Timothy Cordero

IST 659: Final Project

Ice Hockey: NHL Stanley Cup Final Database

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Part 1

Summary

- The Stanley Cup is the trophy given to the team who wins the playoff tournament in the National Hockey League (NHL). The Stanley Cup final is the last round of the playoffs which entails a seven-game series between the best team from the Western Conference and the best team from the Eastern Conference. Collecting all the data from the playoffs

would be useful, but it will be particularly interesting to drill down into the last round, so we can focus on the biggest games in the sport of hockey. Creating a database around this will allow for quick retrieval and analysis of the data and will also allow for fine grain details to be included since the scope of the events that occur in the database will be limited to seven events (games). Each team, the players on both teams, and the event of each game will be tracked. Specific details such as player points and team statistics such as total shots in a game will also be tracked. The hopeful plan is to have a front-end interface where users will be able to interact with the database and retrieve information through a GUI such as a website or Tableau server.

Stakeholders

- Teams, players, coaches, and anyone who loves the sport of hockey will hopefully get value out of this by having all interesting information and statistics about the 2021 Stanley Cup Finals gathered into one easily accessible place.

Business Rules

- Players can only belong to one team.
- A team is made up of many players
- Only one team can win the championship.
- A game is played between two teams.
- A championship cannot be won before the fourth game has been completed.
- If a team has won 4 games, they have won the series (and therefore the championship).
- A series maximum length can be seven, which is when both teams have won 3 games each.

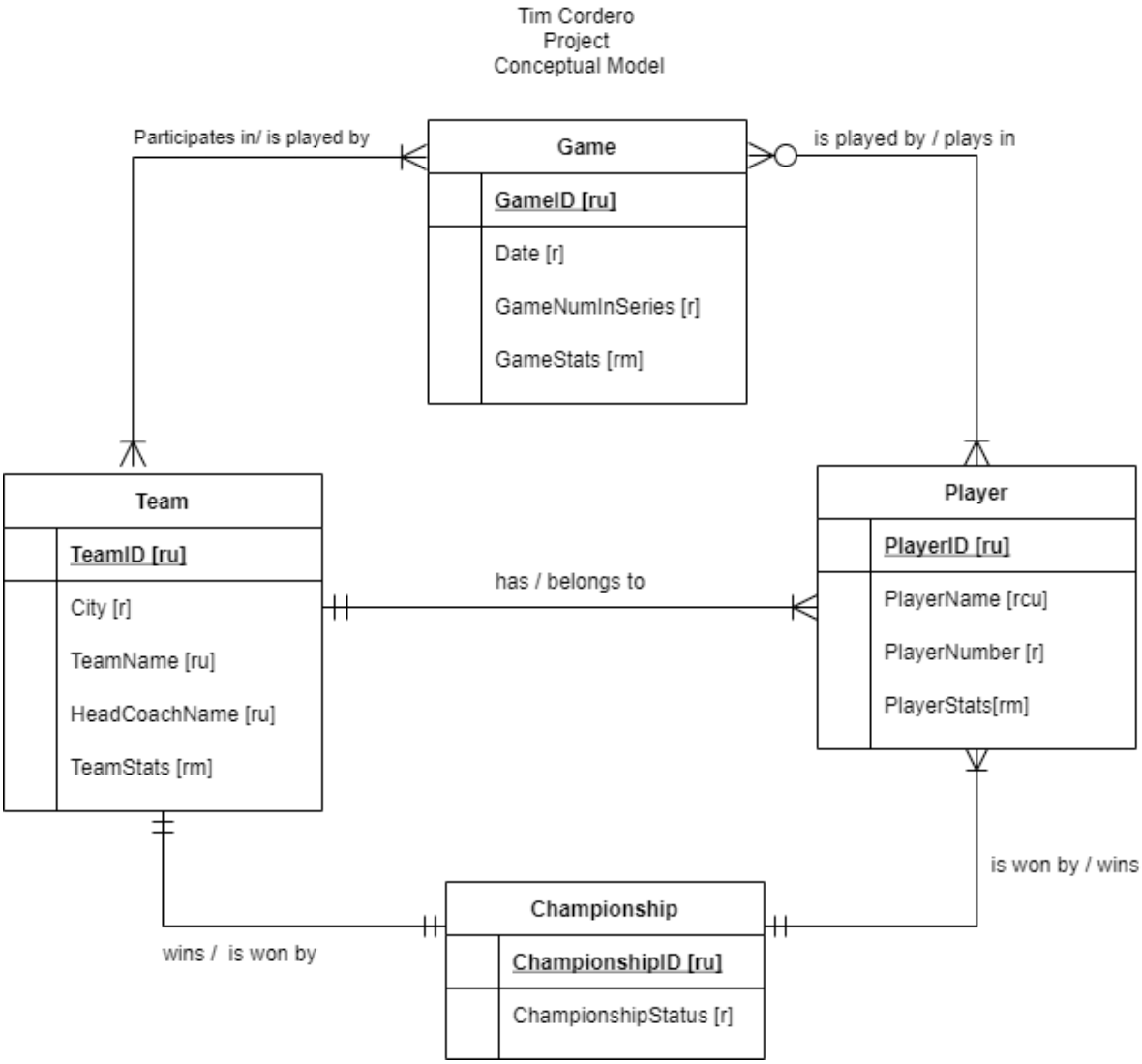
Glossary

- A **team** participates in the National Hockey League.
- A **team** is made up of **players**.
- A **game** is played between two **teams**.
- **Players** play in the **game**.
- A **series** is played between two **teams.**
- A **series** can vary in length between 4 and 7 games**.** First **team** to 4 wins, wins the **series**.
- **Stats** can be recorded for a **game, a team, and players.**
- A **championship** is won by one **team.**
- Many **players** on the winning **team** can win the **championship.**
- A **team** has one **Head Coach.**

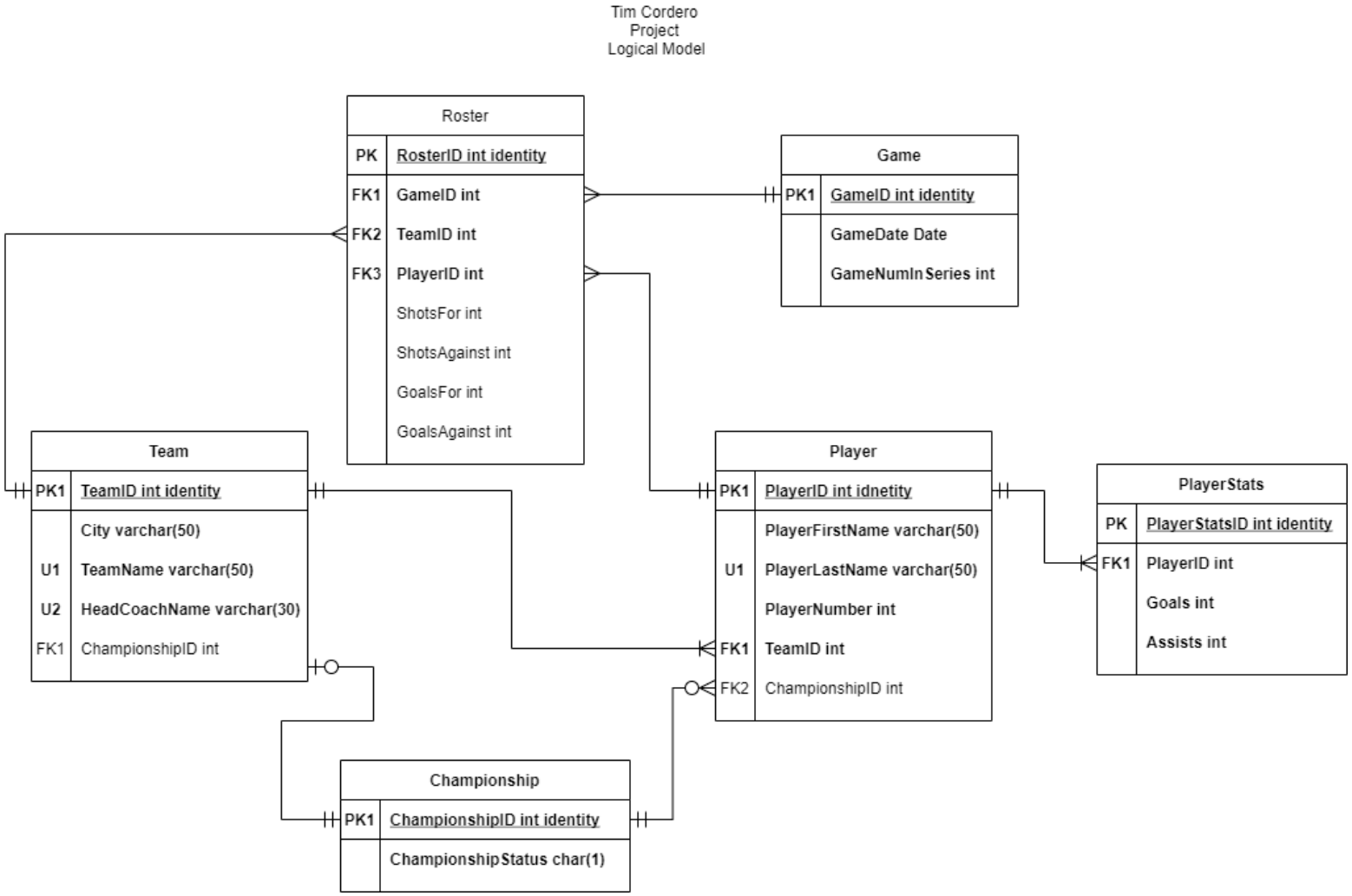
Data Questions

- What 2 teams participated in and who ended up winning the 2021 Stanley Cup Final?
- What player was the leader in points for the Stanley Cup round?
- What was the total number of goals scored in the round?
- Which players should receive a championship ring?
- Who was the coach of the winning team?

Conceptual Model



Normalized Logical Model



Part 2

Data Definition Language – Creating Tables and Constraints

```
-- Drop tables if they exist
IF EXISTS (SELECT * FROM INFORMATION_SCHEMA.TABLES WHERE TABLE_NAME = 'Roster')
	BEGIN DROP TABLE Roster
END GO

IF EXISTS (SELECT * FROM INFORMATION_SCHEMA.TABLES WHERE TABLE_NAME = 'PlayerStats')
	BEGIN DROP TABLE PlayerStats
END GO

IF EXISTS (SELECT * FROM INFORMATION_SCHEMA.TABLES WHERE TABLE_NAME = 'Game')
	BEGIN DROP TABLE Game
END GO

IF EXISTS (SELECT * FROM INFORMATION_SCHEMA.TABLES WHERE TABLE_NAME = 'Player')
	BEGIN DROP TABLE Player
END GO

IF EXISTS (SELECT * FROM INFORMATION_SCHEMA.TABLES WHERE TABLE_NAME = 'Team')
	BEGIN DROP TABLE Team
END GO

IF EXISTS (SELECT * FROM INFORMATION_SCHEMA.TABLES WHERE TABLE_NAME = 'Championship')
	BEGIN DROP TABLE Championship
END GO

--Creating tables
-- Championship table
CREATE TABLE Championship(
	ChampionshipID int identity primary key
	, ChampionshipStatus char(1) not null
)GO

-- Game table
CREATE TABLE Game(
	GameID int identity primary key
	, GameDate Date not null
	, GameNumInSeries int not null
)GO

-- Team table
CREATE TABLE Team(
	TeamID int identity primary key
	, City varchar(50) not null
	, TeamName varchar(50) unique not null
	, HeadCoachName varchar(50) unique not null
	, ChampionshipID int foreign key REFERENCES Championship
)GO

-- Player table
CREATE TABLE Player(
	PlayerID int identity primary key
	, PlayerFirstName varchar(50) not null
	, PlayerLastName varchar(50) unique not null
	, PlayerNumber int not null
```

```
       , TeamID int foreign key REFERENCES Team
       , ChampionshipID int foreign key REFERENCES Championship
)GO

-- PlayerStats table
CREATE TABLE PlayerStats (
       PlayerStatsID int identity primary key
       , PlayerID int foreign key REFERENCES Player
       , Goals int not null
       , Assists int not null
)GO

-- Roster table
CREATE TABLE Roster (
       RosterID int identity primary key
       , GameID int foreign key REFERENCES Game
       , TeamID int foreign key REFERENCES Team
       , PlayerID int foreign key REFERENCES Player
       , ShotsFor int
       , ShotsAgainst int
       , GoalsFor int
       , GoalsAgainst int
)GO
```

Data Manipulation Language

Adding Data using INSERT Statements

```
-- I imported data from excel file into stagging tables

--Inserts from stagging tables
--Championship table
INSERT INTO Championship(ChampionshipStatus)
       SELECT ChampionshipStatus FROM Championship$

-- Game table
INSERT INTO Game (GameDate, GameNumInSeries)
       SELECT GameDate, GameNumInSeries FROM GAME$

-- Team table
INSERT INTO Team (City, TeamName, HeadCoachName, ChampionshipID)
       SELECT City, TeamName, HeadCoachName, ChampionshipID FROM Team$

-- Player table
INSERT INTO Player (PlayerFirstName, PlayerLastName, PlayerNumber, TeamID,
ChampionshipID)
SELECT PlayerFirstName, PlayerLastName, PlayerNumber, TeamID, ChampionshipID FROM Player$

-- Roster table
INSERT INTO Roster (GameID, TeamID, PlayerID, ShotsFor, ShotsAgainst, GoalsFor,
GoalsAgainst)
       SELECT GameID, TeamID, PlayerID, ShotsFor, ShotsAgainst, GoalsFor, GoalsAgainst
FROM Roster$

-- Player Stats table
INSERT INTO PlayerStats (PlayerID, Goals, Assists)
SELECT PlayerID, Goals, Assits FROM PlayerStats$ --typo in excel file under 'Assits'
```

```
-- To drop stagging tables once data is inserted
IF EXISTS (SELECT * FROM INFORMATION_SCHEMA.TABLES WHERE TABLE_NAME = 'Roster$')
       BEGIN DROP TABLE Roster$
END GO

IF EXISTS (SELECT * FROM INFORMATION_SCHEMA.TABLES WHERE TABLE_NAME = 'PlayerStats$')
       BEGIN DROP TABLE PlayerStats$
END GO

IF EXISTS (SELECT * FROM INFORMATION_SCHEMA.TABLES WHERE TABLE_NAME = 'Game$')
       BEGIN DROP TABLE Game$
END GO

IF EXISTS (SELECT * FROM INFORMATION_SCHEMA.TABLES WHERE TABLE_NAME = 'Player$')
       BEGIN DROP TABLE Player$
END GO

IF EXISTS (SELECT * FROM INFORMATION_SCHEMA.TABLES WHERE TABLE_NAME = 'Team$')
       BEGIN DROP TABLE Team$
END
GO

IF EXISTS (SELECT * FROM INFORMATION_SCHEMA.TABLES WHERE TABLE_NAME = 'Championship$')
       BEGIN DROP TABLE Championship$
END GO
```

Querying Data Using SELECT Statements

(Note: Created some views as Programming Objects below)

```
-- Business Question 1:
--     What two teams participated in Stanley Cup and who won?
CREATE OR ALTER VIEW StanleyCupResults AS
       SELECT City
       , TeamName
       , ChampionshipStatus
       FROM Team
       JOIN Championship ON Team.ChampionshipID = Championship.ChampionshipID
Go
-- Explore StanleyCupResults View
SELECT * FROM StanleyCupResults
Go
-- Results
```

Results | Messages

	City	TeamName	ChampionshipStatus
1	Tampa Bay	Lightning	Y
2	Montreal	Canadians	N

```
-- Business Question 2:
---    What player was the leader in points for the Stanley Cup round?
SELECT TOP 1
PlayerFirstName
, PlayerLastName
, Goals
, Assists
, dbo.getPoints(PlayerStats.PlayerID) AS Points
FROM PlayerStats
JOIN Player ON PlayerStats.PlayerID = Player.PlayerID
ORDER BY 5 DESC
-- Results
```

Results | Messages

	PlayerFirstName	PlayerLastName	Goals	Assists	Points
1	Nikita	Kucherov	3	2	5

```
-- Business Question 3:
-- What was the total number of goals scored in the round?
SELECT
SUM(Goals) AS TotalGoals
FROM PlayerStats
GO
-- Results
```

	TotalGoals
1	25

```
-- Business Question 4:
-- Which players should receive a championship ring?
CREATE OR ALTER VIEW ChampionshipWinningPlayers AS
       SELECT PlayerFirstName
       , PlayerLastName
       , PlayerNumber
       FROM Player
       JOIN Championship ON Player.ChampionshipID = Championship.ChampionshipID
       WHERE ChampionshipStatus = 'Y'
GO
SELECT * FROM ChampionshipWinningPlayers
-- Results
```

Results | Messages

	PlayerFirstName	PlayerLastName	PlayerNumber
1	Alex	Barre-Boulet	60
2	Andreas	Borgman	5
3	Erik	Cernak	81
4	Anthony	Cirelli	71
5	Fredrik	Claesson	3
6	Blake	Coleman	20
7	Ross	Colton	79
8	Callan	Foote	52
9	Christopher	Gibson	33

```sql
-- Business Question 5:
-- Who was the coach of the winning team?
SELECT
HeadCoachName
FROM Team
JOIN Championship ON Championship.ChampionshipID = Team.ChampionshipID
WHERE ChampionshipStatus = 'Y'
-- Results
```

Results Messages

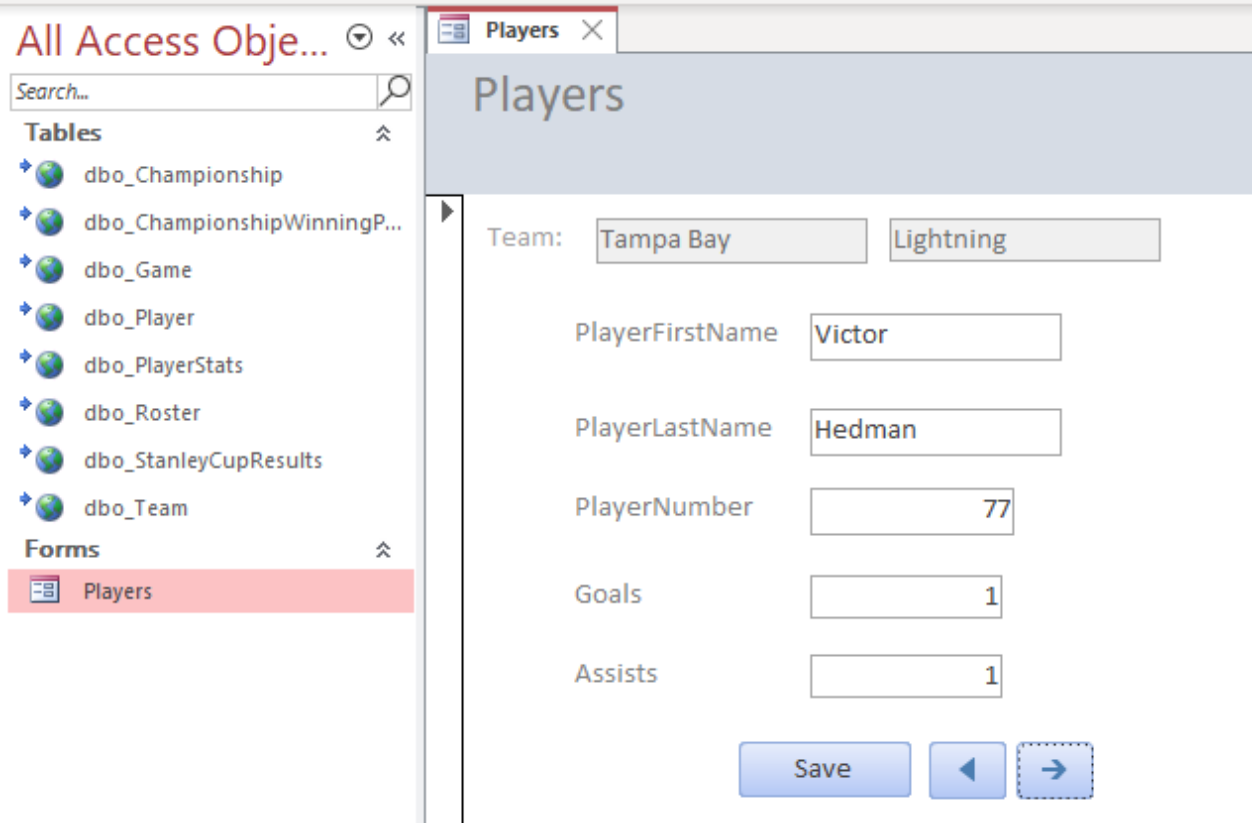
	HeadCoachName
1	Jon Cooper

Programming Objects

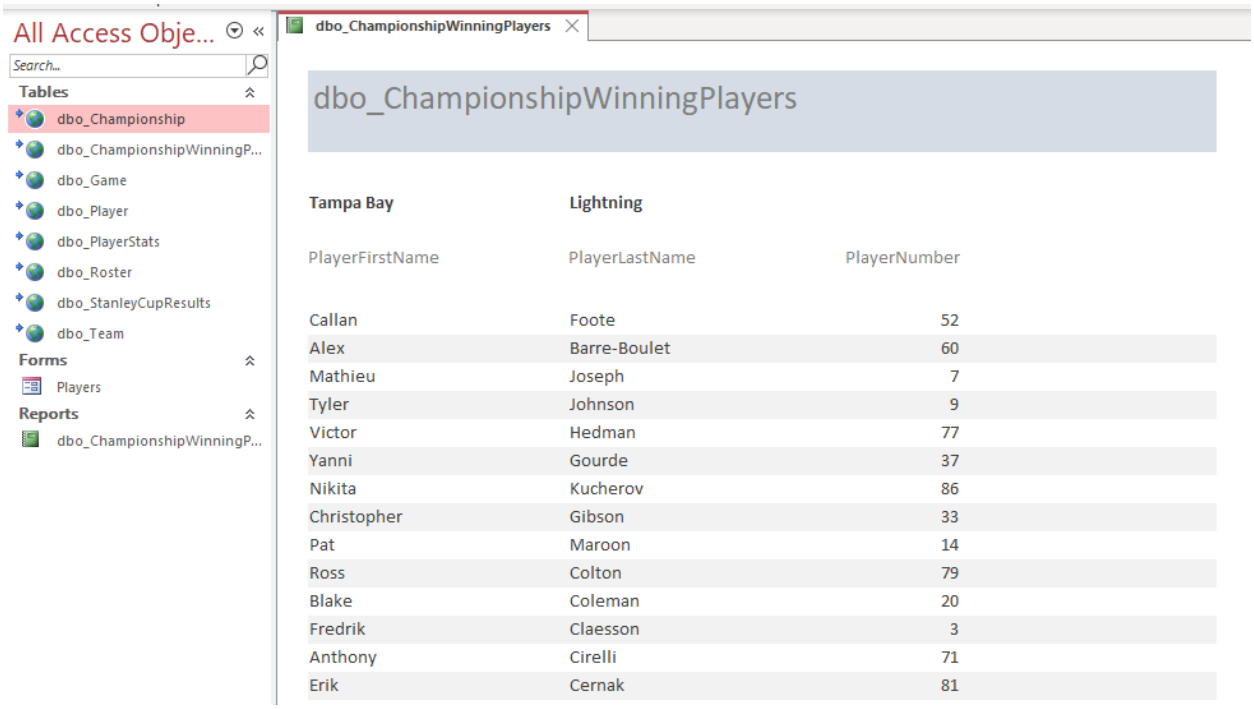
```sql
-- Create function to calculate points for a player (Goals + Assists)
CREATE FUNCTION dbo.getPoints(@playerID int)
RETURNS int AS
BEGIN
	DECLARE @returnValue int -- data type matches "returns" clause
	SELECT @returnValue = Goals + Assists FROM PlayerStats WHERE PlayerID = @playerID
	RETURN @returnValue
END
GO
```

User Interface

Player Maintenance Form



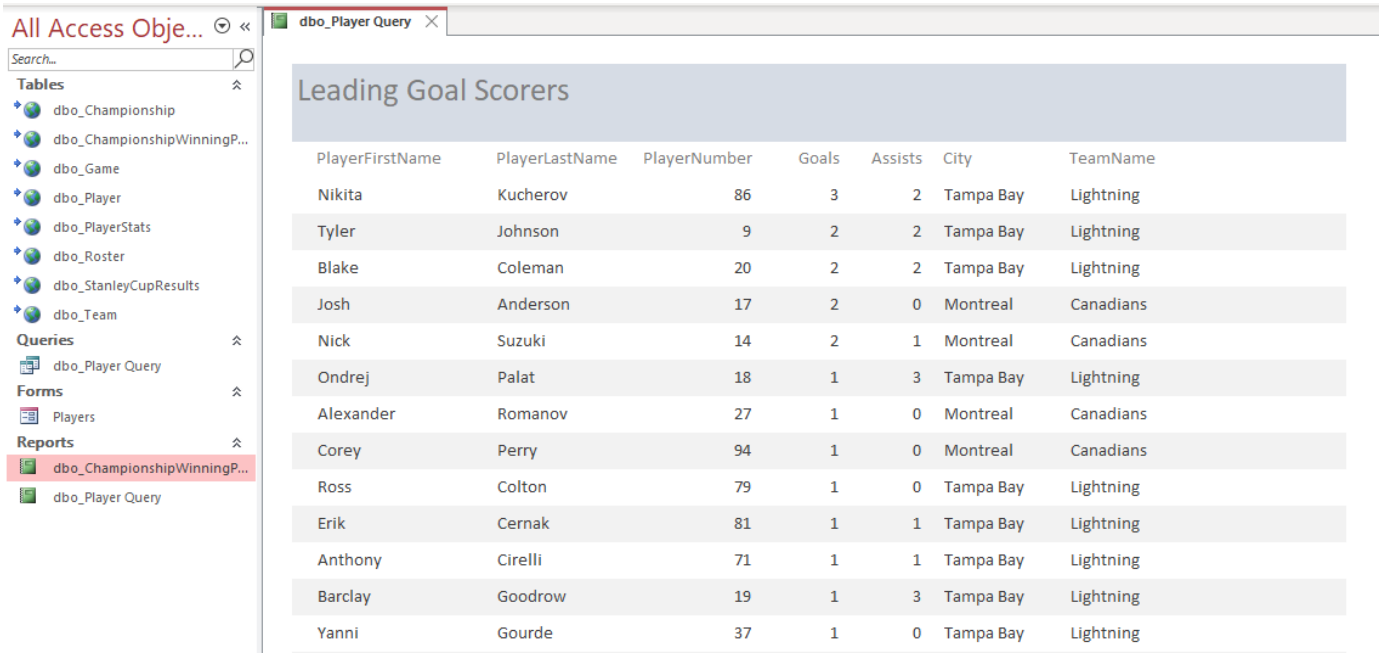
Championship Winning Players Report



dbo_ChampionshipWinningPlayers

Tampa Bay	Lightning	
PlayerFirstName	PlayerLastName	PlayerNumber
Callan	Foote	52
Alex	Barre-Boulet	60
Mathieu	Joseph	7
Tyler	Johnson	9
Victor	Hedman	77
Yanni	Gourde	37
Nikita	Kucherov	86
Christopher	Gibson	33
Pat	Maroon	14
Ross	Colton	79
Blake	Coleman	20
Fredrik	Claesson	3
Anthony	Cirelli	71
Erik	Cernak	81

Series Leading Goal Scorers



Leading Goal Scorers

PlayerFirstName	PlayerLastName	PlayerNumber	Goals	Assists	City	TeamName
Nikita	Kucherov	86	3	2	Tampa Bay	Lightning
Tyler	Johnson	9	2	2	Tampa Bay	Lightning
Blake	Coleman	20	2	2	Tampa Bay	Lightning
Josh	Anderson	17	2	0	Montreal	Canadians
Nick	Suzuki	14	2	1	Montreal	Canadians
Ondrej	Palat	18	1	3	Tampa Bay	Lightning
Alexander	Romanov	27	1	0	Montreal	Canadians
Corey	Perry	94	1	0	Montreal	Canadians
Ross	Colton	79	1	0	Tampa Bay	Lightning
Erik	Cernak	81	1	1	Tampa Bay	Lightning
Anthony	Cirelli	71	1	1	Tampa Bay	Lightning
Barclay	Goodrow	19	1	3	Tampa Bay	Lightning
Yanni	Gourde	37	1	0	Tampa Bay	Lightning

Reflection

The next time you go through the process of creating a database, what will you do differently now that you have been through the whole process?

- After going through the process of creating a database, I would have done more data normalization before inserting the data into my database. I do not believe the Roster table data is fully normalized and it therefore made the data in the table much harder to use, understand, and work with in SQL and on the User Interface. I also would have liked to create more stored procedures and functions given more time and comfortability with those SQL capabilities.
- After completing this project, my takeaway is that data can be very messy, unorganized, and hard to work with, so it is important to be meticulous at every level and layer to store data properly. This will make things much easier down the line when you need to do analysis.