INTERVIEW PACKET

BACKEND DEVELOPMENT – SDE 3

Interview Packet: Backend Development - SDE 3

Preface: Purpose of the document

The purpose of this document is to ensure anyone going for the interview at the company and position that this document is meant for, puts their best foot forward. This helps ensure only prepared learners are going for the interview, and the companies have less false negatives.

A smart and good fit learner failing the interview just because they could have prepared better is a loss for everyone.

What this document is for:

- Reducing false negatives in the interview process.
- Give a detailed walkthrough of the expected interview process.
- Give an exact idea of the difficulty level of the questions asked.
- Tips to help watch out for things to be aware of / careful about.

What this document is not:

- Repository of all actual questions asked in the interview.
- Trying to game the interview process.

This document is used to explain the interview process at a **full-stack application performance management and IT operations analytics company** based in the US.

Evaluation Process

Rounds:

- Round 1: Online Assessment test. This is done on Hacker Rank with coding questions. (If candidates' profile is exact match to the job requirements, then at times online assessment is skipped)
- Round 2: 60-minute technical interview round. Conducted online/physical depending on the current location of the candidate. Medium level DSA questions asked. Typically, 2 questions in the interview. Project work and programming language questions are also asked.
- Round 3: 60-minute technical interview round. Conducted online/physical depending on the current location of the candidate.
- Round 4: 60-minute technical interview round on system design.
- Round 5: 60 min Hiring Manager round. Previous Project + Behavioral questions. Discuss previous work and projects.

Round-wise details

Round 1:

Mode:

Online. Hacker Rank like online assessment.

Sample Questions:

Q1. Validate a IPV4 Address in dotted decimal notation.

Examples

```
Input: queryIP = " 192.0.2.1"
Output: "True"
Explanation: This is a valid IPv4 address, return true.
```

Result=TRUE

```
Input: queryIP = " 272.21.2.1"
Output: "false"
Explanation: This is a not a valid IPv4 address as each octet should be between 0-255, return false.
```

Q2. Find the sum of all numbers less than n which are palindromic in base 10 and base k.

```
Input:  n=10 k=2

Output: 25

Explanation: (here n = 10 and k = 2)
              1 3 5 7 9 (they are all palindrome
              in base 10 and 2) so sum is:
              1 + 3 + 5 + 7 + 9 = 25
```

Sample answers:

For Q1, check the presence of 4 octets separated by delimiter (“.”) and all four octets are having digit only with value between 0-255.

https://www.geeksforgeeks.org/program-to-validate-an-ip-address/

For Q2, solution

https://www.geeksforgeeks.org/double-base-palindrome/

Why candidates fail:

- They start solving the hard problem first and end up spending all the time on that problem.
- Not enough practice in a time constraint environment.
- Start solving the wrong problem statement. Take 3-5 mins to understand the problem statement. There is no rush.
- Start writing code before thinking of the best structure of the code. Take time to structure your code before starting to code.

Tips:

- Become comfortable with the coding editor of Hacker Rank before the round.
- Practice in a time constraint environment.
- Address the issues mentioned in the section above.

Round 2:

Mode:

Online/Offline technical interview done on coderpad / collabedit.

Sample Questions:

`Q1.` Given a sentence, reverse the order of its words without affecting the order of letters within a given word.

`Example`

```
Input: The quick brown fox jumped over a lazy dog
Output: dog lazy a over jumped fox brown quick The
```

`Q2.` Given an array of N non-negative integers arr[] representing an elevation map where the width of each bar is 1, compute how much water it is able to trap after raining
Example:

```
Input: height = [0,1,0,2,1,0,1,3,2,1,2,1]
Output: 6
Explanation: The above elevation map (black section) is represented by array
[0,1,0,2,1,0,1,3,2,1,2,1]. In this case, 6 units of rainwater (blue section) are
being trapped.
```

Q3. Java Questions

Example

- Difference between arraylist and vectors?
- What is Concurrent Modification exception in Java and how to avoid it?
- Print the count of empty strings in a list using parallel streams in java8?
- List elements: "abc", "", "bc", "efg", "abcd","", "jkl"
- A cricket app that notifies viewers about the information such as current score, run rate etc. Suppose we have made two display elements CurrentScoreDisplay and AverageScoreDisplay. Cricket Data has all the data (runs, bowls etc.) and whenever data changes the display elements are notified with new data and they display the latest data accordingly.
- Which design pattern can be used here?

Q4. Project Related Questions

Example:

- Current Project is a monolith or microservice architecture? If it's a microservice architecture, then which container orchestration platform is used.
- Explain the feature that you have recently implemented.
- Explain how observability is implemented in your application and which observability tools are being used in your project.
- How was inter-service communication implemented in your microservice based application?

Sample answers:

Q1 solution:

For this question, two pointers solution for the string reversal can be used. First, we reverse the whole sentence. Then, we use the same approach to reverse individual words within the sentence.

https://www.geeksforgeeks.org/program-to-reverse-a-string-using-pointers/

Q2. solution:

https://www.geeksforgeeks.org/trapping-rain-water/

Q3. solution:

(a) https://www.geeksforgeeks.org/vector-vs-arraylist-java/

(b) https://www.geeksforgeeks.org/concurrentmodificationexception-in-java-with-examples/

(c)

Solution:

```
List<String> strings = Arrays.asList("abc", "", "bc", "efg", "abcd","", "jkl");
//get count of empty string
int count = strings.parallelStream().filter(string ->
string.isEmpty()).count();
```

(d) Explain how observer design pattern is best for the usecase
https://www.geeksforgeeks.org/observer-pattern-set-2-implementation/

Q4. Solution:

(a) Explain the application architecture, if its microservice based then elaborate on how communication is implemented between different microservices for different use-cases.
Explain the orchestrator being used could be Kubernetes, OpenShift, AWS ECS managed service.
If you project is using Kubernetes orchestrator, then you should know.
K8's architecture with all the components. Also know about the core Kubernetes objects i.e., pod, container, deployments, replica set, configmap, k8's service types.

(b) Explain the low-level design of the feature, if at all used any new technology or design pattern for implementation then talk about it.

(c) Observability is implemented in application through logs, metrics & traces.

- Application logs originating from different microservices can be collectively visualized in Kibana.
- Metrics are collected by Prometheus server running in k8 cluster and can be visualized through Grafana dashboard, also alarms can be implemented based on metrics.
- traces help in tracing the path of request through different microservices and are crucial in debugging the response delays/outages. Jaeger is one of the distributed tracing platforms that can be used here.

(d) https://medium.com/design-microservices-architecture-with-patterns/microservices-communications-f319f8d76b71

Why candidates fail:

- Not able to identify the pattern for solving the problem.
- Too slow to solve the problem.
- Not well versed with programming language and commonly used design patterns.
- Not well versed with the project details/technology stack.
- Not aware of the microservice based architecture.

Tips:

- Listen to hints being given.
- Name your functions properly.
- Structure your code well.

- Dry run your code on corner cases.
- When you don't know the answer to a interview question, be honest and admit your lack of familiarity. Don't fake expertise when you really don't know the subject.
- Deep dive on design patterns around microservice based architecture.

Round 3:

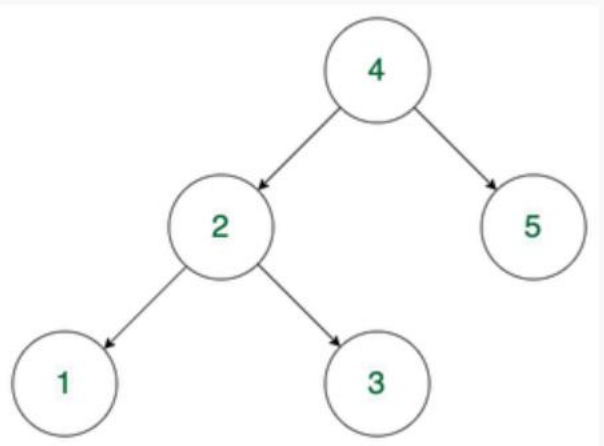
Mode:

Online/Offline technical interview with an interviewer 1:1. DSA.

Sample Questions:

`Q1.` A program to check if a Binary Tree is BST

- A binary search tree (BST) is a node-based binary tree data structure that has the following properties.
- The left subtree of a node contains only nodes with keys less than the node's key.
- The right subtree of a node contains only nodes with keys greater than the node's key.
- Both the left and right subtrees must also be binary search trees.
- Each node (item in the tree) has a distinct key.



Q2. Given an array of intervals where intervals[i] = [start(i), end(i)], merge all overlapping intervals, and return an array of the non-overlapping intervals that cover all the intervals in the input.

> Input: intervals = [[1,3], [2,6], [8,10], [15,18]]
> Output: [[1,6], [8,10], [15,18]]
> Explanation: Since intervals [1,3] and [2,6] overlap, merge them into [1,6].

Sample answers:

Q1. https://www.geeksforgeeks.org/a-program-to-check-if-a-binary-tree-is-bst-or-not/

Q2. https://www.geeksforgeeks.org/merging-intervals/

Why candidates fail:

- Not able to identify the pattern for solving the problem.
- Miss out on corner cases

Tips:

- Ask questions to get the maximum clarity about the problem statement and know the corner cases to be handled.
- Name your functions properly & Structure your code well to increase the readability of the code.
- Dry run your code on corner cases.

Round 4:

Mode:

Online/Offline technical interview with an interviewer ,1:1 System Design Round

Sample Questions:

Q1 Design Tiny URL
Q2 Design API Rate Limiter

Question Details and Sample answers:

Q1. https://github.com/royc0003/CS-Books/blob/master/system-design/educative.io-Grokking-the-System-Design-educative.io.pdf

Q2. https://github.com/Salah856/System-Design/blob/main/Design%20Rate%20Limiter.md

Why candidates fail:

- Not able to understand the functional /non-functional requirements.
- Designing around assumptions and not asking enough questions to the interviewer
- Not able to justify for a design choice.

Tips:

- Ask questions to get the maximum clarity about the problem statement and know the corner cases to be handled.
- Compare the different design options and as per the requirements choose the best one.

Round 5:

Mode:

Online/Offline interview with an interviewer 1:1. Hiring manager

Sample Questions:

[Behavioral]

Q1. Give me an example of when you had to handle stressful situation. how did you handle it?
Q2. Why do you want to switch your job?
Q3. Why should we hire you?
Q4. Do you have any questions for us?

[Past Projects]

Questions on

Q5. High level design & programming language used in previous projects.
Q6. Different build, debugging & test tools used in previous projects?
Q7. Do you follow agile methodology in your project? What's the sprint duration?
What all agile ceremonies are performed?

Sample answers:

Q1. Tell him/her about a stressful situation and explain how you approached and came out of that stressful situation. Highlight the positive outcome of your approach.
Example: I was assigned a critical release blocking bug and many of my peers had already tried to find the RCA for the issue, but they could not crack it. Later, I was assigned that bug. I approached the bug from level zero rather than proceeding as per the investigation done so far and so could finally figure out the RCA of the issue. I was appreciated for debugging the issue and could build a reputation with my manager. I could see more challenging work items coming my way thereafter.

Q2. I have been working in my current organization for the past "XXXX" years. I strongly felt its high time to move to a new organization and develop a fresher perspective with the competitive role that you are offering. I need to push myself to the next level and for that job change is required.

Q3.I have skills and experience that you are looking for & I am
excited about this role. I truly believe that I can add a lot of value to the team.
Q4. Ask day to day responsibilities of the role, also you can ask about the project you are being hired for.
Q5. Talk about the different components of the system and interactions between them i.e., frontend design, backend design, cache, database interaction, load balancer-gateway.
Q6. Talk about build, debugging & test tools that you are aware of and specify the use-case where each of them will be the optimal choice.
Q7. Mention about sprint duration (usually its 2/3 weeks) followed in your current project and different agile ceremonies performed in a sprint i.e. sprint planning, sprint review, retrospective meeting.

Why candidates fail:

- Claim that you cannot handle stressful situations and you usually ask your manager for simple straightforward work items.
- You don't ask any questions about the project /role for which you are being interviewed. This shows that you are not much bothered about the kind of work that you would be assigned and are not enthusiastic about the new work opportunity.
- You don't show passion for the work you have done - this reflects if you don't have much to talk about your previous work, or you talk about it with disinterest.
- You are not aware of the high level design of the project you are working on currently.
- You are not aware of the debugging tools specific to the programming language you claim to be proficient in.

Tips:

- Read all the design level (HLD, LLD) documents of your current project so that you can explain the project details.
- You should be aware of all the build/debug/test tools being used in your previous projects. Research on the prominent debugging/test tool options corresponding to the technology stack mentioned in your resume.