

## [Visit the Basic Income Tax Toolbox](#)

### 1. Framing

- a. Problem to solve:
  - i. The toolkit aims to simplify complex tax concepts, streamline the process of finding relevant information within course materials, and enhance practical understanding by providing a user-friendly capital gains calculator. The primary goal is to facilitate an improved learning experience for students navigating the intricacies of tax-related subjects.
- b. Users / Stakeholders:
  - i. The primary users of the toolkit are students enrolled in tax courses, seeking clear explanations of tax concepts, easily accessible study materials, and practical application tools. Secondary users include instructors or educators in tax-related fields who require resources for teaching purposes.
- c. Detailed user personas for testing
  - i. Tim, a second-year accounting student enrolled in a basic federal income tax course. His goals include understanding fundamental tax concepts, passing exams, and excelling in the course. He faces challenges related to comprehending complex tax regulations and navigating course materials. Professor Joe, an experienced tax instructor, aims to provide effective teaching materials, assess student performance, and ensure students grasp key tax concepts.

### 2. Research

- a. Describes existing solutions in this space or notes absence of same:
  - i. In my research for the tax toolkit website, I identified existing solutions in the educational space, with platforms like Quizlet offering resources for tax-related studies. However, a noteworthy observation was that these existing solutions often came with limitations, especially as some were behind a paywall. The presence of paywalls limited accessibility for students, potentially hindering their ability to benefit fully from these resources. This insight underscored the need for a free and comprehensive toolkit that offers a wide array of educational resources for students enrolled in basic federal income tax courses.
- b. Consulted with practitioners re. relevant solutions:
  - i. As a solo project, I did not engage in direct consultations with practitioners. The decision to work independently stemmed from the project's scale and scope.

### 3. Ideation and Prototyping

- a. Considers and weighs the costs & benefits of multiple technical solutions or design configurations:
  - i. Initially, I explored the option of having a single, all-encompassing chatbot that could handle every function. However, after careful

consideration, I shifted towards a toolbox approach, implementing independent tools for each specific function. This strategic decision was driven by the recognition that managing separate tools would offer greater flexibility, ease of maintenance, and scalability.

- b. Creates prototype only after considering at least three alternatives:
  - i. I considered at least three alternatives, including the initial concept of a single chatbot handling all functions. However, through iterative prototyping, I discovered that other existing websites offering similar functionalities were not free to use. Many were not open source, and some required API keys that incurred additional costs. Taking these considerations into account, the final design of the tax toolkit emerged as a user-friendly and accessible platform, setting it apart from other tools that imposed financial barriers on users. By prioritizing open-source solutions and avoiding dependencies on paid APIs, the toolkit became not only a functional but also an economically viable option for students.

#### **4. User Testing**

- a. At least one tester other than themselves for each type of user in close to real-world conditions:
  - i. Utilizing the personas that were identified earlier in this document, I was able to approach the website from a different point of view as opposed to just being the creator of the website. I was able to obtain feedback from family members on the design and functionality of the website.
- b. Summary of user feedback:
  - i. Positive feedback from persona / self-eval / family members:
    - 1. A.I. chatbot did an alright job giving basic answers to my questions.
    - 2. Quizzes were engaging and relevant to the material at hand.
    - 3. The chatbot responses were personal and “life-like”.
  - ii. Negative Feedback
    - 1. Page is slow in its response time?
    - 2. Some answers that it gave me were incomplete.
    - 3. Answers are incorrect.
    - 4. Confusing to navigate.

iii. GPT-4 / Bing WebCrawler feedback:

**Anonymous**

[https://hhachem001.github.io/CtL\\_Final/Welcome.html](https://hhachem001.github.io/CtL_Final/Welcome.html)

give me feedback on this website i made



**ChatGPT**

Your website, "Welcome to the Basic Income Tax Course Assistant," offers a range of educational tools for enhancing learning in income tax. It includes features like an IRC Chatbot, quizzes and exams, course notes search, IRC Code Extractor, a course outline viewer, and a gains calculator. The design is straightforward, focusing on functionality. Each feature is presented as a distinct option, allowing users to easily navigate and choose the tool they need. The inclusion of an AI ChatBot and a basic RegEx Chatbot for interactive learning is a thoughtful addition. The website is positioned as an educational demo and is not intended as a legal authority source. Overall, it seems well-organized and user-friendly, particularly for students or individuals interested in learning about income tax.



**Anonymous**

anything wrong with the website or anything that needs improvement



**ChatGPT**

Your website is functional and user-friendly, but there are a few areas where improvements could be made:

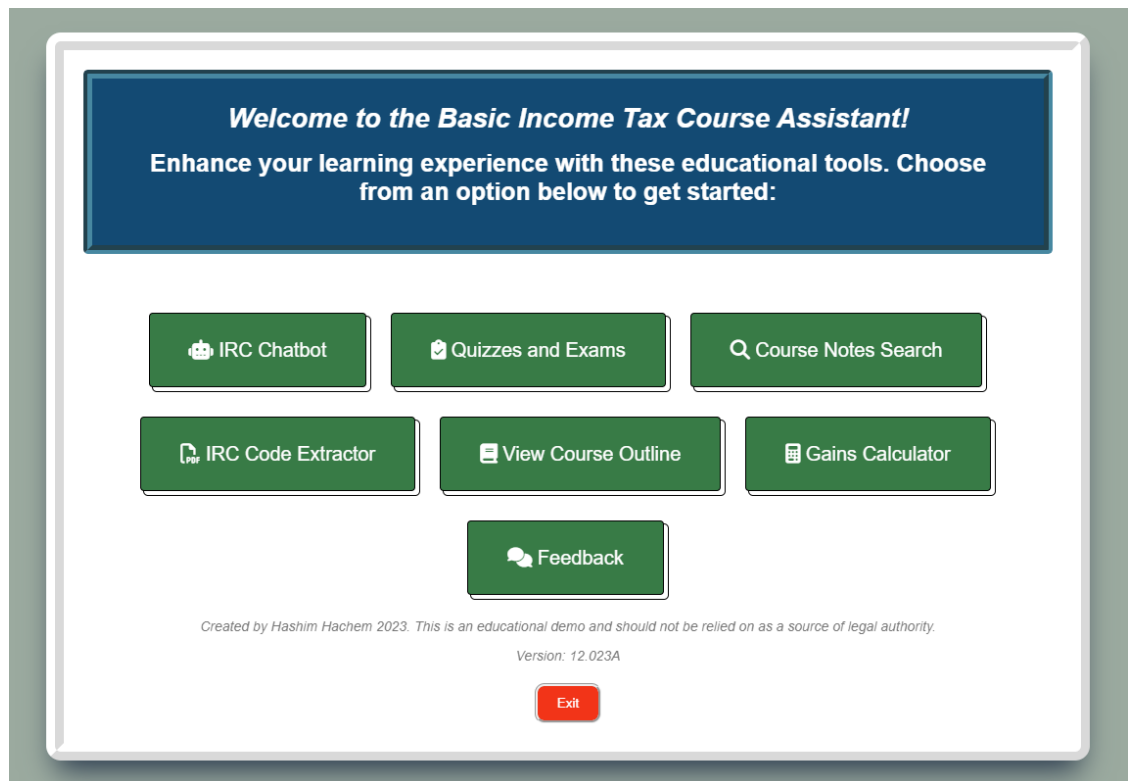
1. **Design and Aesthetics:** The visual design is quite basic. Consider enhancing the user interface with a more modern and visually appealing design. This could include better use of colors, fonts, and spacing.
2. **Mobile Responsiveness:** Ensure that the website is fully responsive and looks good on various devices, especially smartphones and tablets.
3. **Content Organization:** While the content is well-organized, some sections could be more intuitively structured. Clearer headings and subheadings could help users navigate the site more easily.
4. **Loading Speed:** Check the loading speed of the website and optimize it if necessary. Slow loading times can deter users.
5. **Accessibility:** Ensure that the website is accessible to all users, including those with disabilities. This includes text readability, keyboard navigability, and screen reader compatibility.

These improvements could enhance the overall user experience and make the website more engaging and accessible.

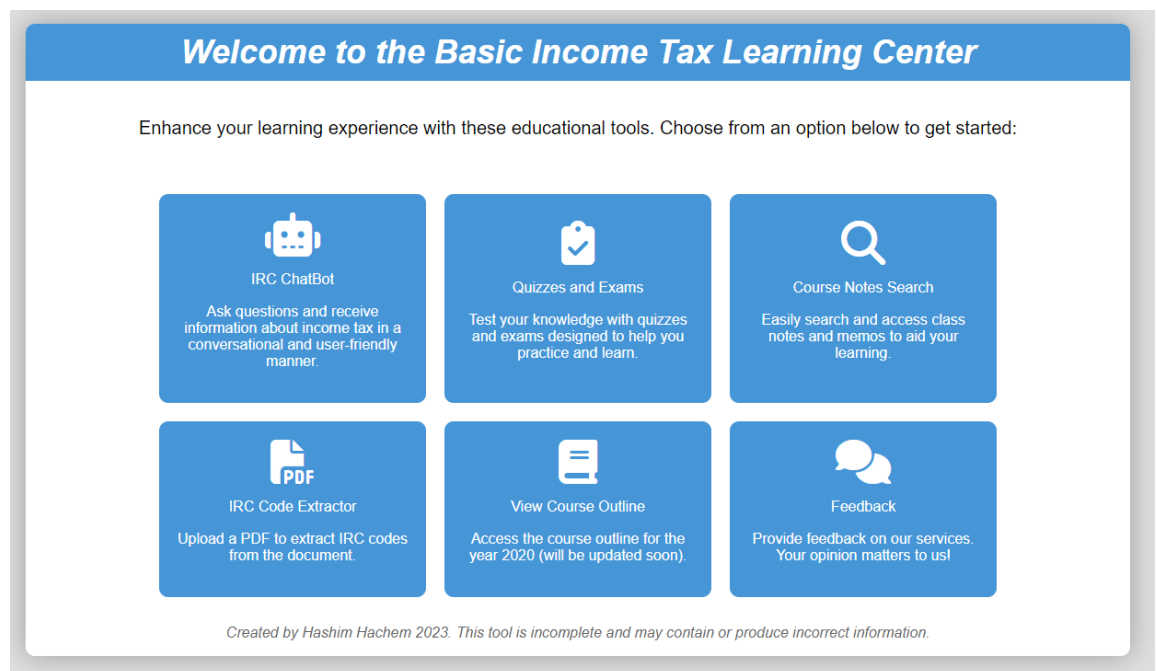
## 5. Refinement

a. Final version is not the same as the original version:

i. **Current Version:**



ii. **First Version:**



## **6. Complexity / Robustness**

- a. In developing my tax toolkit project, I leveraged the power of Regular Expressions (regex) for efficient document scraping, particularly in extracting IRC codes from uploaded documents. I created regex patterns to match both common IRC code formats. Integrating these patterns into my JavaScript code, I could seamlessly scan the content of uploaded documents, applying regex to capture and extract relevant IRC codes. Regularly refining and testing the regex patterns ensured robust handling of variations in IRC code formats within diverse documents.
- b. In implementing the AI-powered chatbot for user interactions within my tax toolkit, I integrated the transformers.js library. This library, functioning with transformer models, served as a crucial component for natural language understanding and generating responses to user queries. As a solo developer on this project, integrating the transformers.js library was instrumental in processing user inputs, tokenizing and encoding text for the transformer model, and obtaining insightful responses. The library facilitated seamless communication between users and the AI model, providing valuable information on tax-related questions.

## **7. Impact & Effectiveness**

- a. Implementing regex for IRC code extraction proved to be a game-changer in terms of time efficiency. Instead of manually sifting through documents to identify and link IRC codes to their definitions, the regex-based solution automated the entire process. As a result, the toolkit effortlessly extracted IRC codes from uploaded documents, saving me considerable time that would otherwise be spent on manual data extraction. Moreover, the time-saving benefits extended beyond mere extraction. The toolkit automatically linked each extracted IRC code to its corresponding definition, creating a seamless and interconnected learning experience. This not only reduced the time required for manual linking but also ensured that users could easily access comprehensive explanations without having to navigate through the documents themselves.
- b. Integrating a capital gains calculator into the tax toolkit was a strategic move that significantly optimized time for users. Instead of relying on external calculators or manual computations, users could instantly access and utilize the calculator within the toolkit.
- c. By developing a dedicated quiz tool, I created an environment where users could practice and assess their knowledge without the need for external platforms. This not only saved time for users who could practice directly within the toolkit but also eliminated the hassle of managing quizzes across multiple platforms.

## **8. Fit / Completeness**

- a. The decision to keep the UI design basic was intentional. Rather than overwhelming users with unnecessary elements, the design focused on delivering a straightforward and user-friendly experience. The simplicity of the UI aligns with the toolkit's educational purpose, ensuring that users can navigate through the various tools and features without unnecessary complexities. The buttons on

the webpage were thoughtfully designed to be simple and intuitive. The emphasis was on creating a user interface that is approachable for individuals with varying levels of technical proficiency. The simplicity of the buttons not only enhances usability but also contributes to a visually clean and organized layout, allowing users to focus on the content and tools provided. Consistency in design elements, such as color schemes, fonts, and button styles, ensures that users encounter a seamless transition between different sections of the toolkit.

- b. In a digital environment where many websites prioritize monetization through ads and product placements, the tax toolkit stands as a refreshing contrast. The intentional avoidance of clutter and complexity enhances the user experience, creating a space where users can concentrate on learning, practicing quizzes, and utilizing tools without the distractions prevalent on other platforms.

## **9. Documentation**

- a. There is a help button on the main page that contains FAQs to common questions, and disclaimers of responsibility are placed across the site.

## **10. Real World Viability / Sustainability**

- a. For the product to be viable in the real world, there needs to be an alternative to the current A.I. implementation. Using transformers.js allows me to bypass the OpenAI paywall, which means the LLM runs on the end user's machine. The downside is the inferencing speed, and the fact that the language model currently utilized is trained on the web and is quite broad. The goal would be to train a language model on tax material.