Technical Phone Prep

1. Which programming language, between Java, C, or Python, would be easiest to transfer between different machines?
2. How would you resolve a decision impasse between technology and business during a critical stage in a project?
3. You are given the opportunity to select one closed door of three, behind one of which there is a prize. The other two doors hide piles of rubble. Once you have made your selection, the gameshow host (called Monty) Hall will open one of the remaining doors, revealing that it does not contain the prize. He then asks you if you would like to switch your selection to the other unopened door, or stay with your original choice. Here is the problem. What do you do? [(This is known as the Monty Hall problem.)](https://www.montyhallproblem.com/)
4. Write a piece of code to create a Fibonacci sequence using recursion.
5. Write a piece of code to create a Fibonacci sequence using the iterative method.
6. Write a piece of code to determine whether a number is a palindrome.
7. Write a piece of code to determine whether two words are anagrams.
8. Write a piece of code to determine whether a binary tree is a binary search tree or not.
9. Write a piece of code to find the mirror image of a binary tree.
10. Write a piece of code to combine fractions from two arrays into a single array.
11. Write a piece of code to find the most frequently occurring element in an array.
12. Can you write your own generic Java hashmap from scratch?
13. You have two arrays of integers. Write a piece of code to output an array that will only have elements found in one, but not both, arrays.
14. You have a ladder of X steps. You can go up the ladder by taking either one or two steps each time. Write a function to determine how many potential different combinations of one or two steps you could take to the top of the ladder.
15. Given two strings 'X' and 'Y', find the length of the longest common substring.
16. Why is a binary tree better than a hash table?
17. Why is a hash table better than a binary tree?
18. What's the difference between a process and a thread?
19. When would you use a thread instead of a process?
20. How does garbage collection work in Java?
21. Given n non-negative integers representing an elevation map where the width of each bar is 1, compute how much water it is able to trap after raining. [(Also known as the tapping rainwater question)](https://www.geeksforgeeks.org/trapping-rain-water/)
22. What are the differences between JS Angular and JS React? Which do you prefer?
23. What differentiates propositional logic from first order logic? Which is better?
24. When should you use functional programming vs. objected oriented programming?
25. How could you set up a recursive function so that a smart language / compiler could evaluate the function and never run out of memory?
26. Here is a file of employee names, presented as a string. It contains first names and last names. Write a piece of code to returns the most common last name in the list.  Consider the complexity of your program: it will need to handle a large dataset in a small amount of time.
27. Talk me through the concept of inheritance in C++.
28. Talk me through the Java design patterns you know.
29. What's a Linked List? Can you build one?
30. Can you reverse a Linked List?
31. How would you find the middle element in a Linked List?
32. How do you delete an element from the middle of a doubly linked list?
33. How can you speed up a database query?
34. What's the difference between Java Heap Space and Stack Memory?
35. What are abstract classes in Java? What's their purpose?
36. How would you design a RESTful Application Programming Interface for returning documents that require long processing times, from a multiterabyte storage facility, at request rates of 1/hour vs 1k/second?
37. Find the maximum value in this binary tree.
38. What is overloading an interface? Why would you do that?
39. How would you write a programme to find the biggest number in a list of 10 numbers?
40. What's Object Oriented Programming?
41. How does Object Oriented Programming differ from Process Oriented Programming?
42. What's polymorphism in OOP?
43. What's inheritance in OOP?
44. Write a piece of code to find the square root of a double number.
45. If you had to make a program that could vote for the top three funniest people in the office how would you do that? How would you make it possible to vote on those people?
46. What's role-based access control? How would you implement it?
47. How do you calculate linear regression using the least squares method?
48. Design a distributed file system.
49. Create a product roadmap for building a product like Amazon's Alexa.