RA1)

$$RA1 := \sigma_{GrossEarnings > 1200000 \text{ AND } GrossEarnings < 1500000}(Movie)$$

RA2)

$$RA2 := \delta\pi_{Person.ID,\ Person.FirstName,\ Person.LastName,\ a1.OscarYear,\ a1.MovieID}\sigma_{a1.ActorID = a2.ActorID \text{ AND } a1.MovieID <> a2.MovieID \text{ AND } a1.OscarOrNot = 'Yes' \text{ AND } a2.OscarOrNot = 'Yes' \text{ AND } Person.ID = a1.ActorID}(\rho_{a1}(Act) \times \rho_{a2}(Act) \times Person)$$

RA3)

$$R := \pi_M\gamma_{MAX(Card.Points)\rightarrow M}(Card)$$

$$RA3 := \pi_{c.ID\rightarrow CardID,\ c.Points,\ p.ID\rightarrow PersonID,\ p.FirstName,\ p.LastName}\ \sigma_{c.ID = Has.CardID \text{ AND } Has.GoerID = p.ID \text{ AND } c.Points \text{ AND } c.Points = R.M}(Has \times \rho_p(Person) \times \rho_c(Card)$$

RA4)

$$R := \pi_M\gamma_{MAX(Movie.GrossEarnings)\rightarrow M}\sigma_{Person.ID = Direct.DirectorID \text{ AND } Direct.MovieID = Movie.ID \text{ AND } Person.FirstName = \text{'Gennadi'}}(Movie \times Person \times Direct)$$

$$RA4 := \sigma_{p.FirstName = \text{'Gennadi'} \text{ AND } p.ID = d.DirectorID \text{ AND } d.MovieID = m.ID \text{ AND } m.GrossEarnings = R.M}(\rho_m(Movie) \times \rho_p(Person) \times \rho_d(Direct))$$

RA5)

$$R := \pi_M\gamma_{MAX(Movie.GrossEarnings)\rightarrow M}(Movie)$$

$$RA5 := \pi_{Movie.ID,\ Movie.Genre,\ Movie.Title}\sigma_{Movie.GrossEarnings >= R.M}(Movie)$$

RA6)

$$RA6 := \pi_{StarFiveOrMore}\gamma_{COUNT(*)\rightarrow StarFiveOrMore}(\pi_{Act.ActorID}\sigma_{X > 5}\gamma_{Act.ActorID,\ Count(Act.ActorID)\rightarrow X}(Act))$$

RA7)

$$R1 := \pi_{Act.ActorID\rightarrow ActorID,\ StarringNum}\gamma_{Act.ActorID,\ COUNT(Act.ActorID)\rightarrow StarringNum}(Act)$$

$$R2 := \pi_M\gamma_{MAX(StarringNum)\rightarrow M}(R1)$$

$$RA7 := \pi_{p.ID,\ p.FirstName,\ p.LastName\rightarrow Amount}\sigma_{p.ID = c.ActorID \text{ AND } c.StarringNum = R2.M}(\rho_p(Person) \times \rho_c(R1))$$

RA8)

$$RA8 := \tau_{Amount\ DESC}\pi_{p.FirstName,\ p.LastName,\ Amount}\ \sigma_{Amount > 150}\gamma_{p.ID,\ p.FirstName,\ p.LastName,\ SUM(t.PaidAmount)\rightarrow Amount}(\sigma_{p.ID = m.GoerID \text{ AND } m.TransactionID = t.ID \text{ AND date LIKE } \text{'\%2015'}}(\rho_m(Make) \times \rho_t(Transaction) \times \rho_p(Person)))$$

RA9)

$R := \delta\pi_{Movie.ID \rightarrow ID}(Movie)$

$RA9 := \pi_{dtr.StudioAffiliation,\ NumOfMovies}\gamma_{dtr.StudioAffiliation,\ COUNT(R.ID) \rightarrow NumOfMovies}(\sigma_{dtr.ID = d.DirectorID\ AND\ d.MovieID = m.ID}(\rho_{dtr}(Director) \times \rho_{d}(Direct) \times \rho_{m}(Movie)))$

RA10)

$R1 := \delta\pi_{Movie.ID \rightarrow ID}(Movie)$

$R2 := \pi_{dtr.StudioAffiliation,\ dtr.ID}\sigma_{Director.StudioAffiliation = dtr.StudioAffiliation\ AND\ Direct.DirectorID = Director.ID\ AND\ Direct.AwardYear\ IS\ NOT\ NULL}(\rho_{dtr}(Director) \times Director \times Direct)$

$R3 := \pi_{E}\gamma_{COUNT(*) \rightarrow E}(R2)$

$RA10 := \pi_{R2.dtr.StudioAffiliation,\ NumOfMovies}\sigma_{COUNT(E) > 0}\gamma_{R2.dtr.StudioAffiliation,\ COUNT(R1.ID) \rightarrow NumOfMovies}\sigma_{R2.dtr.ID = d.DirectorID\ AND\ d.MovieID = m.ID\ AND\ d.Budget >= 7000000}(R2 \times \rho_{d}(Direct) \times \rho_{m}(Movie))$

RA11)

$RA11 := \delta\pi_{m.ID,\ m.Genre,\ m.Title,\ m.ReleaseDate}\sigma_{a.ID = v.GoerID\ AND\ v.MovieTheaterID = t.ID\ AND\ t.ID = s.MovieTheaterID\ AND\ s.MovieID = m.ID}(\rho_{m}(Movie) \times \rho_{a}(Actor) \times \rho_{v}(Visit) \times \rho_{s}(Show) \times \rho_{t}(MovieTheater))$

RA12)

$RA12 := \tau_{ProductsSold}\pi_{cs.MovieTheaterID,\ cs.Type,\ SUM(b.Quantity) \rightarrow ProductsSold}\sigma_{SUM(b.Quantity) > 50}\gamma_{cs.MovieTheaterID,\ cs.Type,\ SUM(b.Quantity)}\sigma_{cs.MovieTheaterID = s.MovieTheaterID\ AND\ cs.Type = s.Type\ AND\ s.ProductID = b.ProductID}(\rho_{cs}(ConcessionStand) \times \rho_{s}(Sold) \times \rho_{b}(Belong))$

RA13)

$RA13 := \tau_{Sales}\pi_{cs.MovieTheaterID,\ cs.Type,\ Sales}\sigma_{Sales > 570}\gamma_{cs.MovieTheaterID,\ cs.Type,\ SUM(t.PaidAmount) \rightarrow Sales}\sigma_{cs.MovieTheaterID = s.MovieTheaterID\ AND\ cs.Type = s.Type\ AND\ s.ProductID = b.ProductID\ AND\ b.TransactionID = t.ID}(\rho_{cs}(ConcessionStand) \times \rho_{s}(Sold) \times \rho_{b}(Belong) \times \rho_{t}(Transaction))$

RA14)

$RA14 := \delta\pi_{t.ID,\ t.Name,\ t.Province}\sigma_{t.ID = s1.MovieTheaterID\ AND\ s1.MovieTheaterID = s2.MovieTheaterID\ AND\ s1.MovieID = m1.ID\ AND\ s2.MovieID = m2.ID\ AND\ m1.Genre = \text{'D'}\ AND\ m2.Genre = \text{'R'}\ AND\ s1.Day = s2.Day}(\rho_{s1}(Show) \times \rho_{s2}(Show) \times \rho_{m1}(Movie) \times \rho_{m2}(Movie) \times \rho_{t}(MovieTheater))$

RA15)

$R1 := \pi_{X,\ t.ID,\ t.Name,\ t.Province,\ t.Screens}\sigma_{X < 10000}\gamma_{YEAR(v.Date),\ SUM(v.Price) \rightarrow X}\sigma_{t.ID = v.MovieTheaterID}(\rho_{v}(Visit) \times \rho_{t}(MovieTheater))$

$R2 := \pi_{E} \gamma_{COUNT(*) \rightarrow E}(R1)$

$RA15 := \pi_{R1.t.ID,\ R1.t.Name,\ R1.t.Province} \sigma_{R.t.Screens >= 4\ AND\ R2.E > 0}(R1)$

RA16)

$RA16 := [\text{Fetch First ROW ONLY}] \tau_{TotSales\ DESC} \pi_{p.Category,\ TotSales} \gamma_{p.Category,\ SUM(p.Price*b.Quantity) \rightarrow TotSales} \sigma_{s.ProductID = p.ID\ AND\ p.ID = b.ProductID}(\rho_{s}(Sold) \times \rho_{p}(Product) \times \rho_{b}(Belong))$