

## Exercise 1

- The following relations are given (primary keys are underlined):
  - COMPETITION(CompetitionId, CName, Place, Date, Discipline)
  - ATHLETE(AthleteId, AName, State, SAId, BirthDate)
  - SPORT\_ASSOCIATION(SAId, SAName, Address, City)
  - PARTICIPATION(CompetitionId, AthleteId, Rank, Time)

1

- Assume the following cardinalities:

- card(COMPETITION)  $\approx 10^5$  tuples
  - COMPETITION.Discipline: 100 distinct values
  - MIN(COMPETITION.Date) = 1/1/1998
  - MAX(COMPETITION.Date) = 31/12/2007
- card(ATHLETE)  $\approx 10^4$  tuples
  - ATHLETE.State: 100 distinct values
  - MIN(ATHLETE.BirthDate)=1/1/1970
  - MAX(ATHLETE.BirthDate)=31/12/1990
- card(SPORT\_ASSOCIATION)  $\approx 10^3$  tuples
- card(PARTICIPATION)  $\approx 4 * 10^6$  tuples
  - MIN(PARTICIPATION.Rank)=1
  - MAX(PARTICIPATION.Rank)=40
- Selectivity HAVING COUNT(\*)  $\geq 5$  equal to  $\frac{1}{10}$

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## Query 1

```
SELECT SAName, City, COUNT(*)
FROM SPORT_ASSOCIATION S, ATHLETE A
WHERE S.SAId = A.SAId
and State = 'Italy'
and BirthDate > 1979
and AthleteId IN
  (SELECT AthleteId
   FROM COMPETITION C, PARTICIPATION P
   WHERE C.CompetitionId = P.CompetitionId
   and Discipline= 'Breaststroke'
   and Date  $\geq$  2003
   and Rank  $\geq$  8
   GROUP BY AthleteId
   HAVING COUNT(*)  $\geq$  5 )
GROUP BY S.SAId, SAName, City;
```

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## Exercise 2

- The following relations are given (primary keys are underlined):
  - COURSE (IdC, NameC, Level)
  - LESSON (IdL, IdA, #Members, Date, Duration)
  - MEMBERS (MemberId, SocialSecurityNumber, ReleaseDate, BirthDate, Name, Surname)
  - REGISTRATION (MemberId, IdL, Date, Deposit)

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- Assume the following cardinalities:

- card(COURSE)  $\approx 10^2$  tuples
- card(LESSON)  $\approx 10^6$  tuples
  - MIN(LESSON.Duration)= 30
  - MAX(LESSON.Duration)= 360
- card(MEMBER)  $\approx 10^5$  tuples
  - MIN(MEMBER.BirthDate) = 1/1/1945
  - MAX(MEMBER.BirthDate) = 31/12/1995
- card(REGISTRATION)  $\approx 10^8$  tuples
- Selectivity HAVING COUNT(\*)  $\geq 5$  equal to  $\frac{1}{10}$

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## Query 1

```
SELECT M.Name, M.Surname
FROM MEMBER M, REGISTRATION R
WHERE M.MemberId = R.MemberId
and M.Birthdate = 1980
and NOT EXISTS
  (SELECT *
   FROM LESSON L
   WHERE L.IdL=R.IdL
   and Duration  $\leq$  45)
GROUP BY M.MemberId, M.Name, M.Surname
HAVING COUNT(*)  $\geq$  5;
```

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