

# Database project - deliverable 1

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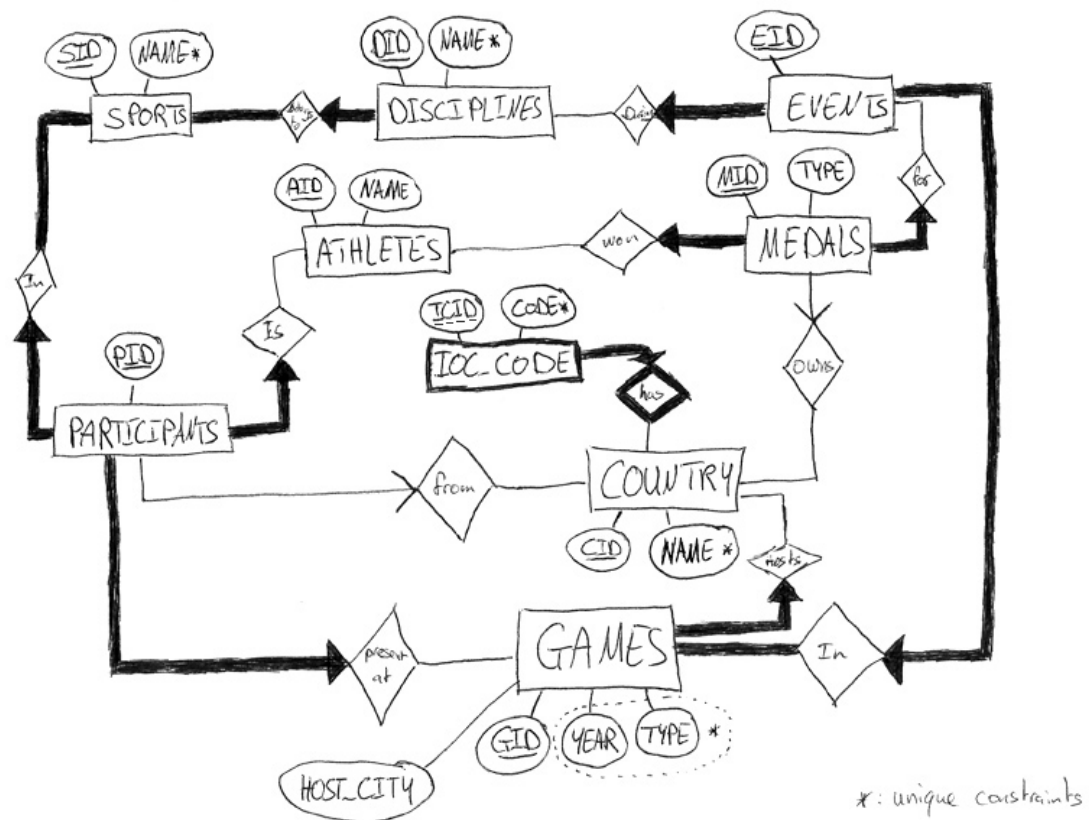
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March 24<sup>th</sup> 2013

## Deliverable 1

### 1 ER model



### 2 Tables creation

```
1 CREATE TABLE COUNTRIES
2 (
3   CID INTEGER NOT NULL
4   , NAME VARCHAR2(50) NOT NULL
5   , PRIMARY KEY ( CID )
6   , CONSTRAINT unique_country_name UNIQUE ( NAME )
7 );
```

```

8
9 CREATE TABLE IOC_CODE
10 (
11     ICID INTEGER NOT NULL
12 , CODE CHAR(3) NOT NULL
13 , CID INTEGER NOT NULL
14 , PRIMARY KEY ( ICID )
15 , FOREIGN KEY ( CID ) REFERENCES COUNTRIES( CID ) ON DELETE CASCADE
16 , CONSTRAINT unique_ioc_code_name UNIQUE ( CODE )
17 );
18
19 CREATE TABLE SPORTS
20 (
21     SID INTEGER NOT NULL
22 , NAME VARCHAR2(100) NOT NULL
23 , PRIMARY KEY ( SID )
24 , CONSTRAINT unique_sport_name UNIQUE ( NAME )
25 );
26
27 CREATE TABLE ATHLETES
28 (
29     AID INTEGER NOT NULL
30 , NAME VARCHAR2(200) NOT NULL
31 , PRIMARY KEY ( AID )
32 );
33
34 CREATE TABLE DISCIPLINES
35 (
36     DID INTEGER NOT NULL
37 , NAME VARCHAR2(200) NOT NULL
38 , SID INTEGER NOT NULL
39 , PRIMARY KEY ( DID )
40 , FOREIGN KEY ( SID ) REFERENCES SPORTS( SID )
41 , CONSTRAINT unique_discipline UNIQUE ( NAME, SID )
42 );
43
44 CREATE TABLE GAMES
45 (
46     GID INTEGER NOT NULL
47 , YEAR INTEGER NOT NULL
48 , TYPE VARCHAR2(50) NOT NULL
49 , HOST_CITY VARCHAR2(200) NOT NULL
50 , CID INTEGER NOT NULL
51 , PRIMARY KEY ( GID )
52 , FOREIGN KEY ( CID ) REFERENCES COUNTRIES( CID )
53 , CONSTRAINT unique_game UNIQUE ( YEAR, TYPE )
54 );
55
56 CREATE TABLE EVENTS
57 (
58     EID INTEGER NOT NULL
59 , GID INTEGER NOT NULL
60 , DID INTEGER NOT NULL
61 , PRIMARY KEY ( EID )
62 , FOREIGN KEY ( GID ) REFERENCES GAMES( GID )
63 , FOREIGN KEY ( DID ) REFERENCES DISCIPLINES( DID )
64 , CONSTRAINT unique_event UNIQUE ( GID, DID )
65 );
66
67 CREATE TABLE PARTICIPANTS
68 (
69     PID INTEGER NOT NULL
70 , AID INTEGER NOT NULL
71 , CID INTEGER
72 , GID INTEGER NOT NULL
73 , SID INTEGER NOT NULL
74 , PRIMARY KEY ( PID )
75 , FOREIGN KEY ( AID ) REFERENCES ATHLETES(AID)
76 , FOREIGN KEY ( CID ) REFERENCES COUNTRIES(CID)

```

```

77 , FOREIGN KEY ( GID ) REFERENCES GAMES(GID)
78 , FOREIGN KEY ( SID ) REFERENCES SPORTS(SID)
79 , CONSTRAINT unique_participant UNIQUE ( AID, CID, GID, SID )
80 );
81
82 CREATE TABLE MEDALS
83 (
84     MID INTEGER NOT NULL
85 , TYPE VARCHAR2(50) NOT NULL
86 , CID INTEGER
87 , EID INTEGER NOT NULL
88 , AID INTEGER NOT NULL
89 , PRIMARY KEY ( MID )
90 , FOREIGN KEY ( CID ) REFERENCES COUNTRIES(CID)
91 , FOREIGN KEY ( AID ) REFERENCES ATHLETES(AID)
92 , FOREIGN KEY ( EID ) REFERENCES EVENTS(EID)
93 , CONSTRAINT unique_medalist UNIQUE ( CID, EID, AID )
94 );

```

---

### 3 Remarks

- Athletes is the entity that stores the information of an athlete who can then participate in multiple sports or games. Which means that if an Athlete competes twice he will have only one entry in the ATHLETES table but two in the PARTICIPANTS table.
  - Each game should at least have one event otherwise nothing happened during he games. The same applies to sports, a sport must have at least one participant, otherwise the sport never took place during any games.
  - Countries, sports and disciplines must have a unique name as the opposite would have no sense. For games it is the pair (YEAR,TYPE) that must be unique.
  - Due to problem with their federations some athletes may present themselves without representing a country.
  - Some medals could not be associated to a country as some athletes aren't as for the above point.
  - The numbers of countries, athletes and events for a given game isn't stored in the GAMES entity as they can be easily computed using some COUNT query.
  - The names of the events, disciplines and games are not stored as they are only the concatenation of information stored in other tables.
- 

## Deliverable 2

### Modifications

We had to slightly modify our model as we forced each athlete to have a binding participant, but we noticed that there is a quite big amount of them that do not. Therefore, we decided to slightly change our ER-model as to allow athletes to not have a binding participant. No change to the table creation code was needed as it is not possible to represent the "at least" constraint.

## Data import

We chose to import the data using Java. We decided that any data that would generate a non-existent foreign key would be dropped as would any inconsistent incomplete data (i.e. medals without color)

## Queries

A) Simple query using multiple ANDs

```
1  SELECT DISTINCT A.NAME
2  FROM ATHLETES A, MEDALS M1, MEDALS M2, EVENTS E1, EVENTS E2, GAMES G1, GAMES
   G2
3  WHERE A.AID = M1.AID
4  AND A.AID = M2.AID
5  AND M1.MID <> M2.MID
6  AND E1.EID = M1.EID
7  AND E2.EID = M2.EID
8  AND G1.GID = E1.GID
9  AND G2.GID = E2.GID
10 AND G1.TYPE <> G2.TYPE
```

B) We have an outer-query which seeks gold medalist in sports that appear in the nested query, which computes all sports that have appeared only once

```
1  SELECT A.NAME AS ANAME, S.NAME AS SNAME
2  FROM SPORTS S, DISCIPLINES D, EVENTS E, ATHLETES A, MEDALS M
3  WHERE A.AID = M.AID
4  AND M.TYPE = 'Gold'
5  AND M.EID = E.EID
6  AND E.DID = D.DID
7  AND D.SID = S.SID
8  AND S.SID IN (
9      SELECT S2.SID
10     FROM SPORTS S2, DISCIPLINES D2, EVENTS E2, GAMES G
11     WHERE S2.SID = D2.SID
12     AND D2.DID = E2.DID
13     AND E2.GID = G.GID
14     GROUP BY S2.SID
15     HAVING Count(*)=1
16 )
17 ORDER BY A.NAME
```

C) We retrieve the minimum year in which each country won its first medal using a subquery and then use a simple query to get the place hosting the corresponding games.

```
1  SELECT DISTINCT C.NAME, G.HOST_CITY
2  FROM COUNTRIES C, MEDALS M, EVENTS E, GAMES G, (
3      SELECT C2.CID, MIN( G2.YEAR ) AS MIN_YEAR
4      FROM COUNTRIES C2, MEDALS M2, EVENTS E2, GAMES G2
5      WHERE C2.CID = M2.CID
6      AND M2.EID = E2.EID
7      AND E2.GID = G2.GID
8      GROUP BY C2.CID
9  ) TMP
10 WHERE C.CID = M.CID
11 AND M.EID = E.EID
12 AND E.GID = G.GID
13 AND C.CID = TMP.CID
14 AND G.YEAR = TMP.MIN_YEAR
15 ORDER BY C.NAME
```

D) We unite (UNION) two same queries using "Summer" for one and "Winter" for the other and compute the number of medals for each country given the type (Summer or Winter), we then order them despondingly and limit the table to 1

```

1  (
2      SELECT COUNT(M.CID) AS MAXIMUM, C.NAME, G.TYPE
3      FROM COUNTRIES C, GAMES G, EVENTS E, MEDALS M
4      WHERE C.CID = M.CID
5      AND M.EID = E.EID
6      AND E.GID = G.GID
7      AND G.TYPE = 'Summer'
8      GROUP BY C.NAME
9      ORDER BY MAXIMUM DESC
10     LIMIT 1
11 ) UNION (
12     SELECT COUNT(M.CID) AS MAXIMUM, C.NAME, G.TYPE
13     FROM COUNTRIES C, GAMES G, EVENTS E, MEDALS M
14     WHERE C.CID = M.CID
15     AND M.EID = E.EID
16     AND E.GID = G.GID
17     AND G.TYPE = 'Winter'
18     GROUP BY C.NAME
19     ORDER BY MAXIMUM DESC
20     LIMIT 1
21 )

```

E) Simple GROUP BY + HAVING query

```

1  SELECT G.HOST_CITY
2  FROM GAMES G
3  GROUP BY G.HOST_CITY
4  HAVING COUNT(*) > 1
5  ORDER BY G.HOST_CITY

```

F) We use two table of participants and two tables for countries and then just use ANDs to make find the athletes that competed for at least two countries

```

1  SELECT DISTINCT(A.NAME)
2  FROM ATHLETES A, PARTICIPANTS P1, PARTICIPANTS P2, COUNTRIES C1, COUNTRIES C2
3  WHERE A.AID = P1.AID
4  AND A.AID = P2.AID
5  AND P1.PID <> P2.PID
6  AND P1.CID = C1.CID
7  AND P2.CID = C2.CID
8  AND C1.CID <> C2.CID
9  ORDER BY A.NAME

```

G) The subquery computes the participants count for each country for a particular games. Then, for each game, the outer-query finds the countries having a participants count greater than all the results of the subquery.

```

1  SELECT G.YEAR, G.TYPE, C.NAME, COUNT(*) AS COUNT
2  FROM COUNTRIES C, PARTICIPANTS P, GAMES G
3  WHERE G.GID = P.GID AND C.CID=P.CID
4  GROUP BY P.GID, P.CID
5  HAVING COUNT(*) >= ALL (
6      SELECT COUNT(*)
7      FROM PARTICIPANTS P2
8      WHERE P.GID=P2.GID
9      GROUP BY P2.GID, P2.CID
10 )
11 ORDER BY G.YEAR

```

H) We simply take the COUNTRIES and use a nested query to delete all entries that do not appear in the MEDALS table

```

1  SELECT DISTINCT C.NAME
2  FROM COUNTRIES C
3  WHERE C.CID NOT IN (
4      SELECT M.CID
5      FROM MEDALS M
6      WHERE M.CID IS NOT NULL
7  )

```

# Front-end

Our web front-end is available at <http://db.tamere.ch/>. It was made using PHP and MySQL.

The screenshot shows the 'Insert data' page of a web application. At the top, there is a dark navigation bar with links: 'Database project', 'Search', 'Insert', and 'Deliverable 2'. Below the navigation bar, the page title 'Insert data' is displayed. Underneath the title, there are several tabs: 'Athlete', 'Participant', 'Sport', 'Discipline', 'Event', 'Medal', 'Game', 'Country', and 'Country code'. The 'Athlete' tab is currently selected. The form contains four input fields: 'Athlete' (text input with 'rensch'), 'Country' (dropdown menu with 'Ladislau Lovrensch' selected), 'Game' (dropdown menu with 'Rene Rensch' selected), and 'Sport' (dropdown menu with 'Air sports' selected). Below the form, there is a blue 'Save' button.

The insertion page

The screenshot shows the 'Search' page of the same web application. The navigation bar is identical. The page title 'Search' is displayed. Below the title, there is a search input field with 'Men' entered and a blue 'Search' button. Underneath the search bar, there are several tabs: 'Athletes', 'Sports', 'Disciplines', 'Games', and 'Countries'. The 'Athletes' tab is currently selected. Below the tabs, the text '704 results' is displayed. A table with 9 rows is shown, listing search results. Each row has a '#' column, a 'Name' column, and a magnifying glass icon in the rightmost column.

#	Name	
1	1200m Freestyle Men	Q
2	500m Freestyle Men	Q
3	Alpine skiing - Men's giant slalom	Q
4	Badminton - Men's doubles	Q
5	Badminton - Women's doubles	Q
6	Double York Round Men	Q
7	Figure skating - Men's singles	Q
8	Men's Tumbling	Q
9	Men's 1 Mile Freestyle	Q

The search page

## Query A

Print the names of athletes who won medals at both summer and winter Olympics.

[Show SQL](#)

10 results fetched in 0.168 seconds

#	Name
1	Gillis Grafström
2	Pekka Niemi
3	Marielle Goitschel
4	Jean Saubert
5	Christine Goitschel
6	Gunnar Larsson
7	Vladimir Smirnov
8	Christa Rothenburger
9	Elena Petrova
10	Clara Hughes

The result of one of the queries