Atlassian Coding Round Sample Data Structure Questions

1. Find the closest Org for target Employees. Find the rules for designing the Groups, Employees and their relationships

    a) Imagine you are the team that maintains the Atlassian employee directory. At Atlassian – there are multiple groups, and each can have one or more groups. Every employee is part of a group. You are tasked with designing a system that could find the closest common parent group give a target set of employees in the organization.
    b) The Atlassian hierarchy sometimes can have shared group across an org or employees shared across different groups – How will the code evolve n this case if the requirement is to provide ONE closest common group
    c) The system now introduced 4 methods to update the structure of the hierarchy in the org. Suppose these dynamic updates are done in separate threads while getCommonGroupForEmployees is being called, How ill your system handled reads and writes into the system efficiently such that at any given time getCommonGroupForEmployees always reflects the latest updated state of the hierarchy?
    d) The company consists of a single level of groups with no subgroups. Each group has a set of employees.

2. Expanding Tennis Club

    a) Implement a function that given a list of tennis court cooking's with start and finish times, returns a plan assigning each booking to a specific court, ensuring each court is used by only one booking at a time and using the minimum number of courts with Unlimites number of courts available.
    An example of the booking record might look like

    Class BookingRecord:
    Id: int//ID of the booking
    Start_time: int
    Finish_time: int

    And our function is going to look like:

List<Court> assignCourts(List<BookingRecord> bookingRecords)

b) After each booking, a fixed amount of time, X, is needed to maintain the court before it can be rented again
   Court only need maintenance after X amount of usage
c) How would you modify the code if each court also had a Y maintenance time that occurred after X bookings?
   The function should now become something like
   Def assign_court_with_maintenence(booking_records: list {BookingRecord],

   Maintenence_time: int,

   Durability: int) -> list [Court]:
d) The original problem can be made simpler by removing the "assigning each booking to a specific court" part. The candidate needs to find the minimum number of courts needed to accommodate all the bookings
e) Check if booking conflict - Write a function that if given two bookings to check if they conflict with each other

3. Design data structure and algorithm that store the Commodity Prices at given point of time and determine the max commodity price at any given point of time. Rules are mentioned below.

   a) Imagine you are given a stream of data points consisting of <timestamp, commodityPrice> you are supposed to return the maxCommodityPrice at any point in time.
   b) The timestamps in the stream can be out of order, or there can be duplicate timestamps, we need to update the commodityPrice at that particular timestamp if an entry for the timestamp already exists
   c) Create an in-memory solution tailored to prioritize frequent reads and writes for the given problem statement

   d) Can we reduce the time complexity of the getMaxCommodityPrice to O (1) if the language does not support it? This can be done using a variable to keep the maxPrice value, but we need to update it when performing the upset operations.

4. Popular content with all the rules focused below

a) Imagine you are given a stream of content ids along with an associated action to be performed on them
b) Example of contents are video, pages, posts etc. There can be two actions associated with a content id:
    - increasePopularity -> increases the popularity of the content by 1. The popularity increases when someone comments on the content or likes on the content
    - decreasePopularity-> decreases the popularity of the content by 1. The popularity decreases when a spam bot's/user's comments are deleted from the content, or its likes are removed from the content
    - content ids are positive integers
c) Implement a class that can return the mostPopular content id at any time while consuming the stream of content ids and its associated action. If there are no contentIds with popularity greater than 0, return -1

5. Build Weighted Graph with below rules

    a) Imagine we have a network with N nodes. Each node has a label (a name). Between two nodes, there is a value of time in milliseconds that indicates how long a packet can be transmitted from one node to the other. Be noted that this is one-way direction which means packet can be transmitted the other way around with different time value, or, even prohibited.
    b) Given 2 node labels (source and destination), write a function that answers the following questions:
    c) Can a packet transmit from the source node to the destination node?
    d) If yes, what is the shortest time that a packet can transmit from the source node to the destination node?

6. Job Interval Reporting with below rules

    a) CI pipeline count
    b) Atlassian runs a lot of CI pipelines, and our team is tasked to build some reporting on the usage to find some cost optimization patterns.
    c) Each CI pipeline starts at a given time X and ends at Y. We are given a list of CI pipeline time windows {X, Y}.
    d) [{X, Y}, {X` , Y` }, ...]

Objective: Find the time windows where at least one CI pipeline is running.

Input: [{2, 5}, {12, 15}, {4, 8}]
Output: [{2, 8}, {12, 15}]

Explanation: The windows in minimum where at least one job is running are {2, 8} and {12, 15}