What is the difference between a Stack and a Queue? How do you take care of conflicts in Hash Tables?
What happens when you visit a website? Describe everything you know.
Background

- CS50 TF
- Google Summer 2010
- Facebook Summer 2011
- How do I prepare for my interviews?

Reverse, Trim, Remove Letters from, Check Palindrome on, Find Longest Palindrome in a String.
How do they hire?

- Interviews!
  - Software Engineer
  - Product Manager
- Require Technical Background

Check if a number is a power of 2. In an array of size n-1 with all but one number from 1-n, find the missing number. Make the pow function.
Why do they interview?

- Acquire the best talent for their company
  - Software Engineers – Code!
  - Product Manager – Innovate!

- The interview process then must be difficult and very selective

Given a linked list, extend the linked list with the current elements reversed. Reverse the linked list. Randomize the linked list.
The Interview

- Series of 2 to 5 depending on the company
- 30-40 minutes each
- Two types:
  - Onsite: whiteboard coding
  - Over the Phone: Collab-edit coding
- 2-3 problems testing your computer science knowledge
- Yes, you may need to code even for product engineers

Write Binary Search, Traverse a Tree recursively. Given traversals (pre, in, post) determine the tree
Types of Questions

1. Problem Solving / Algorithms
   - Find optimal solutions (Big-O)
   - Write the solution

2. Data Structures
   - Goes along with algorithms but they might directly ask questions about this

3. The internet
   - Information flow
   - Web development techniques

4. Designing
   - Database
   - Systems (Classes, modules, etc.)

Write Fibonacci recursively, iteratively. What are the differences?
General Tips

- Know your recruits, don’t be late, dress nicely
- Don’t stop talking!
  - Fast responses
- Think out loud
- They want to see your code (even if it’s pseudocode!)
- Ask for hints
  - They’re nice people!

Create a deck of cards. Then implement shuffle.
Data Structures

- Stacks
- Queues
- Linked-Lists
- Maps / Sets
- Hashtables
- Binary Trees / Trees
- Tries
- Red-Black Trees
- AVL Trees
- Graphs
- Heaps

Implement and give the Big-O for all data structures
Design an iterator for your data structures. Implement insert and delete as well.
Preparation

- Problem solving. Competitive coding problems.
- Do problems as if you are in an interview
- Quiz your friends

1. glassdoor.com, Google  5. topcoder.com
2. poj.org  6. codeforces.com
3. projecteuler.net
4. train.usaco.org

Implement Merge Sort.
Implement a Priority Queue.
People talk about their past interview experiences with companies

Nowhere to turn in code

People’s solutions are mostly wrong or incomplete

How would you create one of the products that you use today? (Gmail, Facebook, Iphones)
Great resource of problems

Competitive programming style

You can code up solutions and submit them

online judger

Great way to practicing coding while looking at interesting problems that could potentially come up in an interview

Find the largest continuous subset of an array. \{6,1,3,2,4\} => \{1,2,3,4\}; \{8, 9, 1, 2, 3\} => \{1,2,3\}
Competitive Programming

- File I/O. Scan file in. Print file out.

- Sample Problem:

```cpp
#include<iostream>
using namespace std;
int main() {
    int a, b;
    cin << a << b;
    cout << a+b << endl;
    return 0;
}
```

```c
#include<stdio.h>
int main() {
    int a, b;
    scanf("%d %d", a, b);
    printf("%d", a+b)
    return 0;
}
```

Calculate a + b from an input file with a and b that are separated by a whitespace.
Questions?
Figure 1 shows a number triangle. Write a program that calculates the highest sum of numbers passed on a route that starts at the top and ends somewhere on the base. Each step can go either diagonally down to the left or diagonally down to the right.