amazon
we pioneer

Software Development Engineer
Interview Preparation Document

"Random forests, naïve Bayesian estimators, Restful services, gossip protocols, eventual consistency, data sharing, anti-entropy, Byzantine quorum, erasure coding, vector clocks ... walk into certain Amazon meetings, and you may momentarily think you've stumbled into a computer science lecture."
- Jeff Bezos, 2010 Shareholder letter

Amazon—a place where builders can build. We hire the world's brightest minds and offer them an environment in which they can invent and innovate to improve the experience for our customers. We want employees who will help share and shape our mission to be Earth's most customer-centric company. Amazon's evolution from Web site, to e-commerce partner, to development platform, is driven by the spirit of invention that is part of our DNA. We do this every day by solving complex technical and business problems with ingenuity and simplicity. We're making history, and the good news is that we've only just begun.

Thank you taking the time to speak with us. The tips below are intended to enhance your candidate experience.

Our **engineers** tackle some of the most complex challenges in large-scale computing. Software development engineers, technical program managers, test engineers, and user-interface experts work in small teams across the company to create experiences that our customers will be thrilled with.

Topics to Review

Below is a short list of vital competencies that define a successful Software Development Engineer at Amazon and suggestions on how to prepare to discuss.

Programming Languages

We do not require that you know any specific programming language before interviewing for a technical position with Amazon, but familiarity with a prominent language is generally a prerequisite for success. Not only should you be familiar with the syntax of a language like Java, Python, C#, C/C++, or Ruby, you should be familiar with some of the languages' nuances, such as how memory management works, or the most commonly used collections or libraries, etc.

Data Structures

Most of the work we do involves storing and providing access to data in efficient ways. This necessitates a very strong background in data structures. You'll be expected to understand the inner workings of common data structures and be able to compare and contrast their usage in various applications. You will be expected to know the runtimes for common operations as well as how they use memory. Wikipedia is a great resource for brushing up on data structures.

Algorithms

Your interview with Amazon will not be focused on rote memorization of algorithms; however, having a good understanding of the most common algorithms will likely make solving some of the questions we ask a lot easier. Consider reviewing traversals, divide and conquer, and any other common algorithms you feel might be worth brushing up on. For example, it might be good to know how and when to use a breadth-first search versus a depth-first search, and what the tradeoffs are. Knowing the runtimes, theoretical limitations, and basic implementation strategies of different classes of algorithms is more important than memorizing the specific details of any given algorithm.

Coding
Expect to be asked to write syntactically correct code—no pseudo code. If you feel a bit rusty coding without an IDE or coding in a specific language, it's probably a good idea to dust off the cobwebs and get comfortable coding with a pen and paper. The most important thing a Software Development Engineer does at Amazon is write scalable, robust, and well-tested code. These are the main criteria by which your code will be evaluated, so make sure that you check for edge cases and validate that no bad input can slip through. A few missed commas or typos here and there aren't that big of a deal, but the goal is to write code that's as close to production ready as possible. This is your chance to show off your coding ability.

Object-Oriented Design
Good design is paramount to extensible, bug free, long-lived code. It's possible to solve any given software problem in an almost limitless number of ways, but when software needs to be extensible and maintainable, good software design is critical to success. Using Object-oriented design best practices is one way to build lasting software. You should have a working knowledge of a few common and useful design patterns as well as know how to write software in an object-oriented way, with appropriate use of inheritance and aggregation. You probably won't be asked to describe the details of how specific design patterns work, but expect to have to defend your design choices.

Databases
Most of the software that we write is backed by a data store, somewhere. Many of the challenges we face arise when figuring out how to most efficiently retrieve or store data for future use. Amazon has been at the forefront of the non-relational DB movement. We have made Amazon Web Services such as DynamoDB available for the developer community that let them easily leverage the benefits of non-relational databases. The more you know about how relational and non-relational databases work and what tradeoffs exist between them, the better prepared you will be. However, we don't assume any particular level of expertise.

Distributed Computing
Systems at Amazon have to work under very strict tolerances at a high load. While we have some internal tools that help us with scaling, it's important to have an understanding of a few basic distributed computing concepts. Having an understanding of topics such as service oriented architectures, map-reduce, distributed caching, load balancing, etc. could help you formulate answers to some of the more complicated distributed architecture questions you might encounter.

Operating Systems
You won't need to know how to build your own operating system from scratch, but you should be familiar with some OS topics that can affect code performance, such as: memory management, processes, threads, synchronization, paging, and multithreading.

Internet Topics
You're interviewing at Amazon. We do a lot of business online, and we expect our engineers to be familiar with at least the basics of how the internet works. You might want to brush up on how browsers work at a high level, from DNS lookups and TCP/IP, to socket connections. We aren't looking for network engineer qualifications, but a solid understanding of the fundamentals of how the web works is a requirement.

This was a relatively long list of topics to review, and might seem somewhat overwhelming. Your interviewers won't be evaluating your ability to memorize all of the details about each of these topics. What they will be looking for is your ability to apply what you know to solve problems efficiently and effectively. Given a limited amount of time to prepare for a technical interview, practicing coding outside of an IDE and reviewing CS fundamentals will likely yield the best results for your time.

"Invention is in our DNA and technology is the fundamental tool we wield to evolve and improve every aspect of the experience we provide our customers."
- Jeff Bezos

Interview Tips

- Be prepared to discuss technologies listed on your resume. For example, if you list Java or Python as technical competencies, you should expect technical question about your experience with these technologies. It's also helpful to review the job description before your interview to align your qualifications against the job's specific requirements and responsibilities.

- Please ask questions if you need clarification. We want the interview process to be collaborative. We also want to learn what it would be like to work with you on a day-to-day basis in our open environment. If you are asked a question, but not given enough information to solve the problem, drill down to get the information that you need. If that information isn't available, focus on how you would attempt to solve the problem given the limited information you have. Often times at Amazon, we have to make quick decisions based on some of the relevant data.

- When answering questions, be as concise and detailed in your response as possible. We realize it's hard to gauge how much information is too much versus not sufficient enough; an effective litmus test is pausing after your succinct response to ask if you've provided enough detail, or if the interviewer would like you to go into more depth.

- We want to hire smart, passionate people. Please reflect on what motivated you to pursue a career with Amazon and be prepared to speak to it. Although "Why Amazon?" is a standard type of question, it's not a check-the-box type of formality for us. We genuinely want to understand what inspired you to explore an opportunity with us, so we get a better sense of who you are. It's also appreciated when a candidate has put thought into a few questions for the interviewer. It goes a long way when you've taken the initiative to research the company prior to your interview.

"Many of the problems we face have no textbook solution, and so we happily invent new ones."
- Jeff Bezos, 2010 Shareholder letter

Amazon Press

- How Jeff Bezos built a business through experimentation
  http://fortune.com/2015/09/17/amazon-founder-ceo-jeff-bezos-skills/

- Why Maria Renz chooses to work for Amazon
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- Amazon ranked in the Top 5 Most Attractive Employers for Computer Science by Universum
  http://top100.universumglobal.com/united-states-of-america/ranking/most-attractive-employers-ranking-for-computer-science-it

- Record Breaking Holiday Season 2014
  http://phx.corporate-ir.net/phoenix.zhtml?c=176060&p=irol-newsArticle&ID=2002024