IT Interview Questions

A Primer For The IT Job Interviews

By

Narasimha Karumanchi

☼ CONCEPTS ☼ PROBLEMS ☼ INTERVIEW QUESTIONS

Acknowledgements

Mother and *father*, it is impossible to thank you adequately for everything you have done, from loving me unconditionally to raising me in a stable household, where you persistent efforts traditional values and taught your children to celebrate and embrace life. I could not have asked for better parents or role-models. You showed me that anything is possible with faith, hard work and determination.

This book would not have been possible without the help of many people. I would like to thank them for their efforts in improving the end result. Before we do so, however, I should mention that I have done my best to correct the mistakes that the reviewers have pointed out and to accurately describe the protocols and mechanisms. I alone am responsible for any remaining errors.

First and foremost, I would like to express my gratitude to many people who saw me through this book, to all those who provided support, talked things over, read, wrote, offered comments, allowed me to quote their remarks and assisted in the editing, proofreading and design. In particular, I would like to thank the following individuals.

- *Mohan Mullapudi*, IIT Bombay, Architect, dataRPM Pvt. Ltd.
- *Navin Kumar Jaiswal*, Senior Consultant, Juniper Networks Inc.
- *A.Vamshi Krishna*, IIT Kanpur, Mentor Graphics Inc.
- *Kiran Kumar Pasupuleti*, IISc, Bangalore
- *Hirak Chatterjee*, Yahoo Inc.
- *Suresh Kodati*, Development Manager, IBM Software Labs
- *Balakrishna Veerala*, *M-Tech.*, *Factuly*, *GATE* Subjects.
- *Kondrakunta Murali Krishna,* B-Tech., Technical Lead, HCL
- *Kota Veeraiah*, Head Master, Obulasuni Palle, Z. P. H. School
- *Potla Venkateswarlu*, Teacher, Kambhampadu, Z. P. H. School
- *Muralidhar*, Teacher, Durgi
- *Chaganti Siva Rama Krishna Prasad*, Founder, StockMonks Pvt. Ltd.
- *Ramanaiah*, Lecturer, Nagarjuna Institute of Technology and Sciences, MLG

-*Narasimha Karumanchi*
M. Tech, *IIT Bombay*
Founder, *CareerMonk.com*

Preface

Dear Reader,

Please Hold on! I know many people do not read the preface. But I would strongly recommend that you go through the preface of this book at least.

India has many of the key ingredients for making transition. It has a critical mass of skilled, English-speaking knowledge workers, especially in the sciences. It has a well-functioning democracy. Its domestic market is one of the world's largest. It has a large and impressive scattering, creating valuable knowledge linkages and networks. In addition, the development of the IT sector in recent years has been remarkable. India has created profitable niches in information technology (IT) and is becoming a global provider of software services.

Many software companies hire graduates with different backgrounds computer science, electrical, civil, mechanical, B.E., B. Tech., MCAs, MBAs etc. The year 2013-14 characterizes a landmark year as aggregate revenue for the Indian IT-BPO sector is estimated to cross USD 120 billion.

India currently produces a solid core of knowledge workers in tertiary and scientific and technical education, although the country needs to do more to create a larger cadre of educated and agile workers who can adapt and use knowledge. Efforts have been put into establishing a top-quality university system that includes many world-class institutions of higher learning that are competitive and meritocratic, such as Indian Institute of Technology (IIT), International Institute of Information Technology (IIIT), Indian Institutes of Management, Indian Institute of Science, National Institute of Technology (NIT), and the Birla Institute of Technology & Science (BITS). Despite these efforts, not all publicly funded universities or other educational institutions in India have been able to maintain high-quality standards or keep pace with developments in knowledge and technology.

IT Interview Questions try to facilitate students who arrive from colleges where they could not find proper assistance for career counseling.

There are hundreds of books on IT interviews already flooding the market. You may naturally wonder what the need of writing another book on IT interviews is! This book assumes you have basic knowledge about computer science. Main objective of the book is *not* to provide you the *catalog* of *IT interview questions* and *their answers*. Before writing the book, I set myself the following *goals*:

- The book be written in *such a way* that students from non-IT branches should be able to understand it *easily* and *completely*.
- The book should present the concepts in *simple* and straightforward manner with a *clear – cut* explanation.
- The book should provide enough *realtime* examples so that students get better understanding of the *IT interview questions* and also useful for the *campus/off-campus* interviews.
- It should challenge you to look at the small but significant changes you need to make to improve your impact at interviews.
- In this book you will learn all the secrets you need to know to help nail your job interview and get the job.

Please remember, the books which are available in the market are lacking one or many of these goals. This book is different from other books available on the market. The main goals of this book are to provide students with a good knowledge base, and to offer a better understanding to those new to IT. Based on my experience, I thought of writing this book aiming at achieving these goals in a simple way. A 3-stage formula is used in writing this book, i.e.

Concepts + Problems + Interview Questions

I used very simple language such that a school going student can also understand the concepts easily. Once the concept is discussed, it is then interlaced into problems. The solutions of each and every problem are well explained. Finally, interview questions with answers on every concept are covered. All the interview questions in this book are collected from various interviews conducted by top software development companies.

Interviewing is all about research, confidence and creating a good rapport. Everyone is nervous on interviews. If you simply allow yourself to feel nervous, you'll do much better. Remember also that it's difficult for the interviewer as well. In general, be upbeat and positive. Never be negative. As a job seeker if you read complete book with good understanding, I am sure you will challenge the interviewers and that is the objective of this book.

It is *recommended* that, at least *one complete* reading of this book is required to get full understanding of all the topics. In the *subsequent* readings, you can directly go to any chapter and refer. Even though, enough readings were given for correcting the errors, due to human tendency there could be some minor typos in the book. If any such typos found, they will be updated at *CareerMonk.com*. I request you to constantly monitor this site for any corrections, new problems and solutions. Also, please provide your valuable suggestions at: *Info@CareerMonk.com*.

Wish you all the best! I am certain that you will discover this volume useful.

-*Narasimha Karumanchi*
M. Tech, *IIT Bombay*
Founder, *CareerMonk.com*

Table of Contents

CHAPTER

Organization of Chapters 1

1.1 Why Separate Book on IT Interviews?

Computer science is one of the most exciting and important technical fields of our time. In our anxiety to expand technical education in the country, we have started a large number of institutes, but unfortunately, we don't have technically qualified people to teach our students. What IT industry people are saying is that there is a requirement, a demand, but your students coming out of engineering colleges are not employable.

Technical jobs are not shrinking. There is still a growing demand, but engineers here are unable to get those jobs because they lack subject and technical knowledge as well as analytical ability, communication and social skills.

I saw students, who graduated two years ago and couldn't get a suitable job, decided he would sit for the civil services exam instead. In many Indian colleges, the faculty and infrastructure is not good or it is simply not there at all. According to a study, hardly 30 to 35% colleges have the basic facilities and students from there do fine. For the rest, even getting a job that will earn them 5,000 rupees a month is very difficult. Remember, even the daily wage workers are making more than 10,000 rupees a month.

Necessity is the mother of invention, and whenever we really need something, humans will find a way to get it. The aim of this book is to assist those pupils who could not take proper direction for campus preparation, including career guidance, technical and non-technical help, hints for successful long IT career. A successful job search requires a careful, thoughtful plan. This book reviews all of the steps involved in getting a job in today's market. It serves as a comprehensive guide to finding the perfect career.

1.2 What Is this Book About?

A unique feature of this book that is missing in most of the available books on IT interviews is to offer a balance between theoretical, practical concepts, problems and interview questions.

Concepts + Problems + Interview Questions

This text provides graduate students in computer science, IT, and electrical engineering, as well as practitioners in industry with an understanding of the specific interview questions and solutions for them.

The book offers a large number of questions to practice each exam objective and will help you assess your knowledge before you take the real interview. The detailed answers to every question will help reinforce your knowledge.

The work of engineers is everywhere—online ticket reservation, online retail, the bathroom, bedroom, kitchen, and living room. We see results of engineering when we

travel—trains, buses, traffic lights, railroads, buildings, etc.—and when we go to work—computers, paper, books, furniture, clocks, pens, etc. Grocery stores, restaurants and hospitals all house the work of engineers. Considering all of this, it is essential that students continue to be encouraged to enter this creative and challenging field. This book provides the aspiring engineer with an overview of the profession. It reveals the pros and cons encountered by the author in his long, successful career as a software engineer. Other topics include job security, the importance of keeping track of goals, maintaining the network, tips for writing good resume, and many more. Hopefully, reading this book will help to answer all relevant questions.

Salient features of the book are:

- While some of the technical expertise you gain in college is essential to your career as an engineer or scientist, much of it will never be used. Your success may depend on other factors all together. This book discusses these factors, passes along some true examples, and gives some real-world advice on how to avoid most of the pitfalls associated with your chosen career.
- This is primarily for college graduates who, upon receiving their degree, are not sure of what they truly want to do with their lives.
- An easy-to-use guide to writing the resume and cover letter that will help college students land the job best suited to their interests and experience.
- Useful for anyone preparing for interviews (campus/off-campus interviews, walk-in interview and company internal interviews for transferring to other teams).
- This book is unique in that it helps you master the most commonly asked questions, instilling you with the confidence that you need to endure the most difficult of interviews.

1.3 Should I Take this Book?

This book is for those who are preparing for campus placements. Although this book is more precise and analytical than many other interview books, it rarely uses any mathematical concepts that are not taught in high school.

I have made an effort to avoid using any advanced calculus, probability, or stochastic process concepts. The book is therefore appropriate for undergraduate students for their interview preparation.

This book is for students (irrespective of branch) who *want* to learn IT interview questions. This covers all probable domains of questions during the technical interviews in your campus/off-campus placements.

I have identified the major areas where a student should prepare himself for an aptitude test or a technical interview so as to get placed into an IT company. The technical fields are: C, C++, Java, DBMS, JDBC, operating system concepts, data structures, algorithms, basics of design patterns, scripting languages, basics of web development, and networking. Similarly, amongst the non-technical fields a student needs to mentally prepare himself for an aptitude test, resume writing skills, brain teasers, and a HR interview. All the basic study material required to prepare concerning the above related fields are deployed in this book. In addition, this book includes latest buzzwords like cloud computing, big data etc…

1.4 Organization of Chapters

The *second* chapter of this text book focus on designing resume and best ways to get an interview call along with dos and don'ts of that process.

After completion of *second* chapter, I recommend reading remaining chapters in sequence. Each of these chapters leverages material from the preceding chapters. There are no major interdependencies among the chapters, so they can be read in any order.

The chapters are arranged in the following way:

3. *Group Discussions*: Group discussions (GDs) have become an integral part of the selection process. It is being used as a selection tool not only by business schools but also by core and software companies. GD is a forum where people sit together to discuss a topic with the common objective of finding a solution for a problem or an issue that is given. GD is conducted to measure certain attributes in a candidate such as content, communication skills, group behaviour and leadership skills. This chapter provides detailed overview of GDs.
4. *Operating System Concepts*: The operating system is an example of system software. The primary role of an operating system is to manage the computer's resources. This includes both physical (hardware) resources, and abstract resources. For every computer science and IT student, it is very important to have basics of operating system concepts. This chapter discusses about basics of process management, memory management, and all interview questions related to different areas of the OS.
5. *C/C++/Java Interview Questions*: If you're interviewing at the fast-moving end of companies like the typical startup, the choice of programming language matters, and most candidates prefer C, C++, or Java. Languages like C, C++, or Java tends to be significantly more verbose than more productive languages like Python or Ruby that come with more powerful built-in primitives like list comprehensions, functional arguments, destructuring assignment, etc. This chapter covers most of the common interview questions in this space and is one of the biggest chapters of this book.
6. *Scripting Languages*: These types of questions would help interviewers to determine if the candidate for the position has spent any time actually writing shell scripts, either on the job or as part of a shell scripting course or training class, or has just read about them in books or online. If you don't know a scripting language well, it's better to use a language you're proficient at, though it'd be even better to just get proficient at a scripting language. If you are a fresh graduate, having knowledge of scripting languages will give you an edge over others. This chapter focuses on the basics of Shell, Python, and Perl scripting.
7. *Bitwise Hacking*: The commonality or applicability depends on the problem in hand. Some real-life projects do benefit from bit-wise operations.

   Some examples:
   - You're setting individual pixels on the screen by directly manipulating the video memory, in which every pixel's color is represented by 1 or 4 bits. So, in every byte you can have packed 8 or 2 pixels and you need to separate them. Basically, your hardware dictates the use of bit-wise operations.
   - You're dealing with some kind of file format (e.g. GIF) or network protocol that uses individual bits or groups of bits to represent pieces of information.
   - Your data dictates the use of bit-wise operations. You need to compute some kind of checksum (possibly, parity or CRC) or hash value and some of the most applicable algorithms do this by manipulating with bits.

   In this chapter, we discuss few tips and tricks with focus on interviews.
8. *Concepts of Computer Networking*: This chapter provides computer networking fundamentals. They include, OSI and TCP models, IP addressing, UDP, Client/Server Models, Wireless networking, DNS, FTP, DHCP, routing protocols etc…
9. *Database Management Systems*: A database is a collection of data organized in a particular way. In other words, it is a collection of information that is organized so that it can easily be accessed, managed, and updated. Databases can store information about people, products, orders, or anything else. Many databases start as a list in a word-processing program or spreadsheet. As the list grows bigger, redundancies and inconsistencies begin to appear in the data. The data becomes

hard to understand in list form, and there are limited ways of searching or pulling subsets of data out for review.

A database is a structure that can store information about multiple types of things (or entities), the characteristics (or attributes) of those entities, and the relationships among the entities. It also contains data types for attributes and indexes.

Databases can be of many types such as Flat File Databases, Relational Databases, Distributed Databases etc. A relational database uses the concept of linked two-dimensional tables which comprise of rows and columns. A user can draw relationships between multiple tables and present the output as a table again. A user of a relational database need not understand the representation of data in order to retrieve it. This chapter focuses on DBMS advantages, database normalization, SQL queries, and interview questions on them.

10. *Brain Teasers*: There were huge numbers of brain teasers and it is very difficult to cover all of them in a technical book. This chapter covers a few sample questions.

Chapters 11 *to* 26: *Data Structures and Algorithms*

Data Structures and Algorithms are important parts of computer science in an interview. They form the fundamental building blocks of developing logical solutions to problems. They help in creating efficient programs that perform tasks optimally. Data Structure refers to the principles of storing and organizing data. The algorithm is the set of logical steps involved in solving a problem.

It focuses on giving solutions for complex problems in data structures and algorithm. It even provides multiple smart solutions for a single problem, thus familiarizing readers with different possible approaches to the same situation. The book comprehensively covers the topics required for a thorough understanding of the subjects. It focuses on concepts like Linked Lists, Stacks, Queues, Trees, Priority Queues, Searching, Sorting, Hashing, Algorithm Design Techniques, Greedy, Divide and Conquer, Dynamic Programming and Symbol Tables.

27. *Basics of Design Patterns*: A design pattern is a defined, used and tested solution for a known problem. Design patterns got popularity after the evolution of object oriented programming. Object oriented programming and design patterns became inseparable. In software engineering, a design pattern is a general reusable solution to a commonly occurring problem within a given context in software design. A design pattern is not a finished design that can be transformed directly into code. It is a description for how to solve a problem that can be used in many different situations. This chapter does not cover design patterns in depth, but focuses on interviews. Design patterns deal with an efficient way of creating classes, objects and interconnecting them.
28. *Non – Technical Help*: This chapter gives tips on non-technical areas. Few sample questions are:
    - What do you like and/or dislike most about your current and/or last position?
    - Why are you leaving your current position?
    - How do you handle pressure? Do you like or dislike these situations?
    - What are your strengths and weaknesses?
29. *Quantitative Aptitude Concepts*: Every placement test paper on quantitative aptitude will contain at least 30% of questions on numbers and series. Aptitude questions on numbers form the backbone for placement preparation. You can score easily on quantitative aptitude section if you understand the basics of number system. Since the questions are simple, importance lies in acquiring the right skills to tackle these problems with speed. This chapter presents the list of important formulae and tips to help you understand and prepare for the quantitative aptitude section.
30. *Basics of Cloud Computing*: Cloud Computing is a new concept which was recently came popular in computer industry. The main idea of cloud computing is the sharing of computing recourses among a community of users. Cloud computing is

a term you can see being used a lot, but there is a lack of clarity about what cloud computing is. However, most of us are probably making use of the cloud without realizing that this is the case; whenever we access our Gmail, Hotmail, or Yahoo mail accounts, or upload a photo to Facebook, we are using the cloud. The potential benefits and risks, however, are more apparent. In this chapter, we will try to shed some focus on defining cloud computing and other latest buzz words.

31. *Miscellaneous Concepts*: This chapter covers other important topics of IT interviews (such as HTML, CSS, Javascript, Ruby on Rails, Google Search Tips, Web Crawling, XML etc.) even though they are out of scope of this book.
32. *Career Options*: You must have asked yourself this question a lot of times at some or the other point in your life. The society is more concerned about the job and pay you get after education and not the intellectual property you have earned. Don't leave an option straight forward because it is too mediocre. You don't need to follow others but to follow your heart. It's okay if a million other people like you are preparing for an entrance exam, including your friends! If you believe you can crack the exam, trust me YOU CAN. Do whatever you want with 100% dedication. In this chapter, we explore list of those options.

At the end of each chapter, a set of problems/questions are provided for you to improve/check your understanding of the concepts. The examples in this book are kept simple for easy understanding. The objective is to enhance the explanation of each concept with examples for a better understanding.