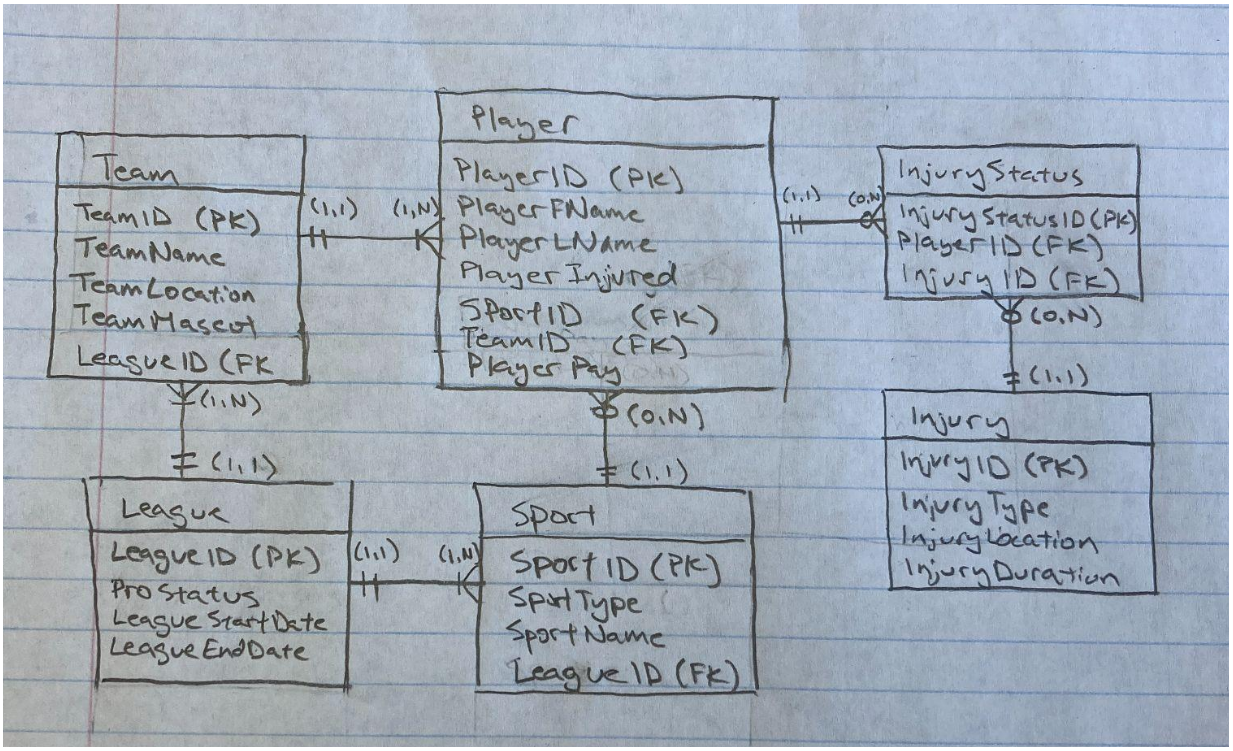
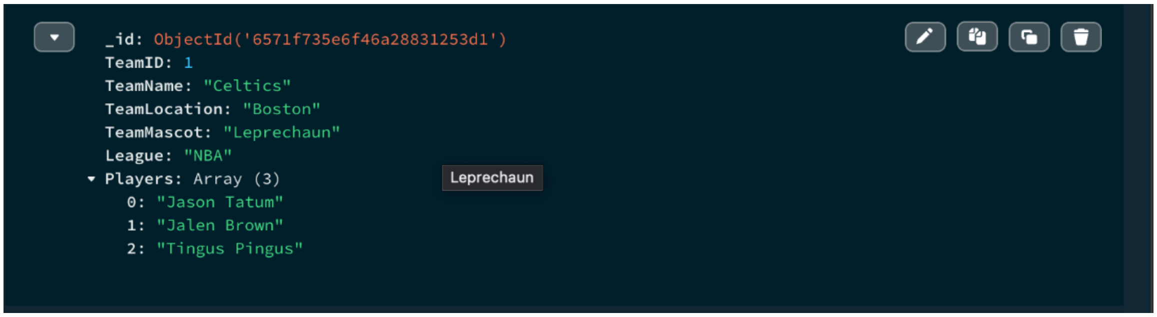
Joe Mahoney, Kai Tsuyoshi, Vincent Garth

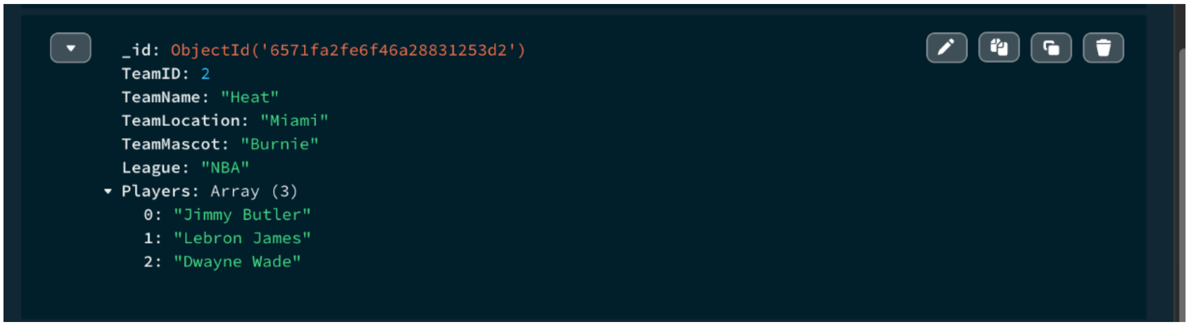
ERD:



Design 1:



```
_id: ObjectId('6571f735e6f46a28831253d1')
TeamID: 1
TeamName: "Celtics"
TeamLocation: "Boston"
TeamMascot: "Leprechaun"
League: "NBA"
Players: Array (3)
  0: "Jason Tatum"
  1: "Jalen Brown"
  2: "Tingus Pingus"
```



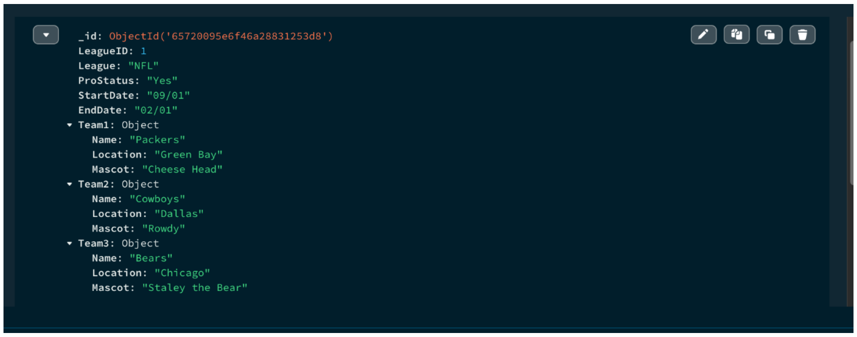
```
_id: ObjectId('6571fa2fe6f46a28831253d2')
TeamID: 2
TeamName: "Heat"
TeamLocation: "Miami"
TeamMascot: "Burnie"
League: "NBA"
Players: Array (3)
  0: "Jimmy Butler"
  1: "Lebron James"
  2: "Dwayne Wade"
```

Explanation: In this relationship, our team represents the one side, while the players represent the many. This is because each team will employ multiple players, while these players will only commit to play for one time at any given moment. There is a limit on the amount of players each team can have, thus our array will be limited to the maximum roster size of 15.

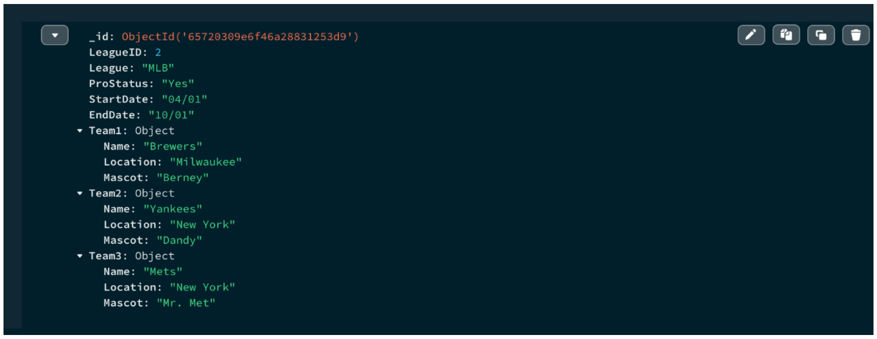
JSON text:

```
{
  "TeamID": 2,
  "TeamName": "Heat",
  "League": "NBA",
  "TeamLocation": "Miami",
  "TeamMascot": "Burnie",
  "Players": ["Jimmy Butler", "Lebron James", "Dwayne Wade"]
}



{
  "TeamID": 1,
  "TeamName": "Celtics",

  "League": "NBA",

  "TeamLocation": "Boston",

  "TeamMascot": "Leprechaun",

  "Players": ["Jayson Tatum", "Jaylen Brown", "Tingus Pingus"]

}
```

Design 2:



```
   _id: ObjectId('65720095e6f46a28831253d8')
   LeagueID: 1
   League: "NFL"
   ProStatus: "Yes"
   StartDate: "09/01"
   EndDate: "02/01"
 ▾ Team1: Object
     Name: "Packers"
     Location: "Green Bay"
     Mascot: "Cheese Head"
 ▾ Team2: Object
     Name: "Cowboys"
     Location: "Dallas"
     Mascot: "Rowdy"
 ▾ Team3: Object
     Name: "Bears"
     Location: "Chicago"
     Mascot: "Staley the Bear"
```



```
   _id: ObjectId('65720309e6f46a28831253d9')
   LeagueID: 2
   League: "MLB"
   ProStatus: "Yes"
   StartDate: "04/01"
   EndDate: "10/01"
 ▾ Team1: Object
     Name: "Brewers"
     Location: "Milwaukee"
     Mascot: "Berney"
 ▾ Team2: Object
     Name: "Yankees"
     Location: "New York"
     Mascot: "Dandy"
 ▾ Team3: Object
     Name: "Mets"
     Location: "New York"
     Mascot: "Mr. Met"
```

Explanation:

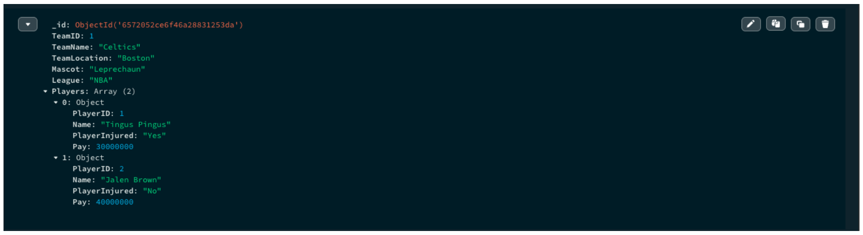
This design represents a 1:M relationship between the League and the Team because each team may only belong to one league, while there are many teams in each sports league. Our array will avoid becoming infinite as there is a cap on the number of teams allowed to play in each specified league. As such, we will cap the amount of teams that can play in each league at 32, because that is the maximum number of teams that are in any professional sports league.

JSON Text:

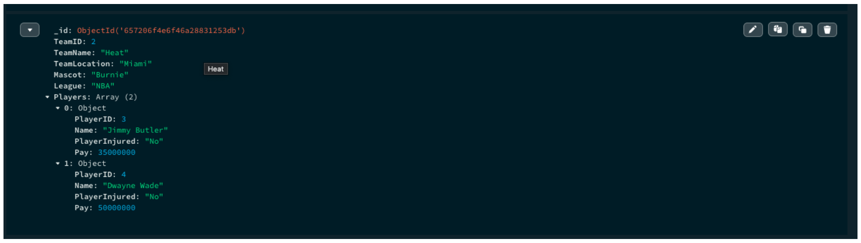
```
{
 LeagueId:1,
 League: "NFL",
 ProStatus: "Yes",
 StartDate: "09/01",
 EndDate: "02/01",
 Team1: {Name: "Packers", Location: "Green Bay", Mascot: "Cheese Head"},
 Team2: {Name: "Cowboys", Location: "Dallas", Mascot: "Rowdy"},
 Team3: {Name: "Bears", Location: "Chicago", Mascot: "Staley The Bear"}
}
```

```
{
 LeagueId:2,
 League: "MLB",
 ProStatus: "Yes",
 StartDate: "04/01",
 EndDate: "10/01",
 Team1: {Name: "Brewers", Location: "Milwaukee", Mascot: "Bernie"},
 Team2: {Name: "Yankees", Location: "New York", Mascot: "Dandy"},
 Team3: {Name: "Mets", Location: "New York", Mascot: "Mr. Met"}
}
```

Design 3:



```
_id: ObjectId('6572052ce6f46a28831253da')
TeamID: 1
TeamName: "Celtics"
TeamLocation: "Boston"
Mascot: "Leprechaun"
League: "NBA"
▾ Players: Array (2)
  ▾ 0: Object
      PlayerID: 1
      Name: "Tingus Pingus"
      PlayerInjured: "Yes"
      Pay: 30000000
  ▾ 1: Object
      PlayerID: 2
      Name: "Jalen Brown"
      PlayerInjured: "No"
      Pay: 40000000
```



```
_id: ObjectId('657206f4e6f46a28831253db')
TeamID: 2
TeamName: "Heat"
TeamLocation: "Miami"
Mascot: "Burnie"
League: "NBA"
▾ Players: Array (2)
  ▾ 0: Object
      PlayerID: 3
      Name: "Jimmy Butler"
      PlayerInjured: "No"
      Pay: 35000000
  ▾ 1: Object
      PlayerID: 4
      Name: "Dwayne Wade"
      PlayerInjured: "No"
      Pay: 50000000
```

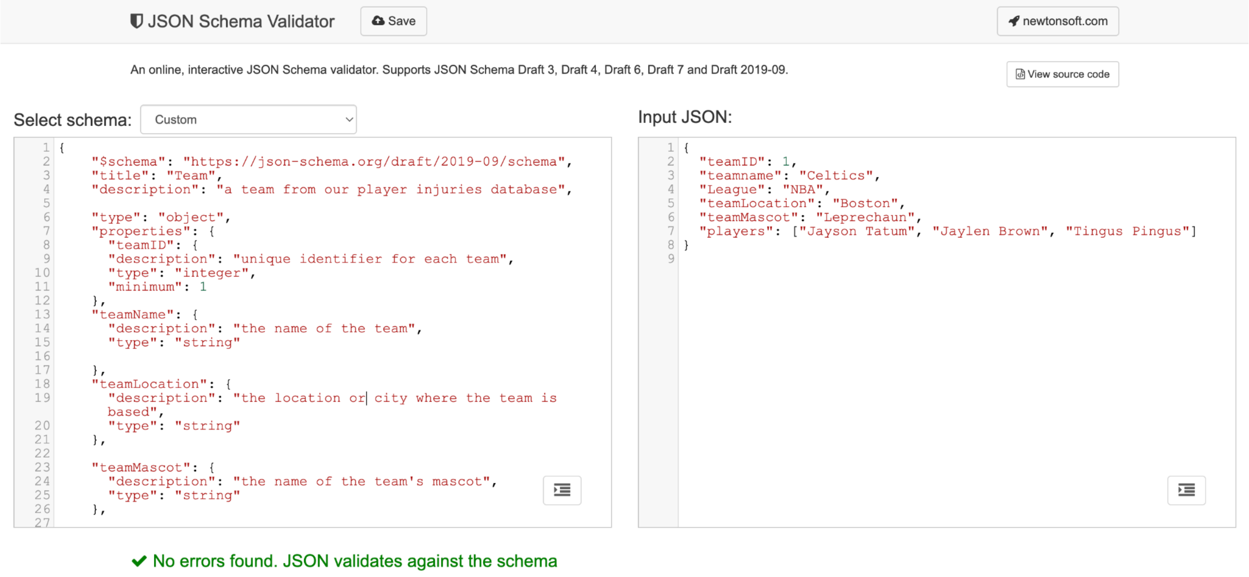
Explanation:

Similar to the previous implementation of this relationship, we know that our relationship is one to many as players are only allowed to play for one team, while teams are allowed to have many (up to 15) players. In addition to this, due to league rules, there is a limit on the number of players on each team, meaning that we avoid an infinite array.

JSON Text:

```
{
 TeamId: 1,
 TeamName: "Celtics",
 TeamLocation: "Boston",
 League: "NBA",
 Players: [{PlayerID: 1, Name: "Tingus Pingus", PlayerInjured: "Yes", Pay: 30000000},
 {PlayerID: 2, Name: "Jalen Brown", PlayerInjured: "No", Pay: 40000000}]
}


{
 TeamId: 2,
 TeamName: "Heat",
 TeamLocation: "Miami",
 League: "NBA",
 Players: [{PlayerID: 3, Name: "Jimmy Butler", PlayerInjured: "No", Pay: 35000000},
 {PlayerID: 4, Name: "Dwayne Wade", PlayerInjured: "No", Pay: 50000000}]
}
```

Part 2: Schemas and Queries:



An online, interactive JSON Schema validator. Supports JSON Schema Draft 3, Draft 4, Draft 6, Draft 7 and Draft 2019-09.

Select schema: Custom

```
{
    "$schema": "https://json-schema.org/draft/2019-09/schema",
    "title": "Team",
    "description": "a team from our player injuries database",

    "type": "object",
    "properties": {
      "teamID": {
      "description": "unique identifier for each team",
      "type": "integer",
      "minimum": 1
    },
    "teamName": {
      "description": "the name of the team",
      "type": "string"

    },
    "teamLocation": {
      "description": "the location or city where the team is based",
      "type": "string"
    },

    "teamMascot": {
      "description": "the name of the team's mascot",
      "type": "string"
    },

```

Input JSON:

```
{
  "teamID": 1,
  "teamname": "Celtics",
  "League": "NBA",
  "teamLocation": "Boston",
  "teamMascot": "Leprechaun",
  "players": ["Jayson Tatum", "Jaylen Brown", "Tingus Pingus"]
}
```

✔ No errors found. JSON validates against the schema

Schema for Design 1:

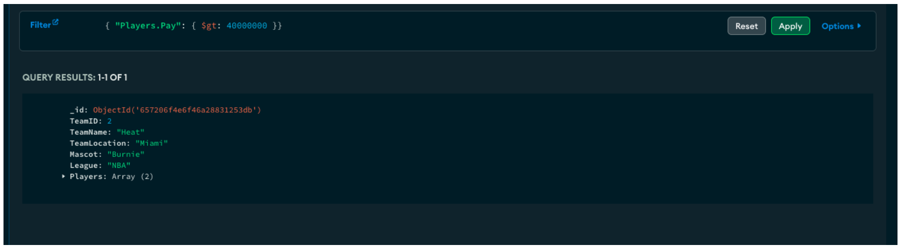
```
{
        "$schema": "https://json-schema.org/draft/2019-09/schema",
  "title": "Team",
  "description": "a team from our player injuries database",


  "type": "object",
  "properties": {
    "TeamID": {
    "description": "unique identifier for each team",
    "type": "integer",
    "minimum": 1
  },
  "TeamName": {
    "description": "the name of the team",
    "type": "string"
  },
  "TeamLocation": {
    "description": "the location or city where the team is based",
    "type": "string"
  },

  "TeamMascot": {
    "description": "the name of the team's mascot",
    "type": "string"
  },

  "League": {
    "description": "the league that the team plays in",
    "type": "string"
  },
  "Players": {
    "description": "An array containing the names of the players in the team",
    "type": "array",
    "items": {
      "type": "string"
    },
   "minitems": 1,
   "uniqueitems": 1
  }
  },   "required": ["TeamID", "TeamName", "TeamLocation", "Players"]
```

}

Queries:

1. Greater than or less than query

   { "Players.Pay": { $gt: 40000000 }}



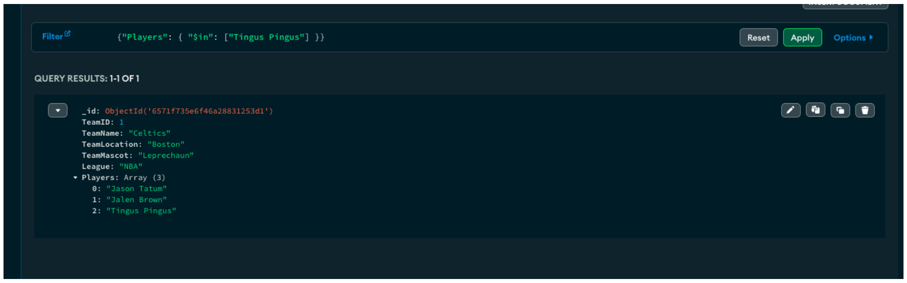
```
{ "Players.Pay": { $gt: 40000000 }}
```

QUERY RESULTS: 1-1 OF 1

```
_id: ObjectId('657206f4e6f46a28831253db')
TeamID: 2
TeamName: "Heat"
TeamLocation: "Miami"
Mascot: "Burnie"
League: "NBA"
Players: Array (2)
```

2. Query within an array

   {"Players": { "$in": ["Tingus Pingus"] }}



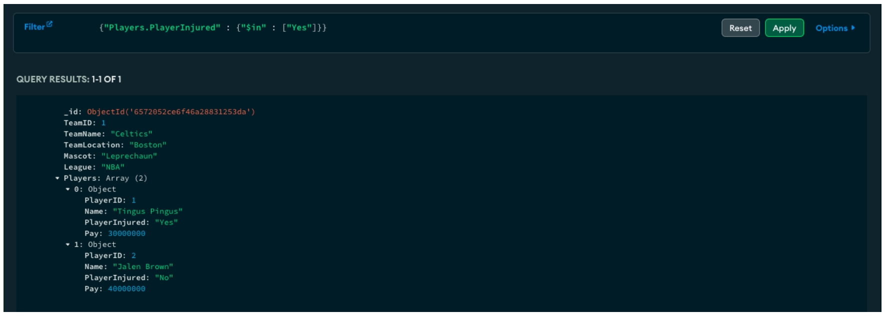
```
{"Players": { "$in": ["Tingus Pingus"] }}
```

QUERY RESULTS: 1-1 OF 1

```
_id: ObjectId('6571f735e6f46a28831253d1')
TeamID: 1
TeamName: "Celtics"
TeamLocation: "Boston"
TeamMascot: "Leprechaun"
League: "NBA"
Players: Array (3)
  0: "Jason Tatum"
  1: "Jalen Brown"
  2: "Tingus Pingus"
```

3. Query within a subdocument

   {"Players.PlayerInjured" : {"$in" : ["Yes"]}}



```
{"Players.PlayerInjured" : {"$in" : ["Yes"]}}
```

QUERY RESULTS: 1-1 OF 1

```
 _id: ObjectId('6572052ce6f46a28831253da')
 TeamID: 1
 TeamName: "Celtics"
 TeamLocation: "Boston"
 Mascot: "Leprechaun"
 League: "NBA"
▾ Players: Array (2)
  ▾ 0: Object
      PlayerID: 1
      Name: "Tingus Pingus"
      PlayerInjured: "Yes"
      Pay: 30000000
  ▾ 1: Object
      PlayerID: 2
      Name: "Jalen Brown"
      PlayerInjured: "No"
      Pay: 40000000
```