Question 1

a.

$$\texttt{RedBooks} \leftarrow \sigma_{\texttt{(color = "red")}}(\texttt{Book})$$
$$\texttt{A} \leftarrow \texttt{RedBooks} \bowtie_{\texttt{(RedBooks.ISBN = Distribute.ISBN)}} \texttt{Distribute}$$
$$\texttt{Calgary} \leftarrow \sigma_{\texttt{(sname = "Calgary")}}(\texttt{A})$$
$$\texttt{Result} \leftarrow \pi_{\texttt{(name, city)}}(\texttt{A - Calgary})$$

b.

$$\texttt{Schools} \leftarrow \sigma_{\texttt{(city = "Paris")}}(\texttt{School})$$
$$\texttt{A} \leftarrow \texttt{Schools} \bowtie_{\texttt{(sname = name)}} \texttt{Distribute}$$
$$\texttt{B} \leftarrow \texttt{A} \bowtie_{\texttt{((pname = name) and (Publisher.city = "London"))}} \texttt{Publisher}$$
$$\texttt{Result} \leftarrow \pi_{\texttt{(director)}}(\texttt{B})$$

c.

$$\texttt{RomePublishers} \leftarrow \sigma_{\texttt{(city = "Rome")}}(\texttt{Publisher})$$
$$\texttt{A} \leftarrow \texttt{RomePublishers} \bowtie_{\texttt{((pname = name) and (sname = "Toronto"))}} \texttt{Distribute}$$
$$\texttt{B} \leftarrow \texttt{A} \bowtie_{\texttt{(sname = name)}} \texttt{School}$$
$$\texttt{Result} \leftarrow \pi_{\texttt{(School.name)}}(\texttt{B})$$

d.

$$\texttt{CalgarySchools} \leftarrow \sigma_{\texttt{(city = "Calgary")}}(\texttt{School})$$
$$\texttt{A} \leftarrow \texttt{CalgarySchools} \bowtie_{\texttt{(sname = name)}} \texttt{Distribute}$$
$$\texttt{B} \leftarrow \texttt{A} \bowtie_{\texttt{(A.ISBN = Book.ISBN)}} \texttt{Book}$$
$$\texttt{Result} \leftarrow \pi_{\texttt{(title, count)}}(\texttt{title} f_{\texttt{(COUNT *)}}(\texttt{Titles}))$$

e.

$$\texttt{A} \leftarrow \texttt{Publisher} \bowtie_{\texttt{(name = pname)}} \texttt{Distribute}$$
$$\texttt{B} \leftarrow \texttt{A} \bowtie_{\texttt{(A.city = School.city)}} \texttt{School}$$
$$\texttt{C} \leftarrow \texttt{Book} \bowtie_{\texttt{(Book.ISBN = B.ISBN)}} \texttt{B}$$
$$\texttt{Result} \leftarrow \pi_{\texttt{(title, count)}}(\texttt{title} f_{\texttt{(COUNT *)}}(\texttt{C}))$$

Question 2

a.

todo

b.

todo

c.

todo

d.

todo

e.

todo