

Homework 2

Due on **Friday, October 13, 2017 at 11:59 PM**

Submit **2-FirstLastName.pdf** and **2-FirstLastName-Lab.txt** through Canvas

Topics: Relational Algebra and SQL Queries

Instructions:

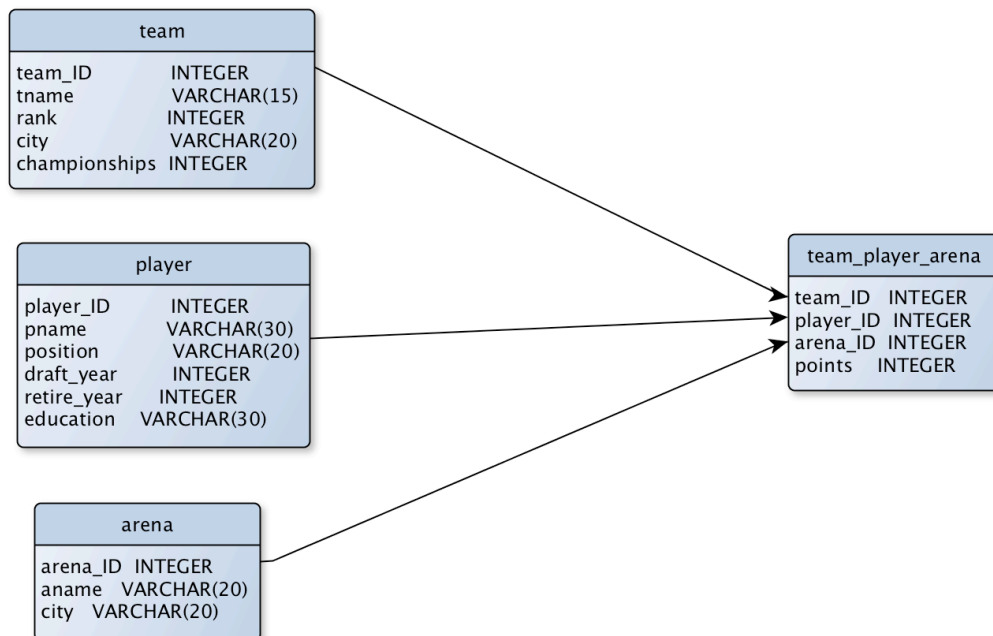
- Complete Section 1 and submit *2-FirstLastName-Lab.txt*
- Complete Section 2 and submit *2-FirstLastName.pdf*

Section 1:

This section covers the practical implementation of a database schema using DDL and SQL queries (50 points).

- Login in to the Linux Oracle server and access the database using *sqlplus* (refer to Oracle Linux Server Instructions)
- Display the SQL commands using: SET ECHO ON
- Create your homework submission log file using: SPOOL *2-FirstLastName-Lab.txt* command
- To terminate log file after working on parts A) and B) use: SPOOL OFF command

A) Using the nba.sql script file provided, create the below NBA schema. (5 points).



- The *team* table has a *team_id* primary key
- The *player* table has a *player_id* primary key
- The *arena* table has an *arena_id* primary key

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- The *team_play_arena* table has a (*team_id*, *player_id*, *arena_id*) composite primary key
- The *team_play_arena* table has a *team_id* foreign key column that references the *team* table
- The *team_play_arena* table has a *player_id* foreign key column that references the *player* table
- The *team_play_arena* table has a *arena_id* foreign key column that references the *arena* table

B) Write and run the following queries (45 points)

1. Print the *player_ids* and names of players of Point guards drafted after the year 2000 (5 points)
2. Print the name and city of arenas that hosted a team from LA (5 points)
3. Print the names of arenas that hosted a team from Charlotte and hosted a Shooting guard. Do this query in two ways:
 - (i) as a flat select (5 points)
 - (ii) completely nested, i.e., using sub queries so as to avoid all JOIN clauses (10 points)
4. Print the names of arenas that hosted a team from Charlotte but did not host a Shooting guard (5 points)
5. Print the *player_id* and average points scored of players who scored an average of points that is greater than the average of points scored in arena 1 (5 points)
6. Print the arena name & city of arenas that did not host the Bulls team (5 points)
7. Print the names of all retired players (5 points)

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Section 2:

This section covers relational algebra (50 points).

(A) Consider the following schema:

Suppliers(sid: *integer*, sname: *varchar*(20), address: *varchar*(50))

Parts(pid: *integer*, pname: *varchar*(20), color: *varchar*(15))

Catalog(sid: *integer*, pid: *integer*, cost: *real*)

- The key fields are underlined
- Domains of each field are listed after field name
- The Catalog relation lists prices charged for parts by Suppliers

Write the following queries in relational algebra (30 points):

(i) Find the *names* of suppliers who supply some blue part

(II) Find the *sids* of suppliers who supply some blue or red part

(III) Find the *sids* of suppliers who supply some blue part and some red part

(iv) Find the *sids* of suppliers who supply every blue part

(v) Find the *pids* of parts supplied by every supplier at less than \$50. (If a supplier either does not supply the part or charges more than \$50, the part is not selected.)

(vi) Find the *sids* of suppliers who do not supply a red part

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(B) Consider the following schema:

PLAYER			
PlayerID	Name	Birth_dt	Draft_year
1204	Chris Paul	May, 1985	2005
1392	Derek Fisher	Aug, 1974	1996
1590	Josh Smith	Dec, 1985	2004
1597	Tyson Chandler	Oct, 1982	2001

TEAM				
TeamID	City	Name	DIV_ID	Championships
5	LA	Clippers	5	0
11	Houston	Rockets	6	0
23	Dallas	Mavericks	6	1

PLAYER_TEAM				
PlayerID	TeamID	Start_date	End_date	No_of_games
1204	5	2011	null	234
1597	23	2010	2011	126
1590	11	2014	null	4
1597	23	2014	null	28

- PlayerID is a key for Player (P)
- TeamID is key for Team (T)
- (PlayerID, TeamID) is a composite key for Player_Team (PT)

Show the results of the following Relational Algebra expressions (20 points):

(i) π P.name, T.name (P \bowtie T \bowtie PT)

(ii) π P.name (P \bowtie PT \bowtie σ city="Dallas" or city="Houston" T)

(iii) ρ (PP (1 \rightarrow playerid1, 2 \rightarrow draftyear1, 3 \rightarrow playerid2, 4 \rightarrow draftyear2) , (π playerid, draft_year P) \times (π playerid, draft_year P))
 $(\pi$ playerid P - π playerid1 σ draftyear1 < draftyear2 PP) \bowtie P

(iv) π P.name ((σ no_of_games > 100 PT) \bowtie T \bowtie P)