# How To Pass A Technical Interview

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# Agenda

- About Me
- The Process
- What to Expect
- Technical Interview
  - How to Practice
  - How You Are Graded
  - Tips and Tricks
  - How to Approach
  - Red Flags

- Hiring Manager
  - How to Practice
  - How You Are Graded
  - Tips and Tricks
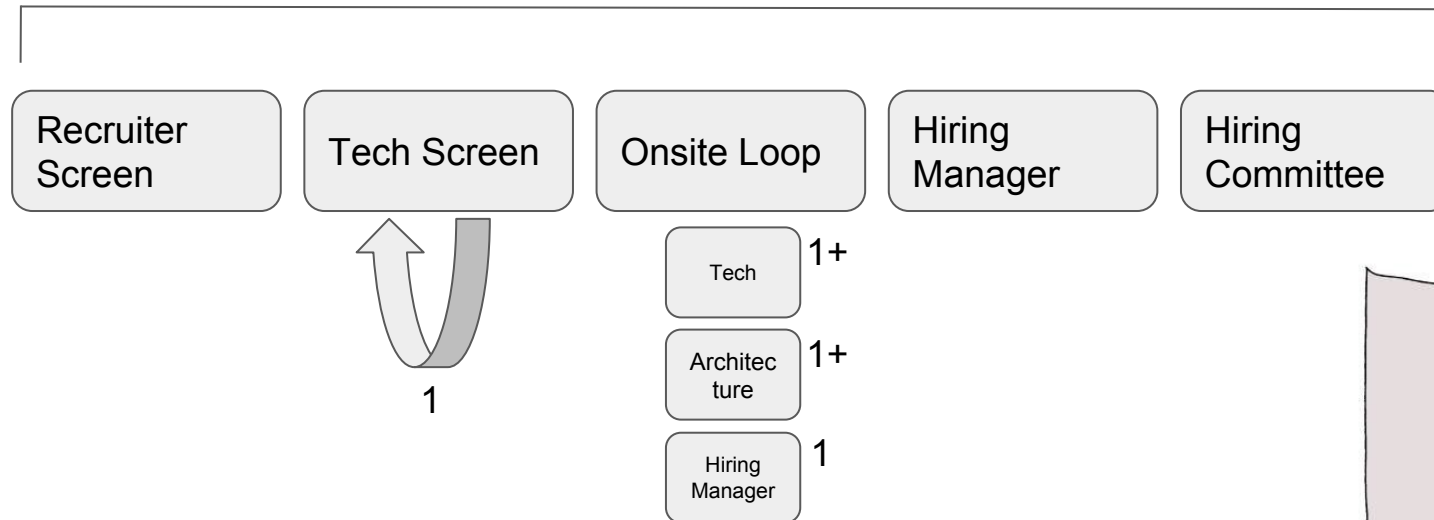  - Red Flags

- Questions

# About Me

- Studied at BYU
- BYU Sports Fan
- 2004 Bachelors in Computer Science
- 2007 Masters in Computer Science
  - Thesis: Cognitive and Behavioral Model Ensembles for Autonomous Virtual Characters
  - Advisor: Dr. Egbert
- Work Experience
  - BYU T.A.L.L.
  - Qualtrics since 2004
- Done 100s of technical interviews

# The Process

Start                                                                  Finish

| Recruiter Screen | Tech Screen | Onsite Loop | Hiring Manager | Hiring Committee |

1

Tech            1+

Architecture    1+

Hiring Manager  1



"I told you they had a tough interview process here."
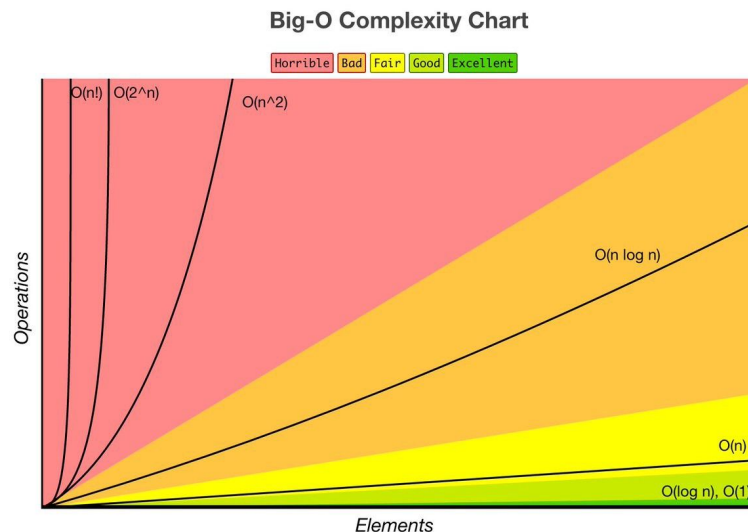
# Technical Interview: What to Expect

- Background questions
  - "Tell me about a project you are proud of?"
  - Be prepared to *dive deep*
- CS Fundamentals
  - Data structures
  - Runtime analysis
  - Object Oriented Design
- Programming Problem
  - An application of a CS algorithms and data structures



IKEA Job Interview

Please have a seat

CANARY PETE

# Technical Interview: How You Are Graded

## We Are Looking for Problem Solving Skills

- Do we want to work with you?
- Fundamentals
  - Do they have strong CS fundamentals?
  - Have they done technically challenging programming?
  - Clarity in requirements
- Can write clean code
  - *Iterates* to a solution
  - Checks for error, edge cases, test cases
  - Consistent typing *(even in untyped-languages)*
  - Easy-to-read, mostly bug free code
- Algorithmic problem solving
  - Explains approach and thought process
  - Considers trade offs
  - Runtime analysis, Big-O
  - Uses appropriate data structures

**Big-O Complexity Chart**

| Horrible | Bad | Fair | Good | Excellent |

O(n!) O(2^n)   O(n^2)

O(n log n)

O(n)

O(log n), O(1)

*Operations*

*Elements*

# Technical Interview: Tips and Tricks

- Practice standard algorithms
    - Recursion
    - Searches (Binary, DFS, BFS)
    - Trees (modification, traversal)
    - Sorts
    - Data structures
    - Paradigms
        - backtracking, dynamic programming, greedy,
        - divide and conquer, memoization, etc.
    - Graph traversals
    - Hashing
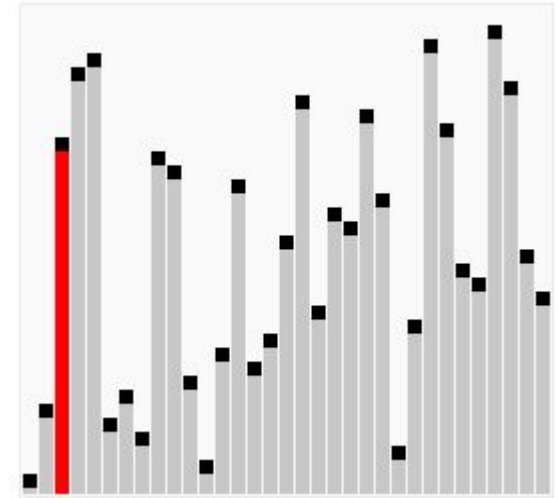
# Technical Interview: Tips and Tricks

- Background: Give **specific examples**
- **Think out loud**
- Practice writing code on a whiteboard. *It's harder than you think!*
- Ask your interviewer questions, clarify!
- Common misconception:
  - You must have a 100% solution to the problem

# Technical Interview: High Level

- Extract the Essence of the Problem
    - What fundamental pieces can you bring to the situation?
- Determine which tools in your toolbox you could use to solve the problem
    - Does this problem remind me of another problem?
    - Is there a better way of representing the data?
    - Are there algorithms that seem to apply to this problem?
- A perfect solution is not the ultimate goal
    - It is valuable to arrive to a suboptimal solution following a solid reasoning path, and then understand the parts of the solution that could be improved.
    - Interviewer will be evaluating not only your technical abilities but also how you approach questions, how you derive the answers, how you communicate, and how you interact with them.
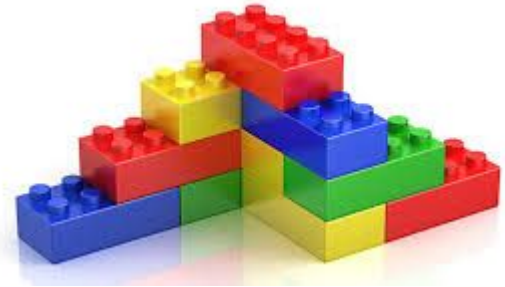
# Technical Interview: Approach

How to Approach Problem Solving

- Step 1: Understand the problem
  - Clarify anything that doesn't make sense, gather the requirements
- Step 2: Think through how to solve it
  - Have a good idea of what you are going to do before writing code
- Step 3: Write the code
  - Break down the problem into smaller problems and solve those
  - Bring it back together
- Step 4: Verify, run the code *(might be in your head)*

*Verbalize Your Thought Process*

# Technical Interview: Tips and Tricks

- Have fun!
- Verbalize your thought process
- Choose a language **you** are comfortable with
  - Intent is more important than API
- Acknowledge shortcomings or todos with a comment
- Time check yourself - be aware but don't stress
- Get a solution even if inefficient
- Listen to your interviewer, good interviewers will guide you
- Don't be afraid to ask questions
  - Defining questions
  - Understand what they want you to do.
    - Time efficient? Space efficient? Any solution?
- Off by one errors
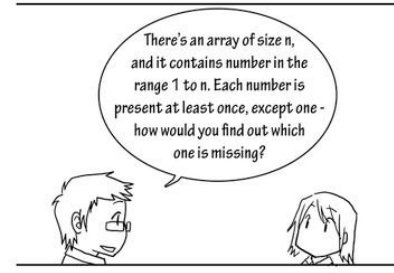
# Good Variable Naming

```javascript
1  function getIt(a, n) {
2      var r = '';
3
4      for (var i = 0; i < a.length; i++) {
5          r += helper(a.charAt(i), n);
6      }
7
8      return r;
9  }
10
11 //CODE DOES THE SAME THING
12
13 function encrypt(message, amount) {
14   var encryptedMessage = '';
15
16   for (var index = 0; index < message.length; index++) {
17       encryptedMessage += rotate(message.charAt(index), amount);
18   }
19
20   return encryptedMessage;
21 }
```

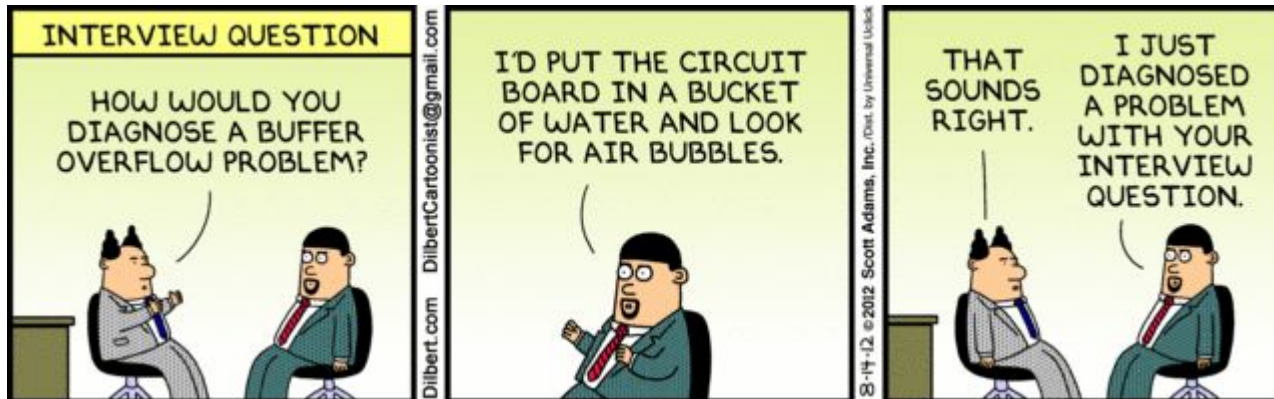Hint: names don't have to be long.

# Technical Interview: Red Flags

Red Flags

- Confuses themselves with their own code
- Poor variable naming
- Codes way too early
- Extended silence--shuts down
- Basic CS knowledge gaps
- Egregious syntax problems

# Technical Interview

Q & A?

# Hiring Manager: What to Expect

- Background questions
  - "Tell me about a project you are proud of?"
  - "Tell me about a time you had to work to earn someone's trust?"
  - Be prepared to *dive deep*
- Culture Fit Questions
  - At Qualtrics it is around TACOS:
    - Transparent; All In; Customer Obsessed; One Team; Scrappy
  - "What is something that you are actively trying to learn?
  - "Explain a time when you made a mistake?"
  - "Tell me about a time you had to overcome a significant challenge in your life."
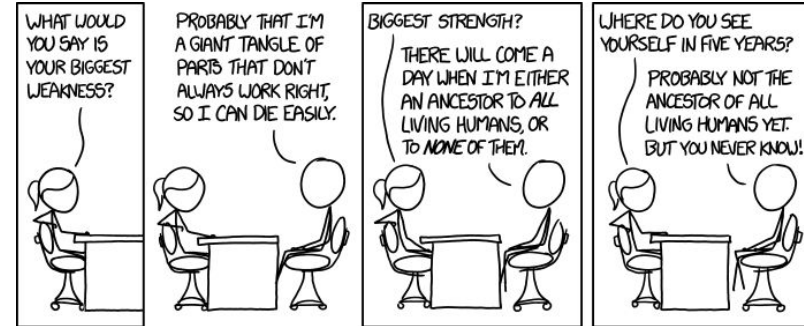


Title text: Do you need me to do a quicksort on the whiteboard or produce a generation of offspring or something? It might take me a bit, but I can do it.

Expect a lot of
"Tell me about a time…"
Type Questions

# Hiring Manager Interview: What to Expect

*"In 2013, Google decided to test its hiring hypothesis by crunching every bit and byte of hiring, firing, and promotion data accumulated since the company's incorporation in 1998. Project Oxygen shocked everyone by concluding that,* **among the eight most important qualities of Google's top employees, STEM expertise comes in dead last.** *The seven top characteristics of success at Google are all soft skills: being a good coach; communicating and listening well; possessing insights into others (including others different values and points of view); having empathy toward and being supportive of one's colleagues; being a good critical thinker and problem solver; and being able to make connections across complex ideas."*

# Hiring Manager Interview: How We Grade

**Do they have a growth mindset?**

- Will the person be good to work with?
- Do they embody our company values?
- Can they evaluate their strengths / weaknesses?
- Were they honest?
- Were they specific?
- Grit
  - Can they push through challenges?
  - Are they passionate about CS?

Have good questions about the company.

# Hiring Manager: STAR Method

## Situation:

Describe the situation that you were in or the task that you needed to accomplish. You must describe a specific event or situation, not a generalized description. Be sure to give enough detail for the interviewer to understand. This situation can be from a previous job, from a volunteer experience, or any relevant event.

## Task:

What goal were you working toward?

## Action:

Describe the actions you took to address the situation with an appropriate amount of detail and keep the focus on **YOU.** What specific steps did you take and what was your particular contribution? Be careful that you don't describe what the team or group did when talking about a project, but what you actually did. Use the word "I," not "we" when describing actions.

## Result:

Describe the outcome of your actions and don't be shy about taking credit for your behavior. What happened? How did the event end? What did you accomplish? What did you learn? Make sure your answer contains multiple positive results.

# Hiring Manager: Red Flags

Red Flags

- Unable to explain technical details of projects
- Not a team player
- Gives up when there is a deadline
- Toxic; Bad attitude
- Hides mistakes / Blame others
- Negativity
- Avoidance

# Hiring Manager Interview

## Q & A?

# Summary

- Technical Interview
  - Practice
  - Verbalize your thought process
  - Ask questions
  - Be methodical
- Hiring Manager Interview
  - STAR method
  - Be specific
  - Be transparent
  - Demonstrate grit

Questions?