Interviewing By Design - Prologue

INTERVIEWING BY DESIGN – CHAPTER 1 HOW TO DESIGN AN INTERVIEW-SECTION 1 OF 8: A PROCESS TO MAKE A PROCESS

Before we tackle interviewing using processes and skills foreign to most engineers, we should consider how engineers develop products and bootstrap a new hiring process from that. Engineers use **Product Development Life Cycles (PDLCs)** across projects and companies across their entire careers. A well-structured PDLC generates the highest quality product from an engineering team by giving them a shared framework for how to move from design intent to shipping, revenue-generating product. As Arthur Jones wrote, *"All organizations are perfectly designed to get the results they get,"* a line often attributed to Deming. If the process is weak or undefined, the outcomes will reflect it. If we want better results, we need to design a better process.

Engineers are first exposed to PDLC concepts early, then repeatedly, in their careers—in university design classes, project work, and ISO certifications. They quickly discover that disciplined methods reduce rework, control risk, and drive first-pass success. Whether the field is hardware, software, mechanical systems, or integrated platforms, every engineering discipline relies on some form of PDLC.

Two of the most common PDLC variations are **Waterfall** and **Agile**. In *Waterfall*, each phase follows sequentially—requirements, design, implementation, verification, release – each step is completed and approved with a phase gate, a signoff, before preceding to the next phase. It's rigid structure of three to seven sequential phases emphasizes getting the design right the first time. By contrast, *Agile* breaks the process into (generally) two-week iterative sprints, allowing teams to adapt product quickly to market feedback as they go, emphasizing flexibility and speed over rigid pre-planning.

While Agile dominates software development, hiring and interviewing align more naturally with the Waterfall model. Agile is ideal when the tech stack supports rapid iteration, when you don't know what exactly the market wants, and the cost of a single release being "wrong" is low. By contrast, there's little about hiring a new engineer that is Agile; interviewing is slow, we typically know what we want in a new engineer, and the cost of a mistake is high.

In section 2, we'll look at the standard Waterfall process in more depth. Just as engineers use PDLCs to design reliable products, we can use the same structure to design reliable and high quality hiring outcomes.

INTERVIEWING BY DESIGN – CHAPTER 1 HOW TO DESIGN AN INTERVIEW- SECTION 2 OF 8: Waterfalls and Requirements

Section 2 – Waterfalls and Requirements

Hiring processes most closely mirror a Waterfall Product Development Life Cycle (PDLC), so our hiring process starts with understanding Waterfall. The most prevalent variant of waterfall uses five phases: requirements, preliminary design, implementation, validation, and release. All development processes, Agile or Waterfall, start with requirements, and all Waterfall processes have formal gates or approvals between phases. Because good product outcomes depend on good requirements, we'll focus at length on Requirements before a brisker discussion of the rest of the Waterfall PDLC.

Requirements

Product design is about envisioning and creating a solution to meet a customer need. The Requirements phase synthesizes market input and competitive analysis to create idealized customers (personas) and an enumerated set of needs. Broad brush strokes of marketing intention are replaced with key features, high level workflows, and performance specifications. Requirements often exceed what's easy or known possible, and reaching beyond easy and known is what creates innovation and value. It's easy to understand why this phase needs formal approval and signoff and the requirements need to be frozen – design changes late in Implementation are expensive in time and money,

But there's another reason why requirements need to be frozen. Validation is supposed to be performed against signed-off requirements, not against "whatever-the-engineers-implemented". Validation of complex systems requires intensive planning, with custom test hardware and software, jigs, scripts, test equipment, training, lab setup, 3rd party support, etc.- these are all dependent on requirements. If requirements change late, the Validation team may not be able to validate the product properly against the new requirements.

The output of the Waterfall Requirements phase should include an assessment of product, price, placement, promotion, company, customer, and competition (the classic 4 Ps and 3Cs of Marketing), a set of key external and internal product features, key success criteria, and a target schedule. The old saying Garbage In Garbage Out applies to product development, and short cuts in the requirements phase cannot be overcome by great design. Conversely, hitting a compelling need squarely on the head with a Minimum Viable Product has been a successful strategy for many.

In Chapter 1, Section 3, we'll finish our introduction to the Waterfall process, looking downstream from Requirements to Preliminary Design.

INTERVIEWING BY DESIGN – CHAPTER 1 HOW TO DESIGN AN INTERVIEW - SECTION 3 OF 8: Downstream on the Waterfall

Section 3 – Downstream on the Waterfall

Once we have defined and signed off Requirements, the Waterfall process continues with Preliminary Design, followed by Implementation, Validation and Release.

The purpose of the Preliminary Design phase is to nail down the "givens" in the project, driving primary design decisions and reducing implementation risk. In electronics products, hardware engineers evaluate and select key components, sole source, and long lead time parts. In the software realm, architects evaluate and select cloud infrastructure, software stacks, and libraries. High level partitioning breaks the product down into manageable parts, and major hardware and software components are selected. Validation teams develop a test plan to identify necessary equipment, software and scripts. Proof of concept prototypes in this phase reduce risk, often using evaluation boards/developer kits.

The Implementation phase is the tedious part of engineering where designs come to life: schematic symbols for 352-pin ICs, 30-page schematics, 1,000 lines of code. Design reviews are the heart of Implementation, where the collective knowledge of a team is brought to bear on a design. Just as it's hard to proofread your own book, it's extremely hard to review your own design alone and well. Design reviews ensure the highest quality work, reduce the likelihood of unplanned revisions and delays, and are the best way to transfer knowledge among staff. In parallel with design, validation engineers implement and verify their test systems. The Implementation phase concludes with a working prototype of the final product, with basic functional testing completed by the designers, and a validation platform ready to go.

Validation evaluates prototypes against customer and regulatory requirements. Whereas design engineers strive to make their prototypes work, validation engineers strive to assure that the product meets requirements on behalf of the customer. Validation efforts vary considerably: consumer mobile applications, which could get bi-weekly updates via app stores, require far less validation effort than integrated circuit design or medical products, which require many months to years of testing.

Release is not an event, but rather a process, to transfer design documentation to production, following approval of final design documentation and validation results.

In Chapter 1, Section 4, we'll look at a variant of the Waterfall PDLC used for qualifying third party product.

INTERVIEWING BY DESIGN – CHAPTER 1 HOW TO DESIGN AN INTERVIEW - SECTION 4 OF 8: The Make Versus Buy Waterfall

Section 4 – The Make vs Buy Waterfall

When engineers evaluate make-versus-buy decisions, or consider third-party components or subsystems, they adapt the general Waterfall PDLC to turn it into a focused qualification process. The same discipline applies, but the emphasis shifts from creation to evaluation. Rather than designing a new product, the team finds external offerings, qualifies them, and selects the most suitable candidate based on overall requirements.

Requirements
Clear requirements are just as important for third party external components and subsystems as in-house design. But one is often forced to compromise from one's ideals when selecting from limited offerings, and requirements may specify a superset of features for validation, even though not one candidate offers all features. Balance is key - too many mandatory requirements can reduce the count of available candidates to zero.

Preliminary Design
The Preliminary Design phase for third-party products or subsystems does not require an internal architectural design effort, instead requiring the specification and design of validation hardware and software.

Implementation
The Implementation phase for third party products focuses on the identification and acquisition of suitable candidates, as well as the development and verification of validation systems.

Validation
Third party products are validated just like "made-in-house" products with a few key differences. Third party selection requires more compromise than custom design. Furthermore, multiple 3rd party candidates are often evaluated at one time to pick the best candidate of those qualified, rather than validation providing feedback to direct the in-house design to iterate the design to meet requirements.

Release
The release phase looks and feels the same as for in-house product – a thorough review of design documentation and validation results against requirements, followed by a signing party, and transfer of documentation to production.

This third-party PDLC mindset ensures that external components are treated with the same rigor as internal designs. While the Preliminary Design and Implementation phases for third party components have reduced design effort compared to an internally designed product, third party qualification efforts require similarly rigorous design and implementation of validation systems.

In Chapter 1, Section 5, we'll build our hiring process from this third-party Waterfall PDLC.

INTERVIEWING BY DESIGN – CHAPTER 1 HOW TO DESIGN AN INTERVIEW - SECTION 5 OF 8: A New Hiring Process

Section 5 – A New Hiring Process

As we shift from a generic Waterfall to a Hiring Waterfall, we are taking a huge leap in complexity (people versus things) at the same time that we're compressing the cycle. Hiring managers typically spend only a little time on job descriptions, with very little time invested in the systematic creation of measurable requirements, and even less time making sure that interview questions test against the complete requirement set.

New Hiring Process - Requirements
My last company, where we designed and manufactured operating room video equipment, elevated and set new standards for product testing for me. This heightened standard for medical product validation informs my perspective of job requirements and the hiring process. For medical equipment, tests need to be traceable to requirements, and everything that's required needs to be tested and documented. So it should be with interviews.

We can take a good initial stab at requirements by assessing skills, experiences, knowledge, and abilities needed for this role for each phase of the Product Development Life Cycle. Then, every requirement must be measurable, testable, and documentable by having one or more questions behind it. The initial cut of job requirements, written by HR and the hiring manager, will be revised by the interview team in the Preliminary Design phase, when interview questions are formulated.

New Hiring Process - Preliminary Design
Engineers are smarter together than apart – that's the fundamental underpinning behind the value of design reviews. Just as preliminary design for a product is a team effort, the creation of questions to measure candidates against those requirements is also best done by a team – the whole interview team. Every question and answer can and should be a valuable data point in the process. The New Hiring Process brings the interviewing team together in the Preliminary Design phase to review and augment the job requirements and then brainstorm questions that test against those requirements.

The Hiring Preliminary Design phase creates:
1) team-validated job requirements that are complete and fully measurable, and
2) an initial two-layer set of phone screen questions for Recruiters and HR staff
3) a brainstormed list of questions that trace to the job requirements.

In Chapter 1, Section 6, we'll continue with Preliminary Design, discussing training for recruiters, HR Staff, and the interview team.

INTERVIEWING BY DESIGN – CHAPTER 1 HOW TO DESIGN AN INTERVIEW - SECTION 6 OF 8: New Hiring Process – Training

Section 6 – New Hiring Process – Training

Preliminary Design Is Not Complete Without Training
Phones ring. Recruiters screen candidates with prepared questions from the interview team. HR staff does a follow-up call, and the interview team gets qualified candidates AND all of their responses. The recruiters and HR staff will be thrilled to have prepared screening questions, and they already know how to phone screen, because that's a primary function of their jobs. But that's not enough. They, and everyone involved, needed training first.

HR Staff and Recruiter Training
HR Staff and Recruiters are your initial contacts with your candidates, and they need to understand more about your company's engineering workflow and technology. The HR Manager and the Hiring Manager accomplish this training by reviewing requirements against each PDLC phase for each open position – as the very first contact, the recruiter needs the same level of education. While I've met recruiters with technical degrees and most know a little about designing chips, boards, systems, or software, they don't know your technology and certainly don't know the tech and tools for this specific job - once you get past talking Altium or SolidWorks, recruiters and HR are out of their depth. By receiving an education in your company's technology and processes, HR and recruiters can optimize their screenings to avoid wasting the time of the interviewing team, expensive engineers, with impostors or skipping over a gem of an engineer. I recommend HR and recruiter education over lunch meetings.

Interview Team Training
Most engineers are happy to have interview training because they've never had any and know that training has worked in every other aspect of their career. Engineering training for interviews happens in two contexts: general training not associated with a specific candidate, and training that occurs during hiring preparation meetings for a specific candidate. Any engineer who interviews candidates should have general interview training once a year to get and keep up to speed on the basics: what they can and cannot ask or say. However, every interview team meeting to discuss job requirements for an opening, and brainstorm and assign questions, is a perfect occasion for interview coaching, a little role-playing, questions, and answers. Training will be pervasive throughout future chapters.

In Chapter 1, Section 7, we'll transition into Implementation, building the Validation engine by assigning requirements and questions to interview team members.

INTERVIEWING BY DESIGN – CHAPTER 1 HOW TO DESIGN AN INTERVIEW - SECTION 7 OF 8: New Hiring Process – Implementation

Section 7 – New Hiring Process – Implementation

Implementation: Recruiting and Validation Assignment
The New Hiring Process Implementation phase consists of two efforts. The Recruiter and HR Manager identify and screen candidates using supplied questions. In parallel, the interview team has to assign both requirements and questions to team members.

The Role of the Interviewer
The role and perspective of the interviewer changes as we shift to a test and validation paradigm. Although the tester's opinion is valuable in a third-party qualification, the tester's role is to document test results against requirements for later analysis. Analogously, interviewers must document answers during the interview or lose information. Written answers allow interviewers to extend beyond their personal disciplines to bring back information for the manager and whole team to consider.

Size and Constitution of Interview Team
The interview team and size wasn't selected at random when initial job requirements were distributed. I've interviewed with as few as one (the hiring VP Engineering) to nineteen (almost half the company!). The initial Recruiter and HR phone screens should only pass strong candidates. The technical interviewing team should include:
- two senior interviewers of the same technical discipline,
- a senior interviewer of an adjacent technical discipline, and
- the hiring manager.

The Director or VP should always do a separate interview for culture and vision alignment, reviewing all of the validation work/ interview results for final approval.

Brainstorming Assignments
Since all answers are documented, there is freedom to assign questions across the team. I like putting requirements and their questions each on a large Post-It on the left side of a white board, clustering them by topic, with columns to the right for each interviewer. Team members discuss and move requirements/questions to their column to own them. Duplicate questions are added in at the left and assigned. After a photo of the whiteboard for posterity, each interviewer takes their Post-Its and drafts up a short Word doc with their questions and places for them to record answers.

Practicing Questions
Once questions are assigned, interviewers should practice with other interviewers, to become practiced at interviewing and writing answers, as well as getting a good estimation for how much time they need for each question and answer.

In Chapter 1, Section 8, we'll finish the Implementation Phase by scheduling the interviews, more involved task than you might expected.

INTERVIEWING BY DESIGN – CHAPTER 1 HOW TO DESIGN AN INTERVIEW - SECTION 8 OF 8: New Hiring Process – Scheduling

Section 7 – New Hiring Process – Scheduling

Implementation – Scheduling Is More Than The Time In Front Of A Candidate
Once we have finalized questions assigned to individuals, we can put an interview schedule together, but the interview is far more than what the candidate sees. Behind the scenes, an interview is more like a track event with a coordinated baton handoff rather than punting the candidate over the wall to the next interviewer.

There are diminishing returns for any single interview - an hour is too long, 30 to 45 minutes per interviewer is optimal. Each question should have a time budget, including the time for the interviewer to document answers in writing during the interview, with 80% of each interview allotted to planned questions, 10% for following up, and 10% for the candidate to ask questions.

The candidate should be left alone for five minutes to chill between interviews while the just-completed interviewer briefs the upcoming interviewer on issues that needed additional follow-up. The just-completed interviewer should spend the next 15-20 minutes finalizing their review notes without delay. Each interviewer comes five minutes early for a debriefing, runs their scheduled interview to the minute, debriefs the next interviewer away from the candidate for five minutes, then finalizes and emails their interview feedback for a final fifteen minutes.

With this planning, each interviewer needs to budget at least 55 minutes per candidate for a net 30 minute interview. Without time during the interview to document responses and time immediately afterwards to capture anything remaining, interview feedback without documentation turns into an emotionally subjective assessment rather than a written validation report.

Our interview team is now well prepared for the main course, the interviews. We are light-years ahead from that morning when Andrei went in for a rough set of interviews with Craig, Joanne, and Tom.

CONCLUSION
This concludes Chapter 1 - How to Design an Interview.
In Chapter 2, we'll take a deep dive into Job Requirements, how most job requirements are unfocused and untestable, and how to write job requirements that we can interview and hire against.

We're going to go back in time, when the job opening was first approved, about six weeks before Andrei's interview. A new character joins the LaPlace narrative – Jennifer, their new HR Manager. Jennifer knows what to do – she's read an advance copy of Interviewing By Design, and she's about to meet with Tom to start working on detailed job requirements.