AI Tax Agent Prototype

Introduction

The AI Tax Agent is an easy-to-use online application that assists in removing the tension involved in filing tax. It is designed to reflect the rules of the 2025 U.S. federal tax to gather several important user details, such as income, filing status, and dependents, after which it will estimate taxes automatically. It is not only calculating whether you must pay or whether you are due to a refund but also making a clear report that could be downloaded. This demo can give an insight into how AI can improve the process of filing taxes to be easier, more precise and less intimidating to everyone concerned.

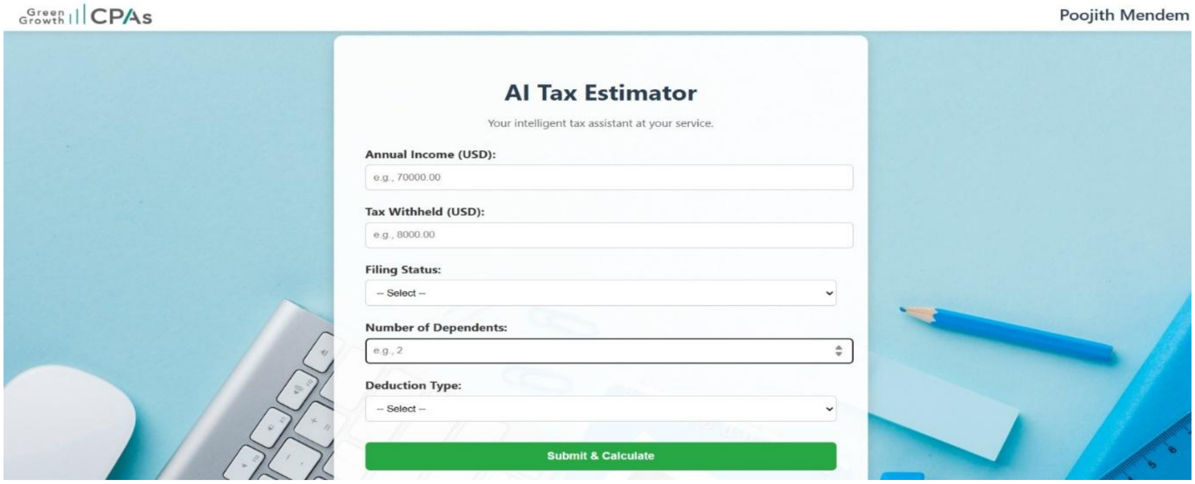
System Architecture Overview

- **Architecture Type**: Client and server (efficiency on automating tax returns).
- **Front-End**: Responsive front- end created by HTML CSS with form to enter the user information (income, taxes withheld, filling status, type of deduction, dependents).
- **Back-End**: The flask framework as the main server to oversee data processing and agent run.
- **AI Agents**:
  - **Agent 1**: Does the calculation of tax use CrewAI and accepts inputs and provides output..
  - **Agent 2**: Produces detailed tax reports with CrewAI, and stores results as Taxreport.md
- **Storage**: local file system (main/ directory) with the name Tax_report.md.

Data Flow

The data flow on the system is a step wise one in the process of input to the completion of delivery of results:

- **User Input**: The user input's through an HTML Input Form.



AI Tax Estimator

Your intelligent tax assistant at your service.

Annual Income (USD): e.g., 70000.00

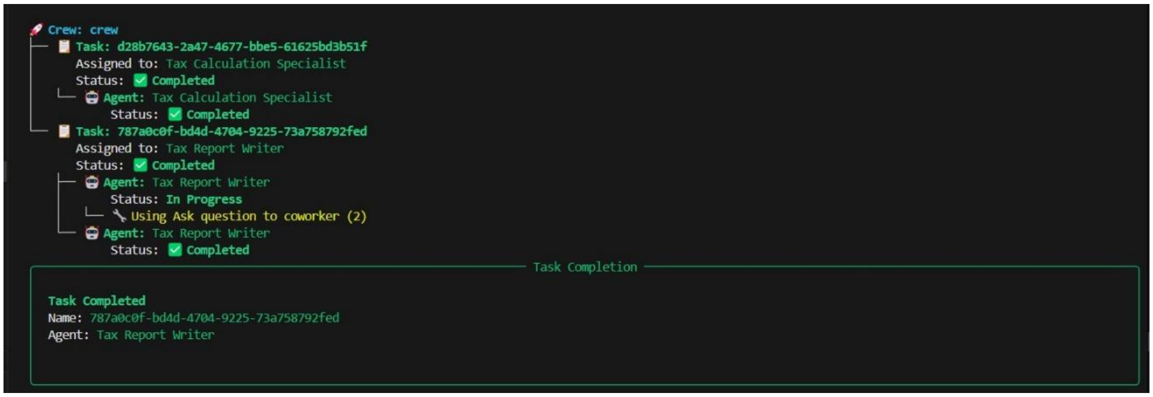
Tax Withheld (USD): e.g., 8000.00

Filing Status: -- Select --

Number of Dependents: e.g., 2

Deduction Type: -- Select --

- **Form Submission**: The form data is sent to the Flask back-end via a POST request to the / route.
- **Back-End Processing**:
  - Flask analyses the form data and feeds the data to a CrewAI crew of two agents.
  - The input is fed into agent 1 (Tax Calculation) to arrive at the tax result.



```
🚀 Crew: crew
├── 📋 Task: d28b7643-2a47-4677-bbe5-61625bd3b51f
│      Assigned to: Tax Calculation Specialist
│      Status: ✅ Completed
│   └── 🤖 Agent: Tax Calculation Specialist
│           Status: ✅ Completed
└── 📋 Task: 787a0c0f-bd4d-4704-9225-73a758792fed
       Assigned to: Tax Report Writer
       Status: ✅ Completed
    ├── 🤖 Agent: Tax Report Writer
    │       Status: In Progress
    │   └── 🔧 Using Ask question to coworker (2)
    └── 🤖 Agent: Tax Report Writer
            Status: ✅ Completed
╭──────────────────────────────── Task Completion ────────────────────────────────╮
│                                                                                  │
│  Task Completed                                                                  │
│  Name: 787a0c0f-bd4d-4704-9225-73a758792fed                                      │
│  Agent: Tax Report Writer                                                        │
│                                                                                  │
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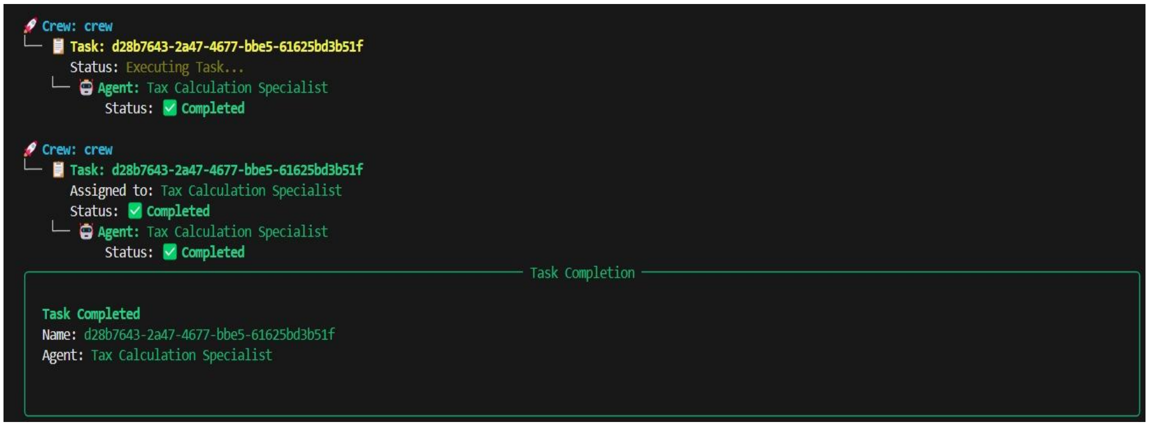
  - Agent 2 (Report Generation) is a report generating agent with detailed tax report created on basis of the user input.



```
🚀 Crew: crew
└── 📋 Task: d28b7643-2a47-4677-bbe5-61625bd3b51f
       Status: Executing Task...
    └── 🤖 Agent: Tax Calculation Specialist
            Status: ✅ Completed

🚀 Crew: crew
└── 📋 Task: d28b7643-2a47-4677-bbe5-61625bd3b51f
       Assigned to: Tax Calculation Specialist
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            Status: ✅ Completed
╭──────────────────────────────── Task Completion ────────────────────────────────╮
│                                                                                  │
│  Task Completed                                                                  │
│  Name: d28b7643-2a47-4677-bbe5-61625bd3b51f                                      │
│  Agent: Tax Calculation Specialist                                               │
│                                                                                  │
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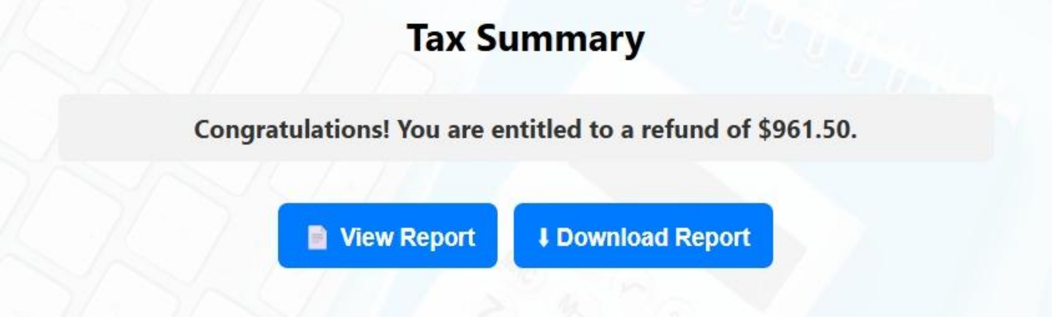
```

  - **Result Handling**:
    - Flask parses JSON output of the agent 1 to obtain the fields of the message that can be displayed as result
    - The output by Agent 2 is saved as a markdown file in the main directory with a filename as Taxr_eport.md.



Tax Summary

Congratulations! You are entitled to a refund of $961.50.

- **Response**: The front-end displays the tax summary and report, it shows the links to see or save the report.

This flow is used to guarantee a smooth experience as the user interface and the back-end that use AI process and respond to data in an efficient manner.

User Interface and Back-End Interaction

- **Front-End**:
  - Responsive HTML form took inputs with validation, initially hidden and activated by "Calculate Tax" button.
  - Displays tax summary with Jinja2, reports available under the options of Viewing and Downloading.
- **Back-End**:
  - Flask actions consist of / (responsible for the submission of forms and results) and /download/<Tax_report.md> (delivers the reports).
  - Directs CrewAI agents (Agent 1 to be used in tax, Agent 2 to report) and utilizes Jinja2 with the ability to display the output UI dynamically.
- **Interaction**:

  Form data initiates CrewAI processing through Flask request and updates the UI with results; download_report button helps to download reports

Tax Calculation Engine

The tax computation engine will use a CrewAI (Agent 1) to determine federal income tax in the 2025 U.S. regulations. Important operations consist of

- It begins with user information such as income, filing type, type of deduction, amount of taxes withheld and number of dependents.
- Then it uses the appropriate standard deduction depending upon filing status (such as $15,000 Single, or 30,000 Married Filing Jointly).
- It computes taxable income after deducting the deductions in the total income and tax is collected based on the corresponding progressive tax bracket levels.
- In case the user has dependent, it grants dependency credit on every dependent of a household equal to $2,000, which reduces the amount of taxes to be paid.
- Thereafter, it examines the amount of tax that had been deducted by the employer to determine whether the user is refundable or is to pay additional tax due.
- lastly, it provides good, clean and neat JSON output with friendly message as well as a step-by-step calculation.

Data Security

Being prototypical, data security is established on a basic level keeping on improvements in the future:

- **Input Validation**: : On the client-side validation there is input validation to take care of required attributes and the numeric data and the back end typecasts the data to floats to avoid parsing errors.
- **Data Handling**: Data Handling: Inputs have no storage and are processed in memory only, and report storage is limited to the main directory requiring server environment.
- **Limitations**: limited support encryption, authentication and secure transmission (e.g. HTTPS) which can be paramount in a live production environment.
- **Future Considerations**: A production version will incorporate HTTPS, user authentication and data encryption in the form of HTTPS and user authentication will have a place in a production version. IRS e-filing requirements, compliance with the GDPR, and proper handling of user data will be guaranteed by data anonymization and audit logging.

Limitations and Improvements

- The following changes can be added in future:
  - Named Entity Recognition to automatically pull out information of documents thus more hand work is avoided .
  - MCP Server used to directly fill calculated information into a 1040 form.
  - Combined with IRS systems to give real-time tax information to the agents to improve accuracy.
- **Limitations**: The prototype is weaker by being static in nature, it is not scalable on a shared environment since it does not allow concurrent multi-users.

Future Enhancements

Future work with aim of rendering the AI Tax Agent even more potent and ready to be used in production will embrace

- Coming to the defense of itemized deductions of a more customized tax return
- Include data security management and encryption on privacy of users
- dockerising the whole application to make deployment into different environments simpler

Tools, Libraries and Frameworks

- **Python 3.11**: Programming language for back-end logic.
- **Flask**: Web framework for routing and UI integration.
- **CrewAI**: Framework for AI agent orchestration.
- **HTML/CSS**: Front-end for the user interface.
- **Jinja2**: Templating engine for dynamic HTML rendering.

Project Directory Structure

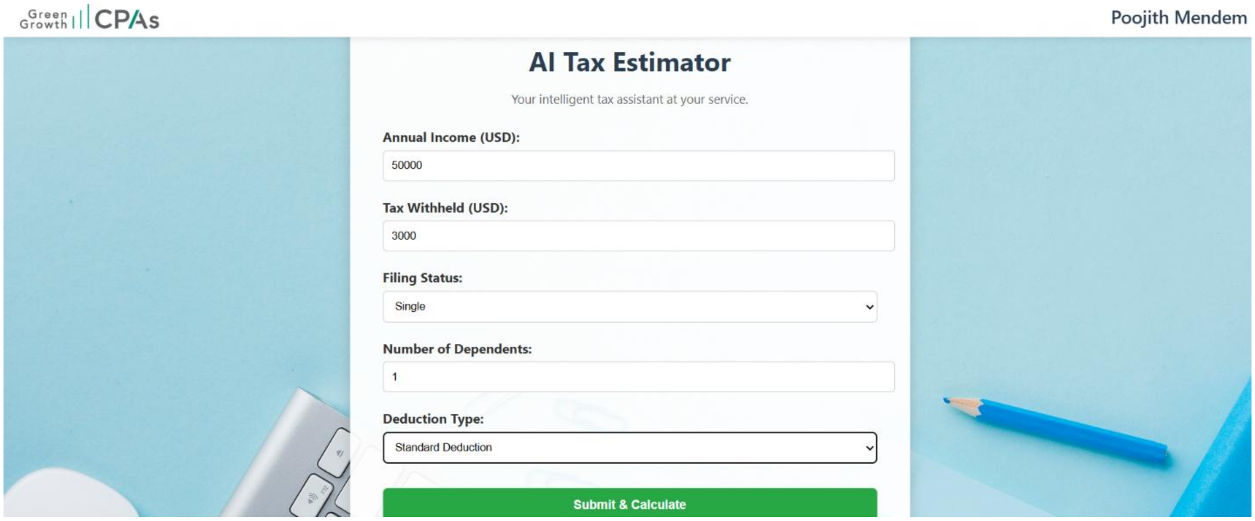
```
AI Tax Agent/
├── app.py
├── agents.py
├── task.py
├── .env
├── requirements.txt
├── static/
│   ├── style.css
│   ├── background.jpg
│   └── logo.png
├── templates/
│   └── index.html
└── tax_report.md
```

Summary and Approach

The prototype was made by designing a modular flask application with CrewAI agents to handle tax calculations and reporting. The strategy implied developing a working-friendly user interface, the tax engine containing 2025 rules, and using a variety of testing strategies. This approach guaranteed that the prototype is functional, and as close as possible to the scope of the case study, implementing the principles of usability and the integration of AI, setting the stage toward scalability in the future

Demo

Interactive and simplified frontend whose users supply income, tax deducted, filing status, dependants and type of deductions.



Green Growth CPAs

Poojith Mendem

AI Tax Estimator

Your intelligent tax assistant at your service.

Annual Income (USD): 50000

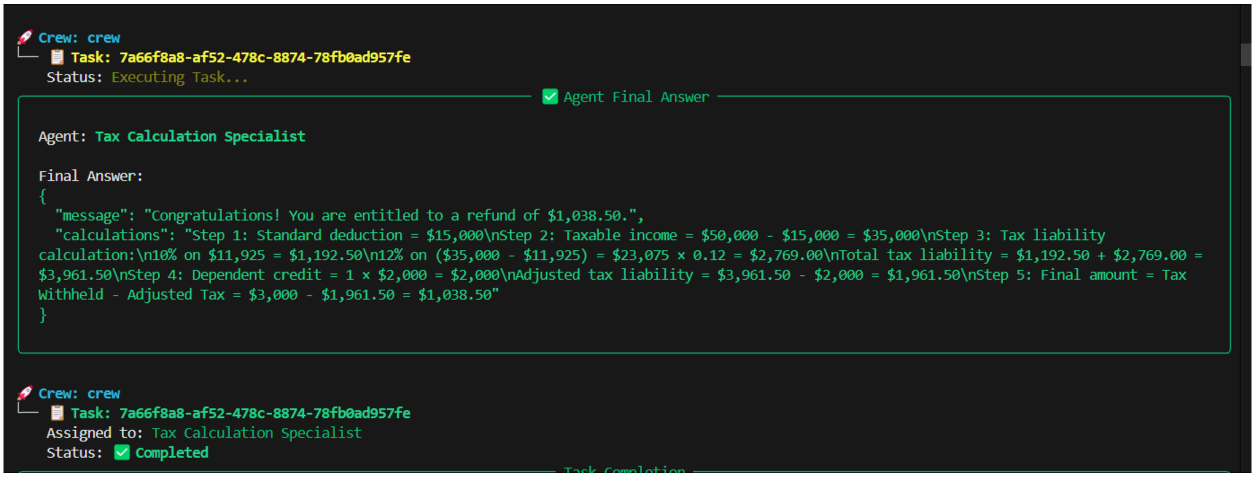
Tax Withheld (USD): 3000

Filing Status: Single

Number of Dependents: 1

Deduction Type: Standard Deduction

Agent 1 (TaxBot) uses 2025 rules to estimate the tax and displays the result and complete breakdown in JSON format.



```
🚀 Crew: crew
└── 📋 Task: 7a66f8a8-af52-478c-8874-78fb0ad957fe
    Status: Executing Task...
╭──────────────────────────── ✅ Agent Final Answer ────────────────────────────╮

  Agent: Tax Calculation Specialist

  Final Answer:
  {
    "message": "Congratulations! You are entitled to a refund of $1,038.50.",
    "calculations": "Step 1: Standard deduction = $15,000\nStep 2: Taxable income = $50,000 - $15,000 = $35,000\nStep 3: Tax liability
  calculation:\n10% on $11,925 = $1,192.50\n12% on ($35,000 - $11,925) = $23,075 x 0.12 = $2,769.00\nTotal tax liability = $1,192.50 + $2,769.00 =
  $3,961.50\nStep 4: Dependent credit = 1 x $2,000 = $2,000\nAdjusted tax liability = $3,961.50 - $2,000 = $1,961.50\nStep 5: Final amount = Tax
  Withheld - Adjusted Tax = $3,000 - $1,961.50 = $1,038.50"
  }

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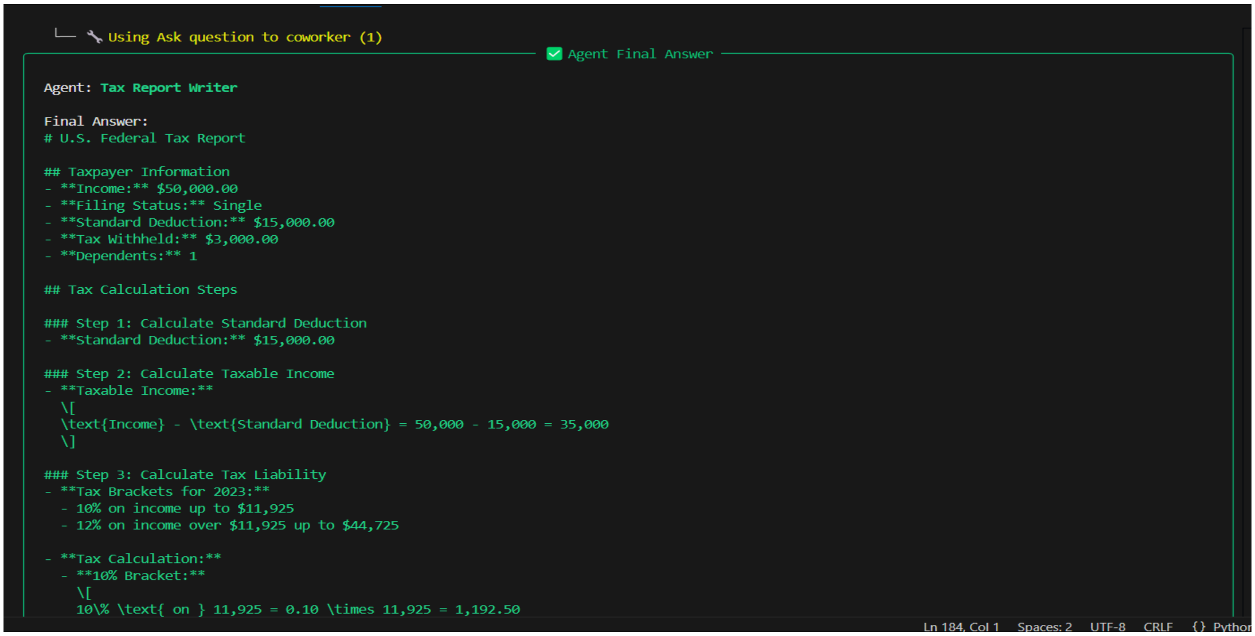
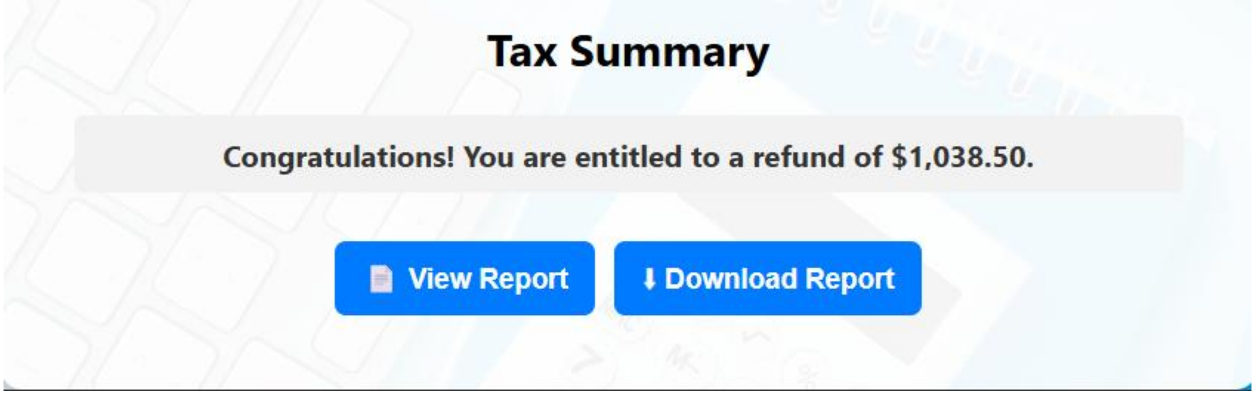
🚀 Crew: crew
└── 📋 Task: 7a66f8a8-af52-478c-8874-78fb0ad957fe
    Assigned to: Tax Calculation Specialist
    Status: ✅ Completed
╭──────────────────────────── Task Completion ────────────────────────────╮
```

ReportBot (Agent 2) transforms the result of the tax calculation into a readable markdown report where all the calculations are accompanied with explanations



```
  └─ 🔧 Using Ask question to coworker (1)
╭──────────────────────────── ✅ Agent Final Answer ────────────────────────────╮
│ Agent: Tax Report Writer
│
│ Final Answer:
│ # U.S. Federal Tax Report
│
│ ## Taxpayer Information
│ - **Income:** $50,000.00
│ - **Filing Status:** Single
│ - **Standard Deduction:** $15,000.00
│ - **Tax Withheld:** $3,000.00
│ - **Dependents:** 1
│
│ ## Tax Calculation Steps
│
│ ### Step 1: Calculate Standard Deduction
│ - **Standard Deduction:** $15,000.00
│
│ ### Step 2: Calculate Taxable Income
│ - **Taxable Income:**
│   \[
│   \text{Income} - \text{Standard Deduction} = 50,000 - 15,000 = 35,000
│   \]
│
│ ### Step 3: Calculate Tax Liability
│ - **Tax Brackets for 2023:**
│   - 10% on income up to $11,925
│   - 12% on income over $11,925 up to $44,725
│
│ - **Tax Calculation:**
│   - **10% Bracket:**
│     \[
│     10\% \text{ on } 11,925 = 0.10 \times 11,925 = 1,192.50
```

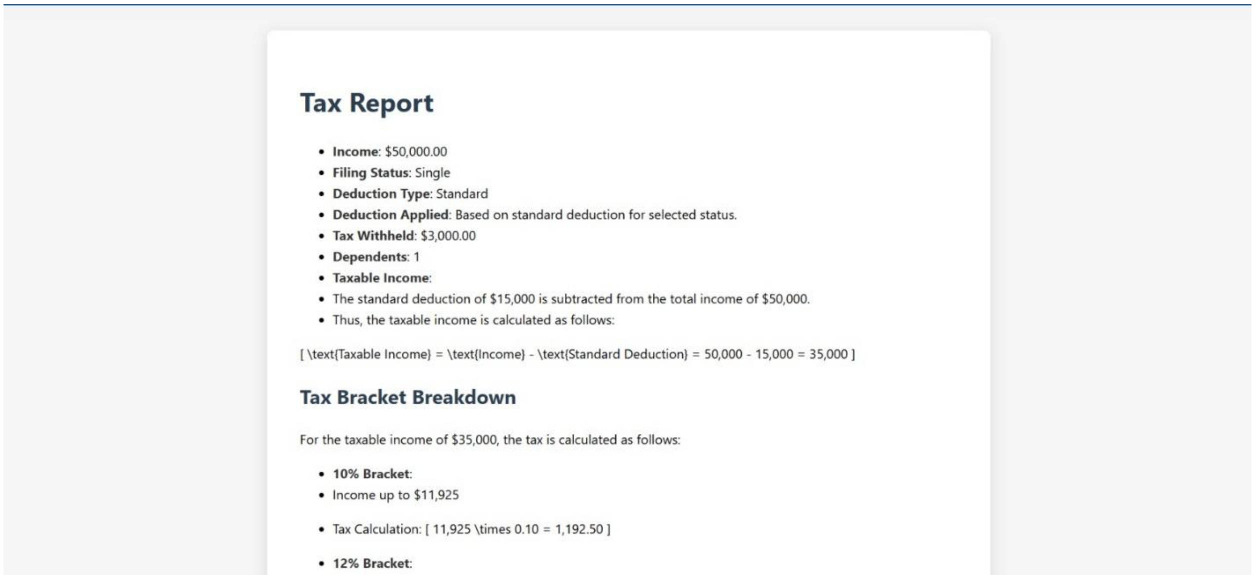
Shours the final message such as refund or amount owed directly on the web page once calculation is carried out.



Tax Summary

Congratulations! You are entitled to a refund of $1,038.50.

Tax report that includes breakdowns, credits, and intelligent suggestions to get more back on downloadable tax.



Tax Report

- **Income**: $50,000.00
- **Filing Status**: Single
- **Deduction Type**: Standard
- **Deduction Applied**: Based on standard deduction for selected status.
- **Tax Withheld**: $3,000.00
- **Dependents**: 1
- **Taxable Income**:
- The standard deduction of $15,000 is subtracted from the total income of $50,000.
- Thus, the taxable income is calculated as follows:

[\text{Taxable Income} = \text{Income} - \text{Standard Deduction} = 50,000 - 15,000 = 35,000]

Tax Bracket Breakdown

For the taxable income of $35,000, the tax is calculated as follows:

- **10% Bracket**:
- Income up to $11,925
- Tax Calculation: [11,925 \times 0.10 = 1,192.50]
- **12% Bracket**: