

Possible Unproved Queries...

- Find the name and telephone numbers of all members who reserved both a “squash court” and a “tennis court” on the same day.

(i) First get the squash reservations. Let S be memberID and date for squash reservation:

$$S = \pi_{\text{date, member}} (\text{CourtReservation} \bowtie_{\text{court} = \text{number}} (\sigma_{\text{type} = \text{'S'}}(\text{Court})))$$

(ii) Now get the tennis reservations. Let T be memberID and date for tennis reservation:

$$T = \pi_{\text{date, member}} (\text{CourtReservation} \bowtie_{\text{court} = \text{number}} (\sigma_{\text{type} = \text{'T'}}(\text{Court})))$$

(iii) Now find members name and tel. who reserved each type of court on the same day

$$\pi_{\text{name, telephone}} (\text{Member} \bowtie_{\text{memberID} = \text{S.member}} ((S) \bowtie_{\text{S.member} = \text{T.member} \wedge \text{S.date} = \text{T.date}} (T)))$$

- Find the names all of the instructors who have ever taught a “tummy tightener” class in the past but are not currently teaching it.

(i) First find instructors who taught or are teaching a “tummy tightner” class

$$\text{All} = \pi_{\text{instructor}} ((\text{Class}) \bowtie_{\text{type} = \text{typeCode}} (\sigma_{\text{description} = \text{'tummy tightener'}} (\text{ClassType})))$$

(ii) Now get instructors who are currently teaching tummy tightener

$$\text{Current} = \pi_{\text{instructor}} ((\sigma_{\text{startDate} \leq \text{CurrentDate} \wedge \text{CurrentDate} \leq \text{endDate}} (\text{Class})) \bowtie_{\text{type} = \text{typeCode}} (\sigma_{\text{description} = \text{'tummy tightener'}} (\text{ClassType})))$$

(iii) Get names of instructors who taught but are not currently teaching “tummy tightener” class

$$\pi_{\text{name}} ((\text{Employee}) \bowtie_{\text{employeeID} = \text{instructor}} (\text{All} - \text{Current}))$$

- Find the first name of the sales representative who did not sell a membership in December but sold at least two memberships in January. The membership starts on the day it is sold. (Hint: to sell a membership, the membership price must be greater than zero – therefore, trial memberships are not considered.)

(i) First find the reps who sold memberships in December

$$D = \pi_{\text{salesRep}} ((\sigma_{\text{Month}(\text{startDate}) = 12} (\text{Membership})) \bowtie_{\text{type} = \text{typeCode}} (\sigma_{\text{price} > 0} (\text{MembershipType})))$$

(ii) Then find the reps who sold at least two memberships in January

$$J = \pi_{\text{salesRep}} (\sigma_{\text{membershipID} \neq \text{membershipID1}} ($$

$$(\pi_{\text{salesRep, membershipID}} ((\sigma_{\text{Month}(\text{startDate}) = 1} (\text{Membership})) \bowtie_{\text{type} = \text{typeCode}} (\sigma_{\text{price} > 0} (\text{MembershipType}))) \bowtie$$

$$\pi_{\text{salesRep, membershipID1}} ((\sigma_{\text{Month}(\text{startDate}) = 1} (\rho_{\text{membershipID} \rightarrow \text{membershipID1}} (\text{Membership}))) \bowtie_{\text{type} = \text{typeCode}} (\sigma_{\text{price} > 0} (\text{MembershipType}))))$$

(iii) Then subtract the reps who sold in December from the January group to get the reps who sold in January but not in December.

$$\pi_{\text{name}} ((\text{Employee}) \bowtie_{\text{employeeID} = \text{salesRep}} (J - D))$$

4. Find the name of the fitness instructor who is currently teaching both a “spinning” and a “step” class.
- (i) Find instructors who are currently teaching a spinning class
- $$C1 = \pi_{\text{instructor}}((\sigma_{\text{startDate} \leq \text{CurrentDate} \wedge \text{CurrentDate} \leq \text{endDate}}(\text{Class})) \bowtie_{\text{type} = \text{typeCode}}(\sigma_{\text{description} = \text{'spinning'}}(\text{ClassType})))$$
- (ii) Find instructors who are currently teaching a step class
- $$C2 = \pi_{\text{instructor}}((\sigma_{\text{startDate} \leq \text{CurrentDate} \wedge \text{CurrentDate} \leq \text{endDate}}(\text{Class})) \bowtie_{\text{type} = \text{typeCode}}(\sigma_{\text{description} = \text{'step'}}(\text{ClassType})))$$
- (iii) Join them on instructor and get the name (or get their intersection)
- $$\pi_{\text{name}}((C1 \cap C2) \bowtie_{\text{instructor} = \text{employeeID}}(\text{Employee}))$$
5. Find the name and telephone numbers of all members who played squash and took a spinning class on the same day.
- (i) Get the memberID and date for members who played squash on one day.
- $$SQ = \pi_{\text{member, date}}((\sigma_{\text{type} = \text{'S'}}(\text{Court})) \bowtie_{\text{number} = \text{court}}(\text{CourtReservation}))$$
- (ii) Get the memberID and date for members who took a spinning class on one day.
- $$SP = \pi_{\text{member, date}}(((\text{Class}) \bowtie_{\text{type} = \text{typeCode}}(\sigma_{\text{description} = \text{'spinning'}}(\text{ClassType})) \bowtie \text{ClassReservation}))$$
- (iii) perform a natural join between these (or use intersection) and join with member info to extract name and telephone numbers.
- $$\pi_{\text{name, telephone}}((SQ \cap SP) \bowtie_{\text{member} = \text{memberID}}(\text{Member}))$$
6. Find the number and description of all squash courts that were not reserved from January 10, 2008 to January 12, 2008.
- (i) Find all squash courts reserved within this interval
- $$S = \pi_{\text{number, type, description}}(\sigma_{\text{type} = \text{'S'}}(\text{CourtType}) \bowtie_{\text{number} = \text{court}}(\sigma_{\text{tdate} \geq \text{'2008-01-10'} \wedge \text{date} \leq \text{'2008-01-12'}}(\text{CourtReservation})))$$
- (ii) Subtract these courts from the set of all squash courts
- $$\pi_{\text{number, description}}(\sigma_{\text{type} = \text{'S'}}(\text{CourtType}) - S)$$
7. Find the name of the instructors who taught the first classes the first week that they were ever offered. (Hint: start-date identifies the week when a class that is offered starts)
- (i) First find when the first courses were offered (similar to finding current session but other end of interval.)
1. Create two relations using the same relation only get type, level, instructor, startDate fields – differentiate the date fields and instructor fields
- $$\text{Class1} = \pi_{\text{type, level, instructor, startDate}}(\text{Class})$$
- $$\text{Class2} = \pi_{\text{type, level, instructor1, startDate1}}(\rho_{\text{instructor, startDate}} \rightarrow \text{instructor1, startDate1}(\text{Class}))$$
2. Use these to get the earliest date for each class
- $$\text{Earliest} = \text{Class1} - (\pi_{\text{type, level, instructor, startDate}}((\text{Class1}) \bowtie_{\text{startDate} > \text{startDate1}}(\text{Class2})))$$
3. Now get the instructor for the earliest class
- $$\pi_{\text{name}}((\text{Class}) \bowtie_{\text{instructor} = \text{employeeID}}(\text{Employee}))$$