INTERVIEW GUIDE

Introduction:

Self: `<Redacted Introduction>`.

Project: In our current research project, we investigate the developers' perspective and approach towards browser extension development. Our goal is to identify, highlight and help resolve any issues or roadblocks that developers may face during extension development and publishing.

Goal of this interview: From this interview, we want to understand your extension development experience so far, the process that you usually follow for your extension development and maintenance, and your perception of the overall extension ecosystem, in general.

Interview pre-requisites and information:

We would like to bring to your attention that we will record this online session along with the shared screen *without capturing your face* for later assessments for our study. Further, during the interview, you can choose to skip any of the questions or abort the interview at any point. We ensure that all personally-identifying information from this data will be removed and not made public. We will transcribe the interview using a GDPR-compliant transcription software operated exclusively on computers of our research institution and we will delete the audio file as soon as the transcription is completed. Thus, we ask you to provide us with your consent to continue:

- Provided Consent - Thanks. (Start the recording)
- Did not provide consent- Thanks. (Stop and exit the interview)

General Overview/Conceptual Questions:

Warm-up questions: Let's start with discussion on the extensions that you have developed.

1. Please tell us in as much detail as possible about how you got familiar with or learned to develop extensions for the first time?
2. What is the utility of the extension(s) that you have developed so far?
   a. Do you often use it for personal purposes?
   b. Does your extension provide services to users of certain characteristics, or everyone, in general? (profession, categories of websites, geographies, etc.)
   c. Do your extensions specifically cater to the needs of your customers or your employer organization?
3. What motivates you to develop and publish extensions?
   a. What are the personal incentives or gains that you seek for?
4. Have you also worked with other Web technologies?
   i. Web applications development
   ii. Mobile-based development.
   iii. Experience with the development of other web-based components, e.g., third-party libraries, Progressive Web Applications, etc.
5. *If the participant is currently employed in the field of Computer Science, engineering or Web development (data from the screening survey), then:* What does your current role entail?

Development Practices: Now, let's talk about the extension development process in particular.

1. Please describe in as much detail as possible about the process you followed to recently develop one of the extension(s)?
   a. When did you last publish or update your extension?
   b. What were the steps in the design process here?
      i. Design methods
      ii. Requirements gathering.
      iii. Best practices for development.
      iv. Toolchains used in different phases of the development life cycle.
      v. Testing considerations.
      vi. Runtime considerations and constraints.
   c. What are the information sources that you referred to during the process?
      i. How did these information sources help towards your development process?
      ii. Do you refer to these resources in general while developing any extension or you only referred to them for this specific task?
2. How has been your experience with the publishing process on the Web Stores?
   a. Did you ever receive any negative feedback from any of the Web Store? *If yes:*
      i. What were the reasons provided by the store?
      ii. Were you able to resolve the issue provided by the Web Store?
         - Can you elaborate a bit more on this?
   b. Why do you think the extension vetting procedure is in place? (Optional)

Practical Tasks: Now, we ask you to complete the set of coding tasks that will help us to better understand your process of extension development. We would like you to think of practical solutions that you would typically use in your own extension and publish them for real-world use. Please note that we only intend to capture the semantic approach to a solution without evaluating its syntactic correctness and efficiency. Further, you are encouraged to ask questions to us at any point if you need more information or if anything is unclear and you can also refer to online resources, if needed. FInally, we ask you to think aloud during the course of the coding tasks.

Coding Task Description

Goal: John Doe is a successful social scientist and philanthropist who wants to promote healthy reading habits among younger generations. To support this cause, he opened an online bookstore selling books and novels at extremely reduced rates. His store has quickly gained popularity among varied groups in society. However, John lacks expertise in web development, and his online store is missing several common features found on most e-commerce websites. Currently, the site is built using publicly available code, focusing primarily on product functionality. The bookstore is accessible at: `<redacted URL>` (For Login: Username = Password = <Your Participation ID>).

Your Role: You are a browser extension developer and decide to help users of this platform by creating and publishing a browser extension that adds the following functionalities:

Task 1: Save Address for Later: Since the website lacks a "Save Address" option, allow users to save their address for future usage. The extension should autofill the previously recorded address when the user clicks the *autofill* button on the UI. Currently, the extension includes code to add the *"Save Address for Later"* button on the order page. However, it does not include the code for recording and retrieving data to autofill the address in the corresponding form. The steps to be followed are:

➢ The API and host permissions are correctly configured for the extension (in the manifest).
➢ The address data is recorded appropriately. (check/implement content script logic)
➢ The address data is retrieved appropriately. (check/implement content script logic)

Task 2: Check Product Price on Amazon: You decided to write an extension that enables customers to have a peek at Amazon for the selected product title before buying the product here. The extension currently adds a "Check on Amazon" button right next to the "Order Now" button for each product item. This button, when clicked, should open up the *amazon.com* site with the product title as a search query in an *iframe overlay*. At the moment, the extension faces certain issues when opening up the overlay.:

➢ The API and host permissions are correctly configured for the extension (in the manifest).
➢ When clicking on the "Check on Amazon" button, the *iframe/overlay* opens the Amazon page with the search query of the product title (check console logs to identify issues).

Further Information: For both tasks, we provide you with the extension with working code (in a zip file) so you don't have to write the intended functionality from scratch. However, the provided code is incomplete and missing critical components, as outlined above. There is also room for improvements and optimization in the extensions' manifest for real-world deployment.

IMPORTANT NOTES:
- Remember this is **NOT** a job interview.
- We **DO NOT** seek a perfectly executable solution without any runtime issues. Instead, outline your approach and related decisions before implementing.
- Think aloud throughout the coding tasks.
- Provide a browser-agnostic real-world approach that you would use for your own published extension.
- Ask questions if you do not understand the provided information, or the requirements, or if you have difficulty navigating to the next steps. We will be happy to help, wherever possible.
- To debug issues/errors on the client side, you can always check them on the browser console.
- You are allowed to refer to any online resources for the coding tasks. However, please verbalize your thought process during the task.

Additional Coding Task Description

Task 3: Social Media Sharing: Add a Facebook Share button next to each product. When clicked, this button should open the Facebook share page, allowing users to share the product on their feed. The extension includes code to inject the Facebook Share button into each product. However, the button is not displayed due to client-side issues. The steps to be followed are:

➢ The API and host permissions are correctly configured for the extension (in the manifest).
➢ The injected resources are correctly loaded. (check console and the manifest)
➢ The injected script executes without any issues. (check console to identify the issue)

Security & Privacy Mindset: Let's dive deep into this (S&P-related task from above) a bit now.
1. What are the potential **security** problems that can be associated with browser extensions?
   a. Can you elaborate a little on the potential implications for the affected parties?
   b. How could these security problems affect/be related to your own extension(s)? Or,

     c. Can you come with an example of a security issue with extensions?
     d. How did you learn this?
     e. How do you consider/include these issues while creating your own extensions?
         i. Can you please specify any guidelines/protocol that you follow to ensure your extension is safe to use?
     f. In your opinion, are there solutions to ensure security of extensions?

2. What are the potential **privacy** problems that can be associated with browser extensions
     a. Can you elaborate a little on the potential implications for the affected parties?
     b. How could these privacy problems affect/be related to your own extension(s)? Or,
     c. Can you come with an example of a privacy issue with extensions?
     d. How did you learn this?
     e. How do you consider/include these issues while creating your own extensions?
         i. Can you please specify any guidelines/protocol that you follow to ensure your extension is safe to use?
     f. In your opinion, are there solutions to ensure privacy for extension users?

3. How was your experience while working with the privacy policies for your extensions?
     a. What do you think about them?

4. What do you think is the current state of the ecosystem with respect to security and privacy?
     a. Who do you think should bear the responsibility to maintain the security and privacy standards within the extension ecosystem?
     b. What could browser vendors do to improve the current state of extension developments and publishing?

5. Have you heard of the new Manifest V3 standards for extensions? *If yes:* (Optional)
     a. Why do you think the vendors, nowadays, encourage (or even mandate) to migrate to the new MV3 standards?
         i. What are your views on this?
    *If they have also **worked** with MV3:*
     b. Can you describe in detail what the task was about?
     c. How was your experience working with the new MV3 standards?
         i. *If the participant indicates that the task was about migration from MV2 to MV3:* How was the experience with migration?

De-briefing: Thank you very much for sharing all the valuable insights and your experience of extension development with us through spending your time and participating in this interview. This is the end of the interview and we will stop the recording now. (Stop the recording)

    I would like to reiterate the goal of this project here more concretely. Through this project, we wanted to understand the security and privacy mindset of the extension developers and the issues that they face to develop secure and privacy-friendly extensions.

    At this point, if you would like to add anything to any of the things we discussed or anything in general, please feel free to go ahead now. *If yes: Would it be okay for you if we record your additional statement here for our study?*

We will send a separate email to you soon which will contain the details of compensation for your participation in the interview. If you have any further queries, please feel free to contact me at: `<redacted EMAIL>`.