Queries in relational algebra

Q1: Suppose a Marvel fan wants to see the names of the characters, who have been embodied by different actors, as well as the name of these actors.

TABLES USED: ACTORS (actorID, name, nationality, dateOfBirth, sex, oscarsWon, charName)

Query: $A \leftarrow \pi_{actorID,\ name,\ charName}\ (ACTORS)$
$\pi_{cName,\ name,\ aName}((A) \bowtie_{charName = cName\ \wedge\ actorID \neq aID}\ \rho_{N\ (cName,\ aID,\ aName)}\ (A))$

Q2: Suppose a Marvel fan wants to see the name and the date of the movies, whose cast involves Chris Evans

TABLES USED: ACTORS (actorID, name, nationality, dateOfBirth, sex, oscarsWon, charName)
MOVIES(movieName, duration, releaseDate, sequenceOfEvents, oscarsWon, budget, boxOffice)
MOVIES_HAVE_CHARACTERS(movieName, charName)

Query: $A \leftarrow \pi_{movieName}(\sigma_{name = \text{“Chris Evans”}}(ACTORS) \bowtie (MOVIES\_HAVE\_CHARACTERS))$
$\pi_{movieName,\ realeaseDate}(A \bowtie MOVIES)$

Q3: Suppose that a Marvel fan is interested in learning about the type and description of events that took place in the first 20, chronologically *, Marvel movies

*The term chronologically refers to the time of the Marvel world and not to real time

TABLES USED: MOVIES(movieName, duration, releaseDate, sequenceOfEvents, oscarsWon, budget, boxOffice)
EVENTS(eventID , type, description, movieName, locationID)

Query: $\pi_{type,\ description}(\sigma_{sequenceOfEvents<=20}(MOVIES) \bowtie (EVENTS))$

Q4: We assume that a Marvel fan is interested in finding out which movies cost over $250,000,000, as well as their profits.

TABLES USED: MOVIES(movieName, duration, releaseDate, sequenceOfEvents, oscarsWon, budget, boxOffice)

Query: $\pi_{movieName,\ budget,\ boxOffice}(\sigma_{budget\ >\ 250.000.000}(MOVIES))$

Q5: We assume that a Marvel fan wants to know the locations and planets where battle has taken place but not death. Both battle and death are considered as events.

TABLES USED: EVENTS(eventID , type, description, movieName, locationID)
LOCATIONS(locationID, name, planet, latitude, longitude)

Query: $A \leftarrow \pi_{type,\ description,\ locationID}\ (EVENTS) \bowtie \pi_{planet,\ locationID,\ name}\ (LOCATIONS)$
$\pi_{planet,\ name}(\sigma_{type\ =\ battle}(A)) - \pi_{planet,\ name}(\sigma_{type\ =\ death}(A))$

Q6: Suppose a Marvel fan wants to see the name of the movie with the longest duration.

TABLES USED: MOVIES(<u>movieName</u>, duration, releaseDate, sequenceOfEvents, oscarsWon, budget, boxOffice)

Query: $A \leftarrow \pi_{MOVIES.movieName,\ MOVIES.duration}(\sigma_{MOVIES.duration < D.duration}(MOVIES \times \rho_{D}(MOVIES))$
$\pi_{MOVIES.movieName,\ MOVIES.duration}(MOVIES) - A$

Q7: Suppose a Marvel fan wants to see the names of the movies, whose cast includes both Robert Downey Jr. and Chris Evans.

TABLES USED: ACTORS(<u>actorID</u>, name, nationality, dateOfBirth, sex, oscarsWon, charName)
MOVIES_HAVE_CHARACTERS(<u>movieName</u>, <u>charName</u>)
MOVIES(<u>movieName</u>, duration, releaseDate, sequenceOfEvents, oscarsWon, budget, boxOffice)

Query: $A \leftarrow \pi_{movieName}(\sigma_{name\ =\ \text{“Robert Downey Jr”}}(ACTORS \bowtie MOVIES\_HAVE\_CHARACTERS))$
$B \leftarrow \pi_{movieName}(\sigma_{name\ =\ \text{“Chris Evans”}}(ACTORS \bowtie MOVIES\_HAVE\_CHARACTERS))$
$A \cap B$

Q8: Suppose a user is interested in finding out the ID and the name of the producer who has appeared in all Marvel Studios Movies.

TABLES USED: MOVIES(<u>movieName</u>, duration, releaseDate, sequenceOfEvents, oscarsWon, budget, boxOffice)
MOVIES_HAVE_PRODUCERS(<u>producerID</u>, <u>movieName</u>)
PRODUCERS(<u>producerID</u>, name, dateOfBirth, sex)

Query: $MOVIES\_HAVE\_PRODUCERS \div \pi_{movieName}(MOVIES)$
$A \leftarrow MOVIES\_HAVE\_PRODUCERS \div \pi_{movieName}(MOVIES)$
$\pi_{name}(PRODUCERS \bowtie A)$

Q9: Suppose a Marvel fan wants to see all the events and specifically their descriptions, in which either death or battle has occurred.

TABLES USED: EVENTS(<u>eventID</u>, type, description, <u>movieName</u>, locationID)

Query: $\pi_{description}(\sigma_{type\ =\ \text{“death”}}(EVENTS) \cup \sigma_{type\ =\ \text{“battle”}}(EVENTS))$