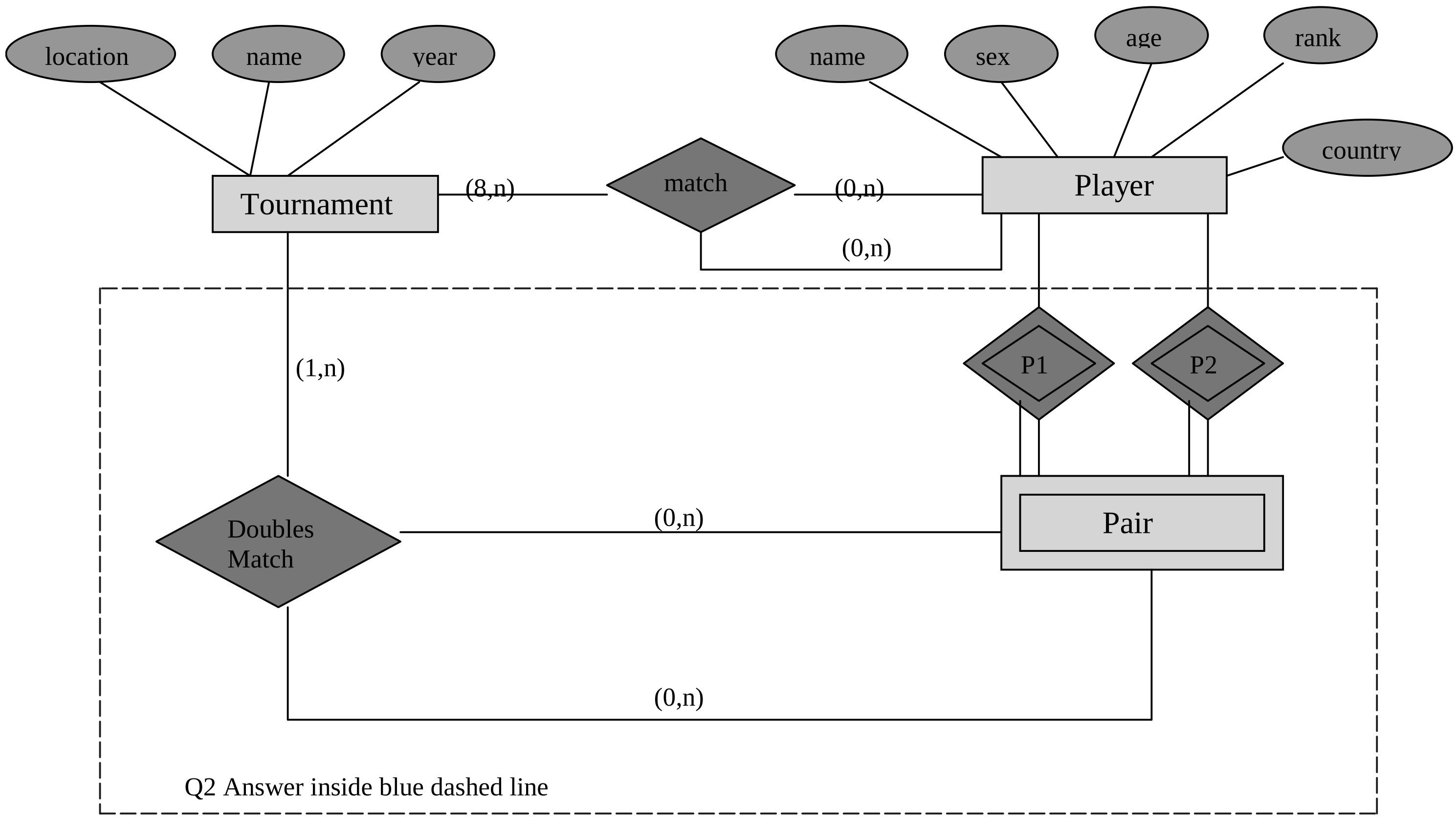
COMP231-- Database Management Systems
Summer 00 Quiz1 Module Solution

Part1: ER Data Model

Q1 & Q2:



Assumptions: It's possible that a player does not play in any match. The doubles players must be a pair (not related palyers).

Q3:

a) True.
Refer the answer of question 2. The weak entity pair has two identifying relationship types with the same entity type player.

b) Ture.
The three binary relationship types have to be identifying relationship types.
Refer Supply ternary relationship type in the text book.

c) True.
For example, Let the foreign key (FK) in relation R be the prime key (PK) in relation S.
Following query:

```
Select *
From S
Where S.PK = val
```

val is the value of FK in R. If above query results in NULL, the relational integrity constraint is violated.

d) True.
   Both tuple relational calculus and SOL are relational complete language.

Part II: Relational Algebra, SQL and Tuple Relational Calculs.

Q4:

- Retrieve the name and rank of players who represent Hong Kong.

  { P.Name, P.Rank | PLAYER(P) AND P.Country = 'Hong Kong'}

- Retrieve the names of players from Hong Kong who won a match in Wimbledon 2000.

  { P.Name1 | PLAYER(P) and P.Country ='Hong Kong' and ∃m (MATCH(m) AND m .Name1 = P.Name) AND ∃t (TOURNAMENT(t) AND t .TID = m .TID AND t .Tname = ' Wimbledon' AND t .Year = '2000')}

Q5:

```
Update PLAYER
Set RANK = 1
Where Name in (
    Select distinct Name1
    From MATCH m, TOURNAMENT t
    Where m .TID = t .TID AND
          t .Tname = 'Wimbledon' and T.Year = '2000'
    minus
    Select distinct Name2
    From MATCH m, TOURNAMENT t
    Where m .TID = t .TID AND
          t .Tname = 'Wimbledon' and T.Year = '2000')
```

or

```
Update PLAYER
Set RANK = 1
Where Name not in (
    Select distinct Name2
    From MATCH m, TOURNAMENT t
    Where m .TID = t .TID AND
          t .Tname = 'Wimbledon' and T.Year = '2000')
```

Q6:

- List player names with age greater than 20 from Hong Kong.

  RA: $\Pi_{\text{Name}}\ \sigma_{(\text{Age} > 20 \text{ AND Country = 'Hong Kong'})}$ (PLAYER)

  SQL:
  ```
  Select Name
  From PLAYER
  Where Age > 20 AND Country = 'Hong Kong'
  ```

- List the name of players who played a match in Wimbledon 2000.

RA: Π_{Name1} (MATCH $*_{\text{TID}}$ $\sigma_{\text{(Tname = 'Wimbledon' AND Year = '2000')}}$ (TOURNAMENT))
U
Π_{Name2} (MATCH $*_{\text{TID}}$ $\sigma_{\text{(Tname = 'Wimbledon' AND Year = '2000')}}$ (TOURNAMENT))

SQL:

```
Select Name1
From MATCH m, TOURNAMENT t
Where m.TID =  t .TID AND Tname  = 'Wimbledon' and T.Year = '2000'
UNION
Select Name2
From MATCH m, TOURNAMENT t
Where m.TID =  t .TID AND Tname  = 'Wimbledon' and T.Year = '2000'
```

- List the player names and the number of matches they won in Wimbledon 2000.

RA: ${}_{\text{Name1}}\mathfrak{I}_{\text{count(Name1)}}$ (MATCH $*_{\text{TID}}$ $\sigma_{\text{(Tname = 'Wimbledon' AND Year = '2000')}}$ (TOURNAMENT))

SQL:

```
Select Name1, count(*)
From MATCH m, TOURNAMENT T
Where m .TID = t .TID AND
        Tname = 'Wimbledon' AND
        Year = '2000'
Group by Name1
```