CSC343 Assignment 1
Yi Fan Shao #1000084151
CDF ID: c5shaoyi

Part I: Queries

1. $\Pi_{lname}(\text{Athelete} \bowtie_{\text{Athelete.AID} \neq \text{Result.AID}} \text{Result})$

2. NoParticipate := $\text{Athelete} \bowtie_{\text{Athelete.AID} \neq \text{Result.AID}} \text{Result}$

Nomedal := $\sigma_{medal=\text{"nomedal"}} \text{Result}$

Π_{lname} (NoParticipate ⋈ Nomedal)

3. NoSamePlace := $\sigma_{E1.SID \neq E2.SID} [(\rho_{E1} \text{Event}) \times (\rho_{E2} \text{Event})]$

NoSamePlaceTaken := NoSamePlace ⋈ Result

$\Pi_{sname}\ \sigma_{NoSamePlaceTaken.SID=Stadium.SID}$ NoSamePlaceTaken × Stadium

4. CompetedAthelete := $\text{Athelete} \bowtie_{\text{Athelete.AID=Result.AID}} \text{Result}$

$\Pi_{sport}\ \sigma_{cname=\text{"Canada"}}$ CompetedAthelete

5. SwimmerGold := $\Pi_{AID,\ fname,\ lname,\ gold}\ \sigma_{sport=\text{"swimming"}}$ Athelete

notMost(fname, lname) := $\Pi_{fname,\ lname}\ \sigma_{S1.gold<S2.gold} [(\rho_{S1}\text{SwimmerGold}) \times (\rho_{S2}\text{SwimmerGold})]$

MostGold(fname, lname) := $(\Pi_{fname,\ lname}\ \text{Athelete}) - \text{notMost}$

6. HaveMedal(CID) := $\Pi_{CID}\ \sigma_{(A1.CID=A2.CID)\cap(A1.gold>0)\cap(A1.silver>0)\cap(A1.bronze>0)} [(\rho_{A1}\text{Athelete}) \times (\rho_{A2}\text{Athelete})]$

Π_{cname} HaveMedal ⋈ Country

7. notEarliest(EID) := $\Pi_{EID}\ \sigma_{(T1.dateIssued>T2.dateIssued)\cap(T1.timeIssued>T2.timeIssued)} [(\rho_{T1}\text{Ticket}) \times (\rho_{T2}\text{Ticket})]$

Earliest(EID) := $(\Pi_{EID}\text{Ticket}) - \text{notEarliest}$

WinningAthelete := $\text{Result} \bowtie_{medal=\text{"gold"}} \text{Earliest}$

WinningCountry := Athelete ⋈ WinningAthelete

Π_{cname} (Country ⋈ WinningCountry)

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8. MexicanAtheletes := $\sigma_{(Country.CID=Athelete.CID)\cap(Country.cname=\text{"Mexico"})}$ Athelete ⋈ Country

Cannot be expressed

9. SameDayTicket := $\sigma_{(T1.EID=T2.EID)\cap(T1.dateIssued=T2.dateIssued)}$ [(ρ_{T1}Ticket) × (ρ_{T2}Ticket)]

$\Pi_{Event.sport}$ $\sigma_{Event.EID=SameDayTicket.EID}$ (Event ⋈ SameDayTicket)

10. notMostGold := $\sigma_{A1.gold<A2.gold}$ [(ρ_{A1}Athelete) × (ρ_{A2}Athelete)]

MostGold := Athelete – notMostGold

$\Pi_{MostGold.fname,\ MostGold.lname,\ Country.cname,\ MostGold.gold}$ (MostGold ⋈ Country)

11. Cannot be expressed

12. soldTicket(EID) := Π_{EID} $\sigma_{Event.EID=Ticket.EID}$ (Event ⋈ Ticket)

notsoldTicket(EID) := (Π_{EID}Event) – soldTicket

noTicketAthelete(AID) := $\Pi_{Result.AID}$ σ (Result ⋈ notsoldTicket)

$\Pi_{Athelete.fname,\ Athelete.lname}$ (Athelete ⋈ noTicktAthelete)

Part II: Additional Integrity Constraints

1. $\sigma_{(R1.AID=R2.AID)\cap(R1.medal\neq R2.medal)}$ [(ρ_{R1}Result) × (ρ_{R2}Result)] = ∅

2.$\sigma_{(Ticket.EID=Event.EID)\cap(Ticket.dateIssued>Event.date)\cap(Ticket.timeIssued>Event.time)}$(Ticket × Event) = ∅

3. Cannot be expressed

4. Qualified(AID, sport) := $\Pi_{Event.AID,\ Event.sport}$(Event ⋈ Result)

$\sigma_{(Qualified.AID=Athelete.AID)\cap(Qualified.sport\neq Athelete.sport)}$(Qualified × Athelete) = ∅