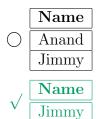
BSCCS2001: Graded Assignment with Solutions Week 12

1. Consider the relation **Classroom** as shown below

Name	RollNo	Age	Marks	Subject
David	M003	23	78	Maths
Matthew	S007	29	54	English
Anand	C001	22	89	JAVA
Mitchel	M006	21	56	Maths
Shaun	M009	26	92	Maths
Jimmy	C009	29	42	JAVA
Richard	S003	20	99	English

Relation Classroom

Choose the correct output of relational algebra expression $\pi_{Name}(\sigma_{age>25}(\sigma_{Subject='JAVA'}(Classroom)))$





 \bigcirc Invalid relational algebra expression

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Solution: According to Equivalence Rule 1 (Slide no 57.11), \pi_{Name}(\sigma_{age>25}(\sigma_{Subject='JAVA'}(Classroom))) = \pi_{Name}(\sigma_{age>25 \land Subject='JAVA'}(Classroom))) Thus, option 2 is correct.
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2. Which of the following is/are true?

[MSQ:2.5points]

- $\sqrt{(E1 \cup E2) \cup E3} = E1 \cup (E2 \cup E3)$
- $\bigcirc \ \sigma_{\theta}(E_1 \cup E_2) = \sigma_{\theta}(E_1) \cup E_2$
- $\sqrt{\pi_L(E_1 \cup E_2)} = (\pi_L(E_1)) \cup (\pi_L(E_2))$
- All of the above

Solution: Please refer to slide no 57.16

3. Consider the following statements.

[MCQ:2.5points]

- 1. $\sigma_{\theta_1 \wedge \theta_2}(E_1 \bowtie_{\theta} E_2) = (\sigma_{\theta_1}(E_1)) \bowtie_{\theta} (\sigma_{\theta_2}(E_2))$, this is true only when θ_1 involves only the attributes of E_1 and θ_2 involves only the attributes of E_2 .
- 2. $\prod_{L_1 \cup L_2} (E_1 \bowtie_{\theta} E_2) = \prod_{L_1} (E_1) \bowtie_{\theta} \prod_{L_2} (E_2)$, this is true when θ involves only attributes from $L_1 \cup L_2$.
- 3. $(E_1 \bowtie_{\theta_1} E_2) \bowtie_{\theta_2 \wedge \theta_3} E_3 = E_1 \bowtie_{\theta_1 \wedge \theta_3} (E_2 \bowtie_{\theta_2} E_3)$, this is true when θ_2 involves attributes from E_2 and E_3 only.

Choose the correct option.

- O Statement 1 and 3 are correct
- O Statement 1 and 2 are correct
- \bigcirc Statement 2 and 3 are correct
- $\sqrt{\text{All the statements are correct}}$

Solution: Refer to Equivalence rules slides in lecture 57.

4. Consider that E_1 and E_2 are two relational algebra expressions. Identify the incorrect statement.

[MCQ:2.5points]

$$\bigcirc E_1 \bowtie_{\theta} E_2 = E_2 \bowtie_{\theta} E_1$$

$$\sqrt{E_1 - E_2} = E_2 - E_1$$

$$\bigcirc E_1 \cup E_2 = E_2 \cup E1$$

$$\bigcirc E_1 \cap E_2 = E_2 \cap E_1$$

Solution:

- Theta-join operations are commutative.
- The set operations union and intersection are commutative. However, set difference is not commutative