# Design Technologist - Exercise Interview

## Part 1 - BIM Data Extraction Challenge (30 mins)

Surfacing BIM/design data to non-designers is crucial to our sales process because it enables us to provide our homeowners with accurate cost estimates before signing a contract. In this exercise, we would like you to use a sample Revit model to extract BIM quantity data for non-Revit users. The goal of this challenge is not to find the 'correct answer', but more about your approach to understand the problem, organize the requirements, and come up with a creative technical solution.

- User
  - The extracted project data will be used primary by our Sales team and general contractors
  - The Revit tool which triggers the data extraction will be directly used by Cottage junior designers with varying levels of Revit proficiency
- Data to be extracted (Sample model: *See Appendix A*)
  - Exterior wall: Linear footage by wall type
  - Flooring: Square footage by type
  - Plumbing fixtures: Count by type
- Technical guideline
  - Using Revit API, please create a one-button tool that will allow junior architectural designers to extract quantity takeoff data for the 3 items listed above
  - The extracted data should be automatically outputted into a gsheet that can easily be shared with non-Revit users such as our Sales team or general contractors.
  - To interact with Revit API, please be creative and use any methods that you think is the best approach and explain why. (e.g. Dynamo, pyRevit, Rhino.inside, C# add-in, Speckle, Forge, etc.)
  - Utilizing open-source frameworks is encouraged.
- Presentation
  - System Design: Please diagram the workflow, system, and tech stack of your solution in a single slide. Show us where your tooling fits into our project delivery process and describe how information speaks to each via your tooling. *(See Appendix B)*
  - Technical Demo: Let's see it in action!

# Part 2 - Success Measurement (15 mins)

One of the most important parts of internal tool development is measuring the success and efficacy of the product in order to understand its ROI. Below is the list of good examples of 'success metrics' that we should track:

- How many hours/minutes are we saving per project by using the automation tool?
- How can we measure the success of the tool's deployment?
- How can we understand which particular tool is underutilized, and why?
- How can we minimize the time spent on the maintenance of the tool?

Describe in a few slides or bullets how you would track these types of metrics to understand the success of your tool. What kind of technology/system would you propose to achieve this? Please demonstrate your methodology and communication plan in simple diagrams.

# Appendix

A. Sample model: **Download here** (Revit Version: 2021 / Please use 30-day trial version if needed)
B. Here are some bullet points that summarize our pre-contract project lifecycle– from acquiring a new lead, up through the signing of our contract [people involved & duration in brackets].

1. **New Lead/Sales Screening Call** [Sales] - New customers are primarily acquired by driving users from Facebook and Google ads through our website and saved into our CRM. Our CRM schedules a call with a salesperson for the homeowner at a mutually available time. The salesperson asks some basic questions to find out the goals of the ADU (form factor, use case) and qualify the homeowner (intentfulness, finances) before recommending a next step.
2. **Site Visit** [Sales - 1-2 wks after sales call] - Two sales people will go to the homeowner's property. We typically spend several days per week on the road and will group site visits based on their proximity to each other. During the site visit, we take notes on the site conditions that may affect construction. The primary goals are to develop an understanding of the "difficulty of construction" for our later estimate as well as to gather property notes to pass to the design team.
3. **Schematic Design** [Design & Sales - 2-4 wks with the homeowner] - Based on our notes from the site visit and sales call, we create a preliminary ADU floor plan with a suggested location on the property. We may iterate on the designs a few times as we learn more about the design preferences of the homeowner. Finally, we assess the level of spec/finish the

homeowner wants for the ADU for estimation purposes. The goal of this stage is to align on a design to send to our general contractor partners to get an estimate.

4. **GC Site Visit** [Sales, GC - within 1 wk after we align on designs] - If the homeowner is still highly intentful and satisfied with the design, we'll schedule a subsequent session for our GC partner to confirm the first site visit notes prior to providing an estimation. This site visit also functions as a chance for the homeowner and GC to build comfort with each other.

5. **Estimation** [Sales & GC - ~1 wk to process] - Cottage provides the general contractor with the preliminary design, takeoffs, notes on any finishes the homeowner has decided on, and the General Contractor creates an estimate and scope of work for the project.

6. **Contracting** [Sales & GC - 1-2 wks] - We preview the estimate with the homeowner and, if the scope is agreed upon, we create a contract for the project and answer any questions on our agreement structure. The homeowner may check references for Cottage and/or the GC at this point.

C. Cottage's current BIM/Design Systems tool stack
- Revit 2021: Design & documentation
- Autodesk Docs (Previously BIM 360 Docs): Cloud model & data management
- Forge: Cloud project setup and access management automation
- pyRevit: Custom add-in framework for Revit