Background

1. How did you end up at your undergraduate school? How did you choose your major? What appealed to you about it? What Mathematics, Statistics, Computer Science, or related subject(s) did you take while in school?
2. Please list the computer programs, full stack tools, and other computational tools you are familiar with including your proficiency and a brief description on what you used the tool for.
3. List 3 websites or apps that annoy you (functionally/aesthetically). In your opinion what's wrong with them? How would you fix them?
4. What is the hardest thing you ever programmed? Why was it difficult? How did you overcome the difficulty?
5. What online (sports/programming/statistics) communities do you read and/or participate in on a regular basis?
6. Have you ever taught yourself something? What was it? Why did you learn it? How did you learn it?
7. During your time in school, what single skill did you develop that you think would be the most valuable for this role and what single skill did you develop that you think would be the least valuable for this role? Why?
8. What interests you about working for a basketball team? How do you think a Basketball Front Office could maximize your development?

Lineups

In the attached zip folder, you will find JSON files in the dev_test_data folder which will be used for this question. Note: your code will be tested in a new environment with new data so make sure your code is easily runnable. Please make sure to include any documentation that may be needed to properly run your code (including packages/libraries used)

1. **Database creation**
   a. Write code to transfer the files from a directory called dev_test_data to a SQL database called lac_dev_lineups (code can be Python, SQL, etc.)
      i. The tables created should be named team, player, game_schedule, and lineup
      ii. Make sure your code creates tables if needed and that it can handle data reloads, merges, and/or updates
   b. What should be the Primary Keys across the tables?
2. **Basic Queries**
   a. Write a SQL query that can calculate team win-loss records, sorted by win percentage (defined as wins divided by games played)
      i. Final table should include team name, games played, wins, losses, win percentage
   b. In the same table, show how the team ranks (highest to lowest) in terms of games played, home games, and away games during this month of the season? Make sure your code can extend to additional months as data is added to the data set. For each show both the number of games and the rank
3. **Schedule SQL Queries**:
   a. The NBA has a concept of a Back-to-Back (B2B) which is if a team played 2 days in a row (regardless of start time). For the data given which team had the most Home-Home B2Bs? Which had the most Away-Away B2Bs? For example, ATL's game on 10/30 at CLE would be an Away-Away B2B since ATL played 10/29 at PHI.
   b. Which team(s) had the longest rest between 2 games and what were the days of the 2 games?
4. **Lineups Queries**: In answering any of these items, feel free creating intermediate temp tables, inline tables, or CTEs as needed.
   a. Notice that in the lineup data each row corresponds to a given player, game, lineup_num, period. Write a SQL query that creates a "wide" table for the team (so a given row is now game_id, team_id, lineup_num, period, time_in, time_out, and the 5 players on the court)
      i. Notice that time_in and time_out are in seconds, starting at 12 minutes (720) and going down to 0 minutes

b. The field lineup_num changes as a player on either team gets substituted. Write a SQL query with the resultant table that stores when a player is continuously on the court for a given period (call this a stint)
    i. Final table should be game date, team, opponent, player_name, period, stint_number, stint_start_time, stint_end_time
    ii. Format the stint times in mm:ss so the start of the period is 12:00 and the end of the period is 00:00
c. From you answer to 4.b, for each player, calculate the average number of stints a player has and average stint length for a player for a given game.
d. Extend the query from 4.c to show columns for all games, in wins, in losses as well as a column that shows the difference in wins and losses
    i. each set (all/wins/losses) should have # of games, average stint length, average number of stints

5. **Front-End Visualization**
    a. Create a visualization where a user selects a game and sees the stints for all the players that played in that game
        i. You have freedom to choose the visualization; it can be displayed tables, a figure, or something else
        ii. You can make the visualization using any tool, web-based, Excel, Tableau, Power BI, but the tool should be easily refreshable as your database is populated with new data
        iii. Make sure the visualization allows the user to clearly see the important information like how many stints the player had and how long those stints were

Two Way Full-Stack

In the attached zip folder, you will find XML and JSON files in the two_way_data folder which will be used for the following project. Note that your code will be tested in a new environment with new data so make sure your code is easily runnable and please make sure to include any documentation that might be needed to properly run your code (including packages/libraries used). You can assume that any new data will have the same names as the given files. For all the questions, please describe your approach from start to finish and issues that came up along the way.

The NBA has the concept of a Two-Way Contract where the player gets paid an NBA salary when with the NBA team and a G-League (GLG) salary when in the G-League. For more information about Two-Way's read Larry Coon's CBA FAQ http://www.cbafaq.com/salarycap.htm specifically Q22, Q82, Q83. The entire project will be about Two-Ways and you will need to present on this and your project so make sure you fully understand the concept.

1. **Basic Questions**
    a. Based on the season given in game_schedule, what is the first day of the NBA season? What is the last day? How many days are in the season? How about for the GLG?
    b. For the season included in game_schedule, how much does the Two-Way make for a day in the G-League? How about for a day in the NBA?
    c. What is the maximum number of countable NBA days a Two-Way can have? Based on the season given in game_schedule, what is the maximum number of days a Two-Way can be on an NBA active/inactive list? Explain your answer.
2. **Database Creation**:
    a. Create a SQL database for the files include in the ZIP file
        i. What tables did you come up with?
        ii. What are the Primary Keys and data types?
    b. Populate the tables with the data from the zip tables
        i. Make sure your code creates tables if needed
        ii. Make sure your code can handle new data as well as data reloads, merges, and/or updates
3. **Front-End Tool**:
    a. You will be making an interactive web base tool that allows the user to do a couple Two-Way specific tasks

i. First you will have the following users interacting with your tool

User	User ID	User Password
LAC	lac	password123
ACC	acc	123password
Person 3	lacuser3	pass123word

b. The tool should have a section that allows a user to determine the following information for a Two-Way contract signed on any given day during the season:
   i. the number of countable NBA days the Two-Way has
   ii. the maximum possible number of NBA days
   iii. and the salary range the player could make.

c. The tool should have a section that contains a sortable table displaying the current Two-Way players and their statuses. Be sure to include:
   i. Team (could be logo), Player Name (at least name, but could contain image), Age, NBA Days Remaining, NBA Service Limit, Total Salary Earned, NBA Earned Salary, NBA Salary Days, GLG Earned Salary, GLG Salary Days, Unreported Days
   ii. If you need it, the following will give a gray silhouette in the case there is an error with a player's image

https://www.nba.com/.element/img/2.0/sect/statscube/players/large/default_nba_headshot_v2.png

d. The tool should have a section where a user can interactively map out the remaining schedule of Two-Way players for a given team (including if they sign a new Two-Way on a certain date)
   i. The section should look like a calendar, and it would be helpful to include any of the team's NBA or GLG games
   ii. For a given team, allow the user to select if the players are with the NBA team or the GLG team on a given day (Leave the only options as "NBA" or "GLG")
   iii. Have the calendar indicate when days are outside the countable period
   iv. At the top, have the tool display for each Two-Way the following cumulative information that updates as the user interacts:
      1. How much the Two-Way has earned to date, how much the user has added, and total salary earned
      2. How many NBA Days the Two-Way has earned to date, how many days the user has added, and total salary earned.
      3. How many GLG and NBA Games is the player able to play in
   v. Allow the user the ability to save their proposed plan to the database
      1. The user should be able to access this later, update it, and share … or just start fresh
      2. If someone edits the plan, the new plan does not overwrite the one in the DB, but creates a new one in the DB

e. From your reading on Two-Ways, what other tools/pages/dashboards/etc do you think would be helpful? What other data would you need?
   i. If you were asked to handle waiving and signing Two-Way's how would you handle this? What if the player was not already in the database?

f. What are other takeaways from your readings about Two-Way players?