE MROLE.id=PERSON_TV PERSON)) We need to specify id (them rolled to be a production of the produc
- π id, first_name, last_name ($\sigma_{production_year=1995}$ (ROLE \bowtie PERSON))
 There is no need to specify id under π
- Note the difference between Cartesian Product, Inner Join and Natural Join.



Assignment of whome the parent of the parent

https://powcoder.com



ALS STERRITH CIP TO STERRITH T

Which relation schema(s) will be used?

- Monetitle production per country contine majorgentine primary ley title, production year?
- WRITER(id, title, production_year, credits) primary key : {id, title, production_year} foreign keys : [title, production_year] ⊆ MOVIE[title, production_year] [id] ⊆ PERSON[id]



Assignment Project Exam Help List the ids of the directors who have directed at least one movie

List the ids of the directors who have directed at least one movie written by themselves.

Which https://powceder.com

- $\pi_{\text{DIRECTOR.id}}(\sigma_{(\text{DIRECTOR.}id=\text{WRITER.}id)}) \land (\text{DIRECTOR.}title=\text{WRITER.}title) \land (\text{DIRECTOR.}production_year=\text{WRITER.}production_year)(\text{DIRECTOR} \times \text{WRITER}))$
- TDIRACTOR id (DIRECTOR MORRECTOR id—WRITER id) Λ (DIRECTOR title—WRITER title) Λ (DIRECTOR title—WRITER title) Λ (DIRECTOR to the title) Λ (DIRECTOR title—WRITER title—
- $\pi_{id}(DIRECTOR \bowtie WRITER)$

All the above RAs are correct.



A List the ids of the directors have directed at least one movie 1p

Which about the following RAs?

* To be of the control of the worter of the control of the control



A List the ids of the directors pho have directed at least one movie 1p

Which about the following RAs?

*πρίμοταμ (στομεντολής water in) (preserved and compare production_year



A List the ids of the directors has been directed at least one movie 1p

Which about the following RAs?

*πρίμες ταμ (στριβεστολής white in) (preserved a street in) (preserved a stre

 $\overset{\bullet}{Add} \overset{\pi_{\mathsf{DIRECTOR},\mathsf{id}}(\sigma_{\mathsf{DIRECTOR},\mathsf{id}=\mathsf{WRITER},\mathsf{id}}(\mathsf{DIRECTOR} \times \mathsf{WRITER}))}{\mathsf{Add}} \overset{\bullet}{\mathsf{WeChat}} \overset{\bullet}{\mathsf{powcoder}}$



A List the ids of the directors has been directed at least one movie 1p

Which about the following RAs?

* (Director of Constant) POWCOder. Com

We need to compare *production_year*

• $\pi_{\text{DIRECTOR},id}(\sigma_{\text{DIRECTOR},id=\text{WRITER},id}(\text{DIRECTOR} \times \text{WRITER}))$ This quart is idsovithed testing with half with values in the first of the control of the



A List the ids of the directors pho have directed at least one movie 1p

Which about the following RAs?

* πρήμες ταμ ja (στρισε στο λεί γνωτε επ. ή) (ρεες του δεί γνωτε επ. ή) (ρ

- π_{DIRECTOR} id $(\sigma_{\text{DIRECTOR}}, j\sigma_{\text{EWRITER}}, j\sigma_{\text{CIRECTOR}})$ This quartes ids $(\sigma_{\text{DIRECTOR}}, j\sigma_{\text{EWRITER}}, j\sigma_{\text{CIRECTOR}})$ This quartes ids $(\sigma_{\text{DIRECTOR}}, j\sigma_{\text{EWRITER}}, j\sigma_{\text{CIRECTOR}})$
- $\pi_{id}(DIRECTOR) \cap \pi_{id}(WRITER)$



he ids of the directors Pho have directe that least one movie 1p

Which about the following RAs?

* Tolksorgh id (Copiecotok id wenter id) A (piecotok id) A (We need to compare production_year

- π_{DIRECTOR} id $(\sigma_{\text{DIRECTOR}}$ id=writer id (DIRECTOR × WRITER))
- $\pi_{id}(DIRECTOR) \cap \pi_{id}(WRITER)$

This guery lists ids of the directors who have written at least one movie.



A List the ids of the directors Phohave directe Eat least one To lie 1p

Which about the following RAs?

*πρίμες ταμ (στριβεστολής white in) (preserved a street in) (preserved a stre

- π_{DIRECTOR} id $(\sigma_{\text{DIRECTOR}}, j\sigma_{\text{EWRITER}}, i\sigma_{\text{CDIRECTOR}})$ This cause is ideal the rector with half with a less constitution.
- $\pi_{id}(DIRECTOR) \cap \pi_{id}(WRITER)$

This query lists ids of the directors who have written at least one movie.

• $\pi_{id}(\pi_{id,title,production_year}(DIRECTOR) \cap \pi_{id,title,production_year}(WRITER))$



A List the ids of the directors has been directed at least one movie 1p

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- $\pi_{\mathsf{DIRECTOR},\mathsf{id}}(\sigma_{\mathsf{DIRECTOR},\mathsf{id}=\mathsf{WRITER},\mathsf{id}}(\mathsf{DIRECTOR}\times\mathsf{WRITER}))$ This quart is ideal the rectar and have writered in the contraction of the rectar and have a superior of the contraction of the rectar and have a superior of the contraction of the contracti
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A List the ids of the directors has been directed at least one movie 1p

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• $\pi_{id}(\pi_{id,title,production_year}(DIRECTOR) \cap \pi_{id,title,production_year}(WRITER))$ Correct.



Assignment Project Exam Help movies directed by themselves.

• List idential directors powcoder.com



Assignment Project Exam Help movies directed by themselves.

• List ids of all directors powcoder.com



- List idea of all directors powcoder.com
- List ids of director who have played at least one role in the movies directed by themselves.
 WeChat powcoder



- List idea of all directors powcoder.com
- List ids of director who have played at least one role in the movies directed by themselves.

 D2 Aid GET TOWN DE hat powcoder



- List idea of all directors powcoder.com
- List ids of director who have played at least one role in the movies directed by themselves.

 D2 Aid GET TO THE hat powcoder
- List the ids of the directors who have never played any roles in the movies directed by themselves.



- List idea of all directors powcoder.com
- List ids of director who have played at least one role in the movies directed by themselves.

 D2 Aid RICTOR CTOR DOWCOGET
- List the ids of the directors who have never played any roles in the movies directed by themselves.
 Result = D₁ - D₂.



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Relational algebra is a query language with RA operators:

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Relational algebra is a query language with RA operators:

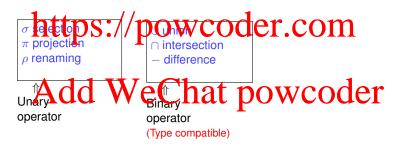
σ lettps://powcoder.com
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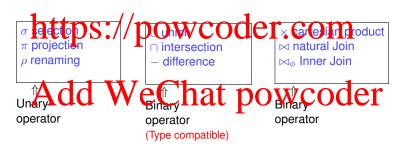
Relational algebra is a query language with RA operators:





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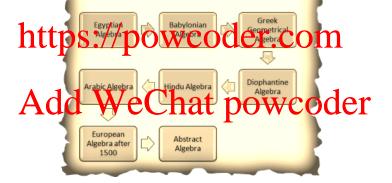
Relational algebra is a query language with RA operators:





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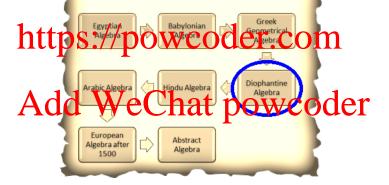


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http://historyofpythagoreantheorem.weebly.com/algebra.html



(credit cookie) Diophantus of Alexandria

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Through art algebraic, the stone tells how old:

'God gave him his boyhood one-sixth of his life,

One twalfth more as /youth while whiskers grew rife;

And then yet phe-sever the ere marriage begun,

In five years there came a bouncing new son.

Alas, the dear child of master and sage

After attaning malf the measure of his father stiff chill father him.

After consoling his fate by the science of numbers for four years,

he ended his life'.



(credit cookie) Diophantus of Alexandria

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$$x = x/6 + x/12 + x/7 + 5 + x/2 + 4$$



(credit cookie) Diophantus of Alexandria

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he ended his life'.

$$x = x/6 + x/12 + x/7 + 5 + x/2 + 4 \Rightarrow x = 84$$



(credit cookie) Arithmetica and Margin-writing by Fermat

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(credit cookie) Arithmetica and Margin-writing by Fermat

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"If an integer n is greater than 2,

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SUMPORD SEPATIANI CARMONY, VA
LIONAL INCOME.

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CAMPARTILE COME.

"If an integer n is greater than 2, then $a^n + b^n = c^n$ has no solutions in non-zero integers a, b, and c. I have a strong for the contain of this proposition which this margin is too narrow to contain."

eChradopowicoder



(credit cookie) Arithmetica and Margin-writing by Fermat

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"If an integer n is greater than 2,



"If an integer n is greater than 2, then $a^n + b^n = c^n$ has no solutions in non-zero integers a, b, and c. I have a constant of this proposition which this margin is too narrow to contain."

eChradepoweoder

Fermat's Last Theorem was proved by Andrew Wiles in 1994.