1 Self Study 3: Exam Preparation 1

1.1 Excercise 4

1

$\pi_{\texttt{sname}}(\texttt{Suppliers} \bowtie (\texttt{Catalog} \bowtie \sigma_{\texttt{color=red}}(\texttt{Parts})))$

$\{s.\texttt{sname} \mid s \in \texttt{Suppliers} \wedge \exists c \in \texttt{Catalog}(s.\texttt{sid} = c.\texttt{sid} \wedge \exists p \in \texttt{Parts}(c.\texttt{pid} = p.\texttt{pid} \ \wedge \ p.\texttt{color} = \texttt{red}))\}$

$\{\langle b \rangle \mid \exists a, c(\langle a, b, c \rangle \in \texttt{Suppliers} \wedge \exists i, j(\langle b, i, j \rangle \in \texttt{Catalog} \ \wedge \ \exists y, z(\langle i, y, z \rangle \in \texttt{Parts} \ \wedge \ z = \texttt{red})))$

2

$\pi_{\texttt{sid}}(\texttt{Catalog} \bowtie \sigma_{\texttt{color=red} \ \vee \ \texttt{color=green}}(\texttt{Parts}))$

$\{c.\texttt{sid} \mid c \in \texttt{Catalog} \ \wedge \ \exists p \in \texttt{Parts}(c.\texttt{pid} = p.\texttt{pid} \ \wedge \ p.\texttt{color} = \texttt{red} \ \vee \ p.\texttt{color} = \texttt{green}))\}$

$\{\langle b \rangle \mid \exists i, j(\langle b, i, j \rangle \in \texttt{Catalog} \ \wedge \ \exists y, z(\langle i, y, z \rangle \in \texttt{Parts} \ \wedge \ (z = \texttt{red} \vee z = \texttt{green})))$

3

$\pi_{\texttt{sid}}(\texttt{Catalog} \bowtie \sigma_{\texttt{color=red}}(\texttt{Parts})) \bowtie \pi_{\texttt{sid}}(\texttt{Catalog} \bowtie \sigma_{\texttt{color=green}}(\texttt{Parts}))$

$\{c_1.\texttt{sid} \mid c_1 \in \texttt{Catalog} \ \wedge \ \exists c_2 \in \texttt{Catalog}(c_1.\texttt{sid} = c_2.\texttt{sid} \ \wedge \ \exists p_1, p_2 \in \texttt{Parts}(c_1.\texttt{pid} = p_1.\texttt{pid} \ \wedge \ c_2.\texttt{pid} = p_2.\texttt{pid} \ \wedge \ p_1.\texttt{color} = \texttt{red} \ \wedge \ p_2.\texttt{color} = \texttt{green}))\}$

$\{\langle b \rangle \mid \exists i, j, k, l(\langle b, i, k \rangle \in \texttt{Catalog} \wedge \langle b, j, l \rangle \in \texttt{Catalog} \wedge \exists u, v, x, y(\langle i, u, v \rangle \in \texttt{Parts} \ \wedge \ \langle i, x, y \rangle \in \texttt{Parts} \ \wedge \ v = \texttt{red} \wedge y = \texttt{green})))$

4

$\{s_1.\texttt{sid}, s_2.\texttt{sid} \mid \exists c_1, c_2 \in \texttt{Catalog}(c_1.\texttt{sid} = s_1.\texttt{sid} \ \wedge \ c_2.\texttt{sid} = s_2.\texttt{sid} \ \wedge \ \exists p_1, p_2 \in \texttt{Parts}(c_1.\texttt{pid} = p_1.\texttt{pid} \ \wedge \ c_2.\texttt{pid} = p_2.\texttt{pid} \ \wedge \ p_1.\texttt{cost} > p_2.\texttt{cost}))\}$