

RA

Q 5.1:

$$\pi_{isbn}(\text{edition} \bowtie \text{books} \bowtie \sigma_{\text{first name} = 'Tom' \text{ and last name} = 'Christiansen'}(\text{authors}))$$

Q 5.2:

$$\begin{aligned} &\rho(\text{tmp1}, \sigma_{\text{subject} = 'Short Story'}(\text{authors} \bowtie \text{books} \bowtie \text{subjects})) \\ &\rho(\text{tmp2}, \sigma_{\text{subject} = 'Horror'}(\text{authors} \bowtie \text{books} \bowtie \text{subjects})) \end{aligned}$$

$$\pi_{\text{lastname,firstname}}(\text{tmp1} \bowtie \text{tmp2})$$

Q 5.3:

$$\begin{aligned} &\rho(\text{tmp1}, \sigma_{\text{after } 1999-10-01 \text{ and before } 2001-10-01}(\text{authors} \bowtie \text{books} \bowtie \text{editions})) \\ &\pi_{\text{title,publication,autorID,lastname,firstname}}(\text{tmp1} \bowtie \text{books} \bowtie \text{editions}) \end{aligned}$$

Q 5.4:

$$\begin{aligned} &\rho(\text{tmp1}, \pi_{\text{authorid,firstname,lastname,subject}}(\text{authors} \bowtie \text{books} \bowtie \text{subjects})) \\ &\rho(\text{tmp2}, \pi_{\text{subject}}(\sigma_{\text{firstname} = 'EdgarAllen', \text{lastname} = 'Poe'}(\text{authors}) \bowtie \text{books} \bowtie \text{subjects})) \\ &\text{tmp1/tmp2} \end{aligned}$$

RC

Q 5.1:

$$\begin{aligned} &\{P | \exists A \in \text{authors} \exists B \in \text{books} \exists E \in \text{editions} (P.\text{isbn} = E.\text{isbn} \wedge B.\text{authorid} \\ &\quad = A.\text{authorid} \wedge E.\text{bookid} \\ &\quad = B.\text{id} \wedge A.\text{firstname} = 'Tom' \wedge A.\text{lastname} = 'Christiansen')\} \end{aligned}$$

Q 5.2:

$$\begin{aligned} &\{P | \exists A \in \text{authors} (P.\text{lastname} = A.\text{lastname} \wedge P.\text{firstname} \\ &\quad = A.\text{firstname}) \exists B1 \in \text{books} \exists S1 \in \text{subjects} \exists B2 \\ &\quad \in \text{books} \exists S2 \in \text{subjects} (A.\text{authorid} \\ &\quad = B1.\text{authorid} \wedge A.\text{authorid} = B2.\text{authorid} \wedge B1.\text{subjectid} \\ &\quad = S1.\text{subjectid} \wedge B2.\text{subjectid} \\ &\quad = S2.\text{subjectid} \wedge S1.\text{subject} = 'Short Story' \wedge S2.\text{subject} \\ &\quad = 'Horror')\} \end{aligned}$$

Q 5.3:

$$\begin{aligned} &\{P | \exists B \in \text{books} (P.\text{title} = B.\text{title}) \exists E \\ &\quad \in \text{editions} (P.\text{publication} = E.\text{publication}) \exists A \\ &\quad \in \text{authors} (P.\text{lastname} = A.\text{lastname} \wedge P.\text{firstname} \\ &\quad = A.\text{firstname} \wedge B \in \text{books} (B.\text{authorid} = A.\text{authorid}) \wedge \exists E \\ &\quad \in \text{editions} (E.\text{bookid} = B.\text{bookid} \wedge E.\text{publication} \\ &\quad > 1999.10.01 \wedge E.\text{publication} < 2001.10.01))\} \end{aligned}$$