USER MANUAL

BY Antony Jacob

A Comprehensive Guide to the Two-Pass Assembler

Introduction

Welcome to the Two-Pass Assembler Web Tool, designed to streamline the process of converting assembly language into machine code through the two-pass assembly process. This tool allows you to upload your assembly source file and opcode table (optab), process them through Pass 1 and Pass 2 algorithms, and generate outputs such as intermediate code, symbol tables, program length, and object code.

Whether you're a student or a professional, this tool offers a clear and intuitive interface for managing assembly code compilation.

Features of the Website

1. **File Uploads:**
   - Allows uploading of two critical files: the assembly input source file and the opcode table (optab) file.
2. **Pass One Processing:**
   - Executes the pass one of the two-pass assembler to generate the intermediate output, SYMTAB (symbol table), and program length.
3. **Pass Two Processing:**
   - Executes the pass two, producing the final overall output and object code, which is the machine code for the input assembly program.
4. **Downloadable Outputs:**
   - Users can download generated outputs like intermediate files, symbol tables, program lengths, and object codes as .txt files.
5. **Clear Segregation of Pass One and Pass Two:**

- The site is structured to distinctly handle Pass 1 and Pass 2 operationsthrough individual tabs for clarity.

7. **The Two-Pass Assembler Algorithms:**
   - There is a separate section that displays algorithm for each pass one and passtwo of two pass assembler.

How to Use This Website

Step-by-Step Guide:

1. **Visit the Home Page:**
   - Upon loading the website, you'll be greeted with a simple, user-friendly interface. The navbar allows you to navigate between the **Home**, **Pass One**,and **Pass Two** sections.
2. **Uploading Files:**
   - In the "Upload Files" section, two file inputs are required:
   - **Input File**: Upload a .txt file containing the assembly code you want toprocess.
   - **Optab File**: Upload a .txt file containing the opcode table (optab),which maps operation codes to machine instructions.
3. **Running the Assembler:**
   - Once both files are uploaded, click the **Run** button to initiate the two-passassembler process.
4. **Viewing Pass One Outputs:**
   - Navigate to the **Pass One** tab to view the intermediate outputs. The threesections within Pass One are:
   - **Intermediate Output**: Displays the intermediate file generated duringPass 1.
   - **SYMTAB Output**: Shows the symbol table with the addresses of thesymbols used.

- **Program Length**: Displays the total length of the program after Pass 1.

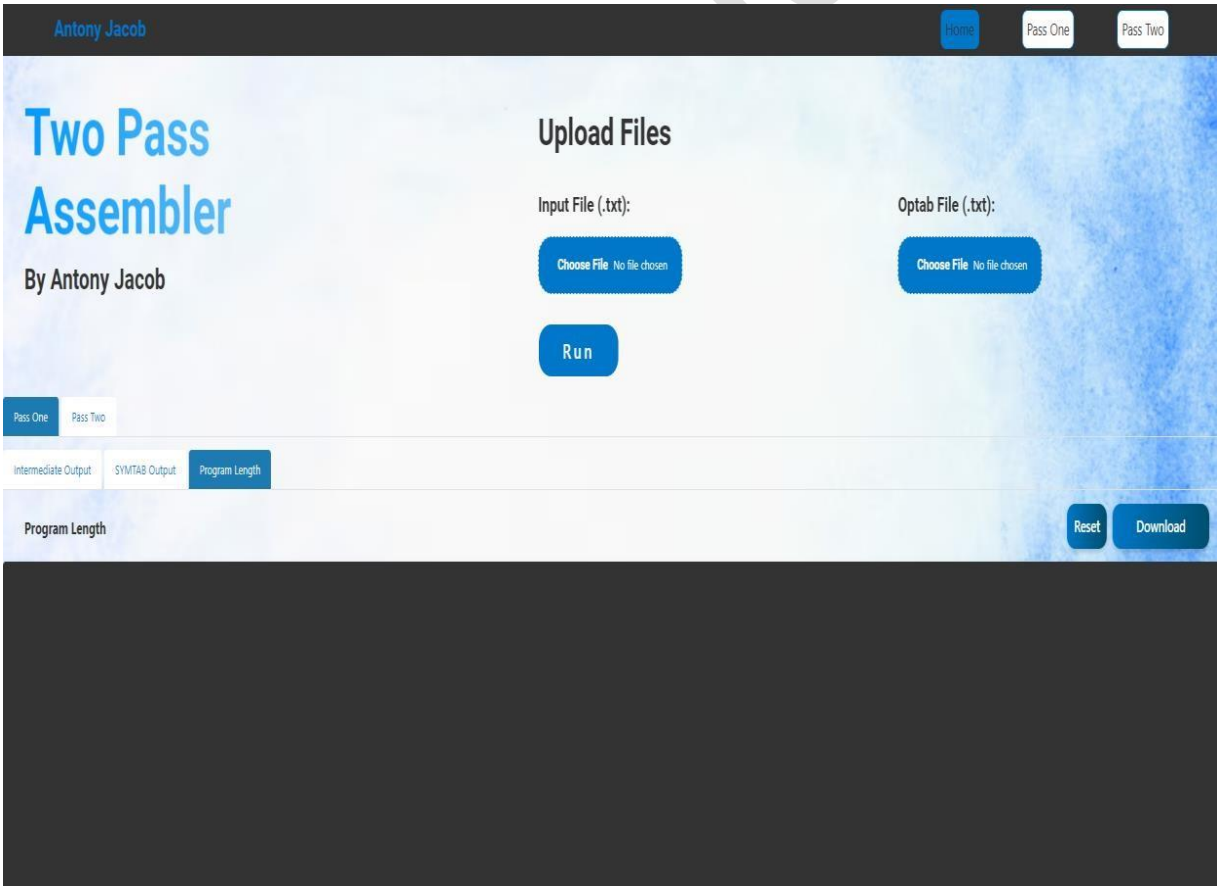
5. **Viewing Pass Two Outputs:**

- Go to the **Pass Two** tab to check the final outputs. You'll find:
- **Output**: The overall machine code generated after Pass 2.
- **Object Code**: The final object code for each instruction in header record, text record and end record (HTE).

6. **Downloading Results:**

- You can download the results in .txt format for further analysis or use byclicking the **Download** buttons next to each output section.

User Interface



Example Input and Optab

Sample Input File (input.txt):

```
PGM1    START   1000
-       LDA     ALPHA
-       MUL     BETA
-       STA     GAMMA
ALPHA   WORD    2
BETA    WORD    4
GAMMA   RESW    1
-       END     1000
```

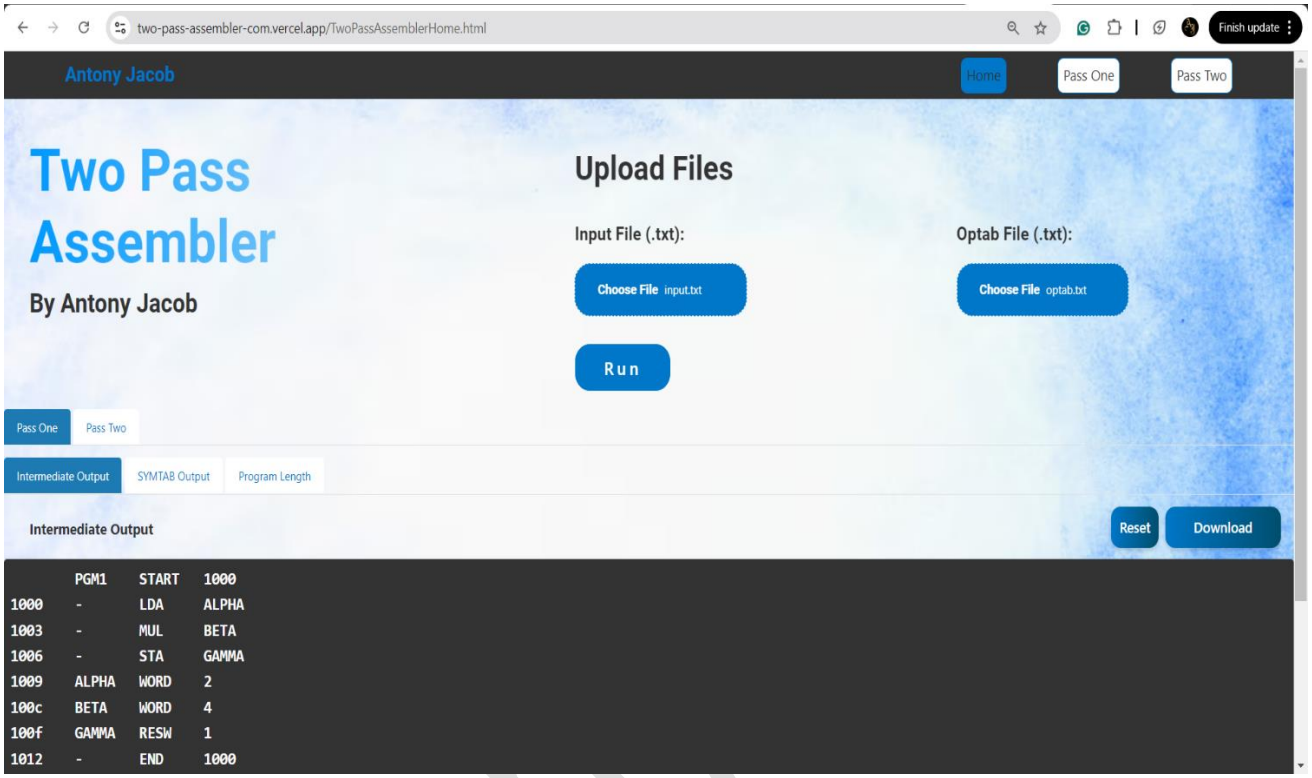
Sample Optab File (optab.txt):

```
LDA     00
STA     0C
MUL     20
```

Home Page

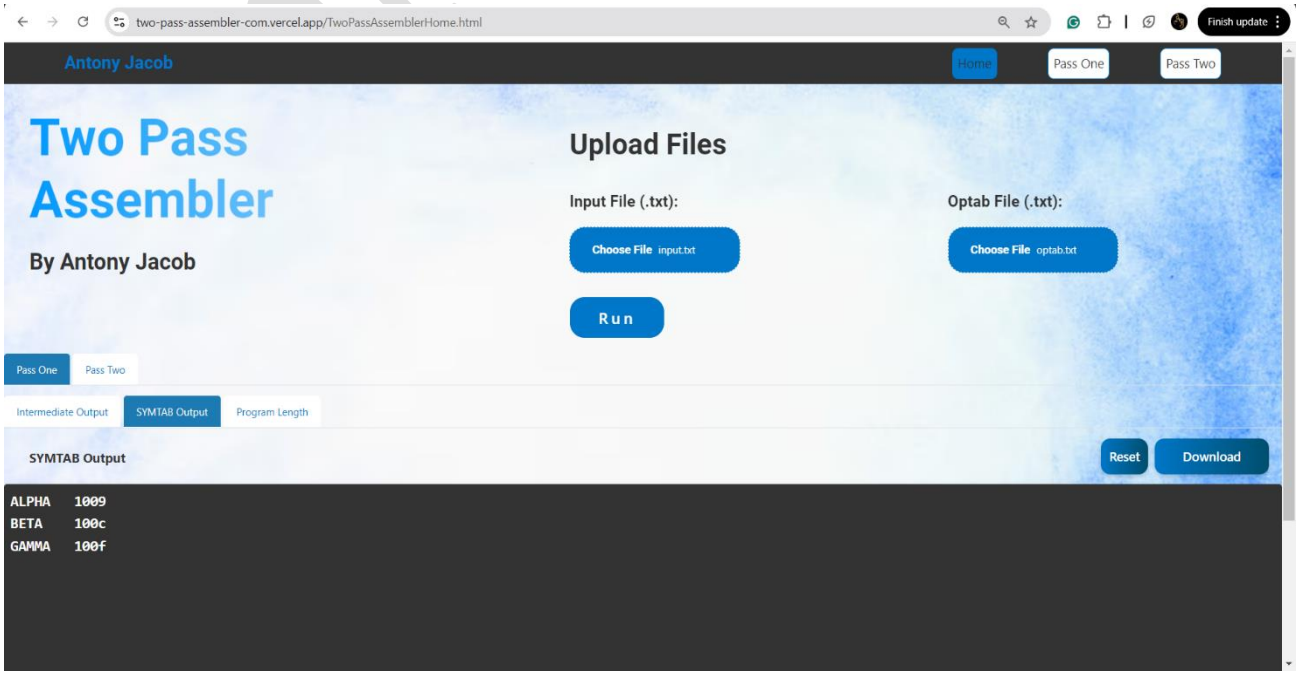
Intermediate Output:

This file contains information about each line of code and its associated address, generated after pass 1.



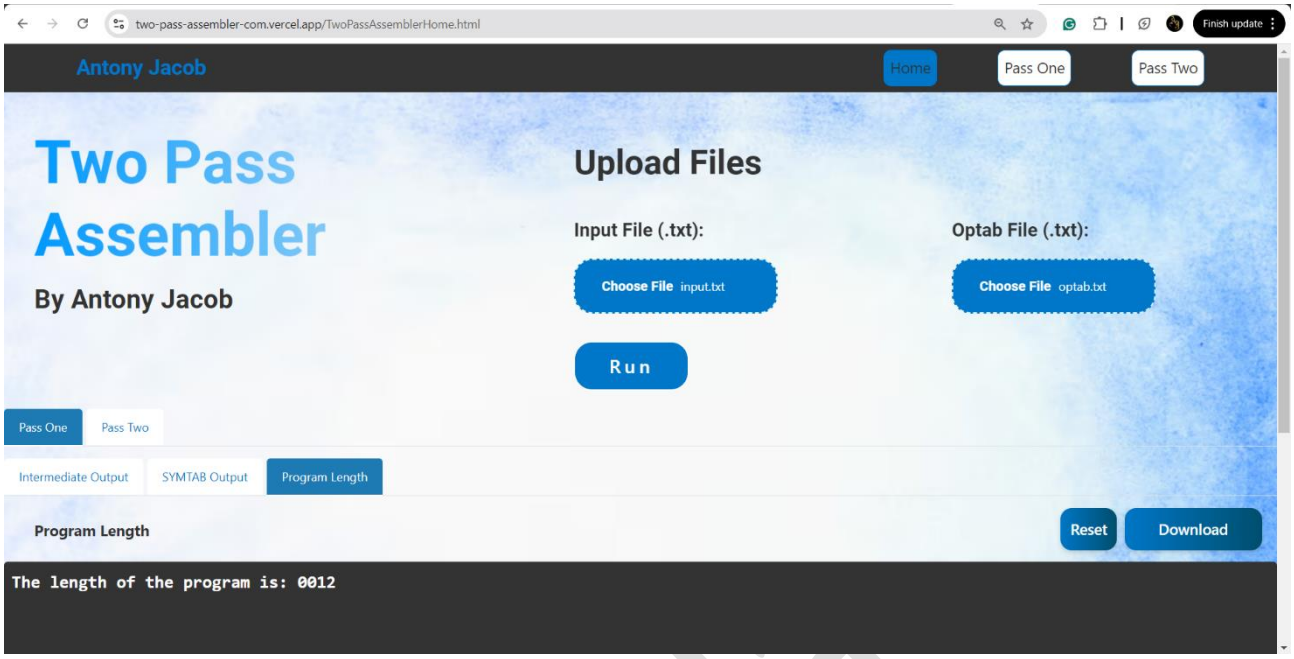
SYMTAB Output:

This output shows the symbol table (SYMTAB) which includes labels used in the input file and their assigned addresses.



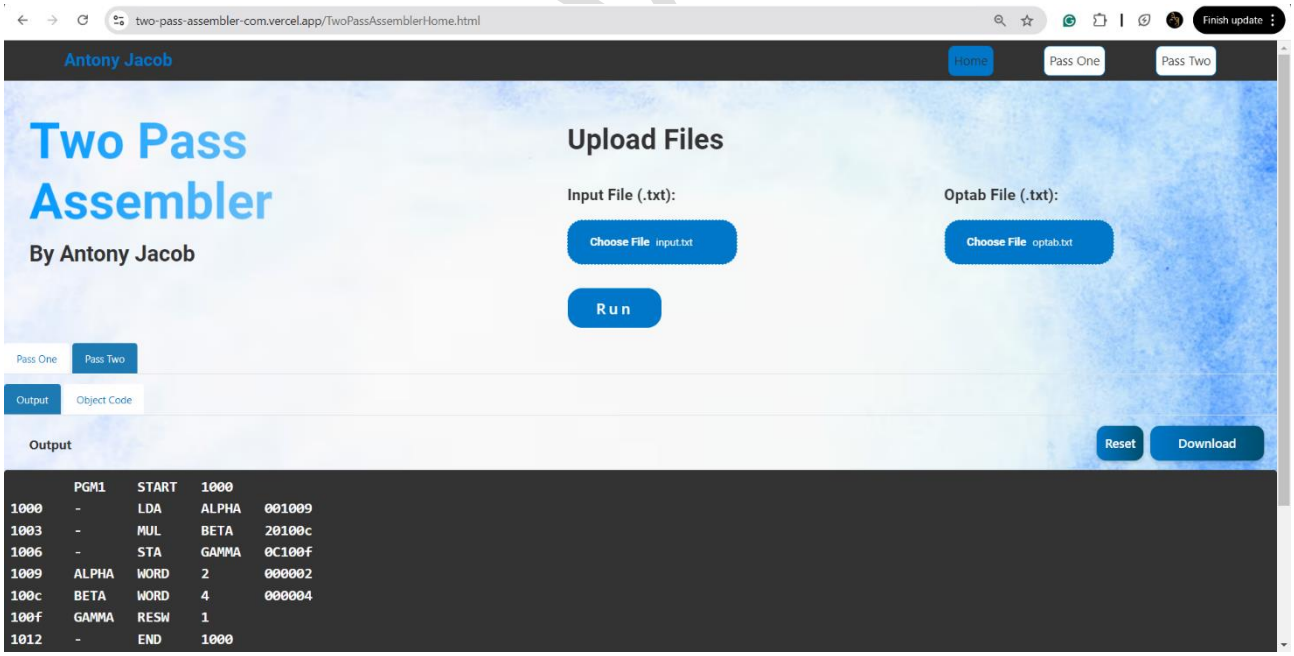
Program Length:

Displays the total length of the program.



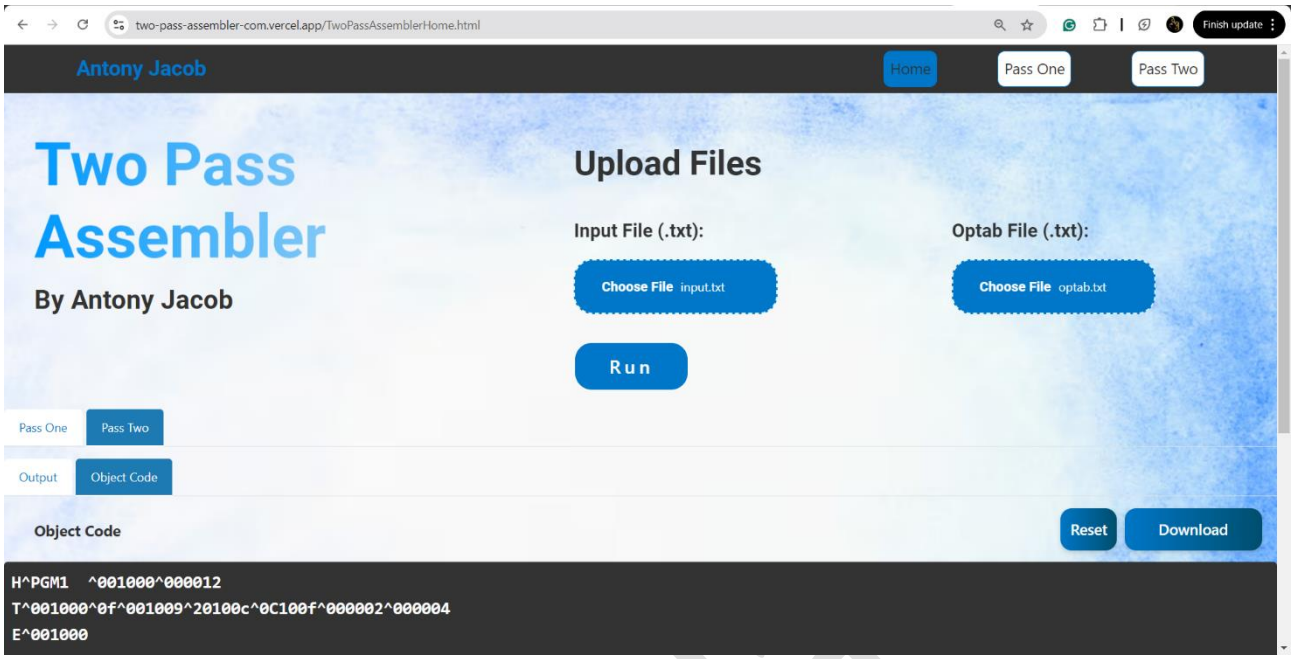
Output:

The overall machine code generated after Pass 2.



Object Code:

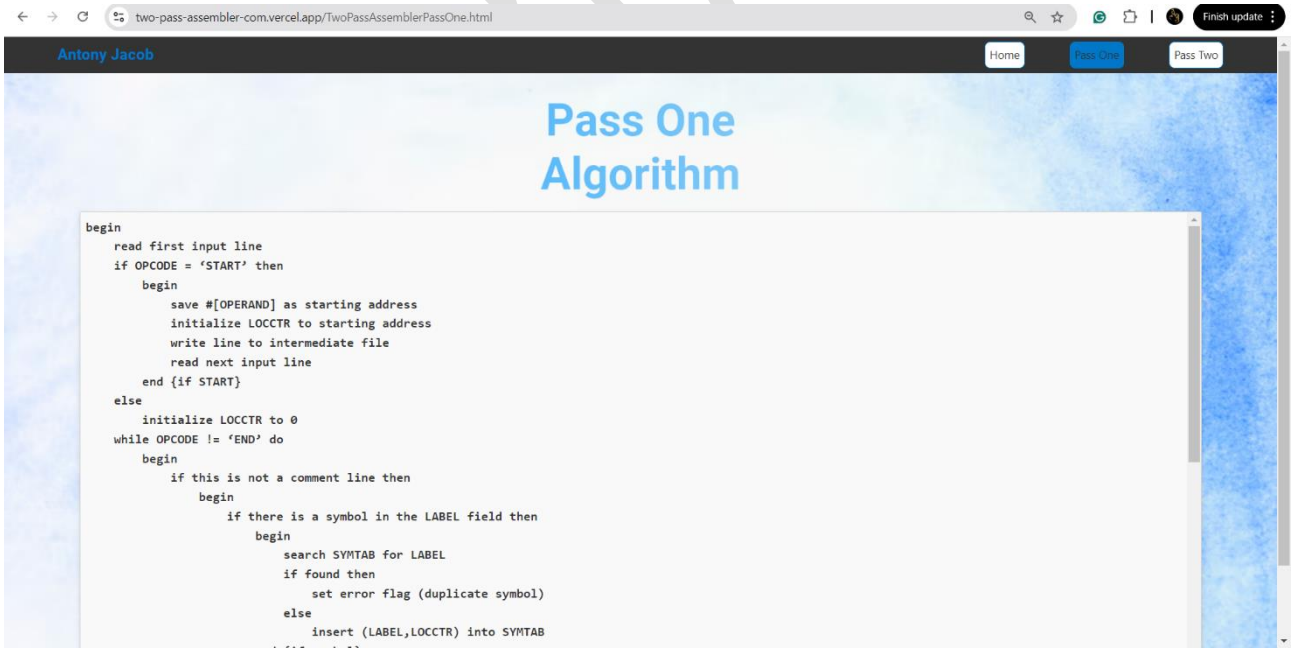
The final object code for each instruction, generated after Pass 2.



Pass One Page

Pass One Algorithm:

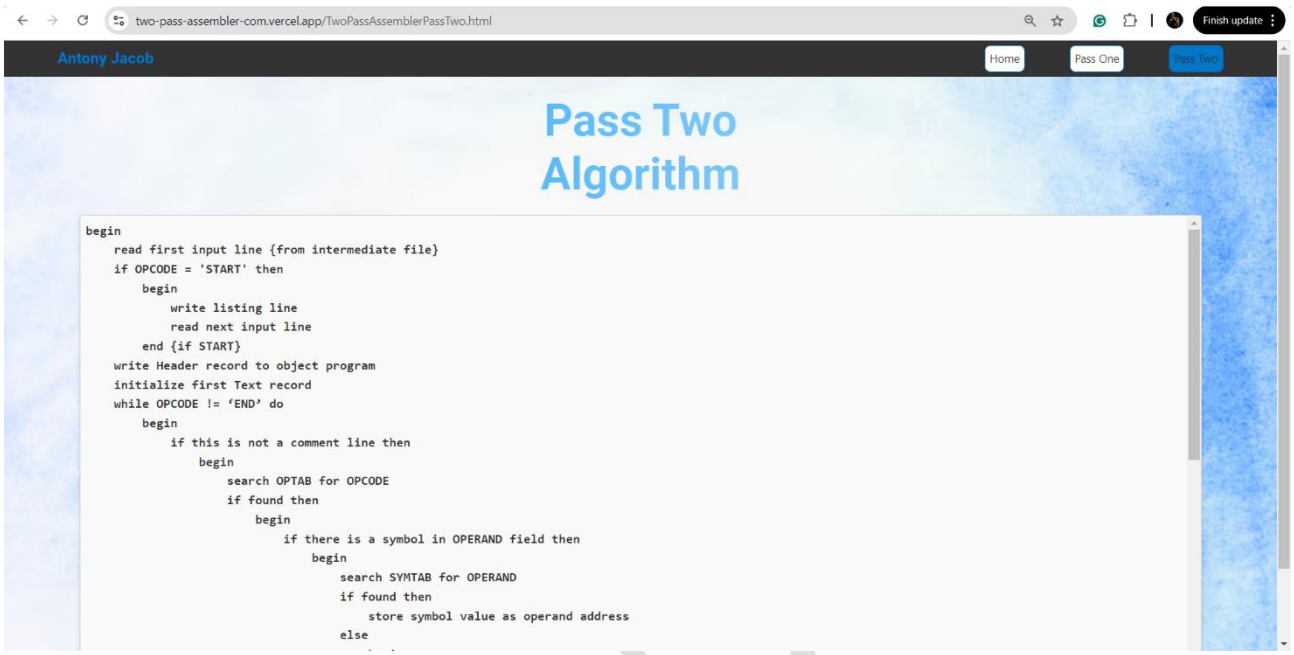
This page contains the algorithm for Pass One of the Two-Pass Assembler.



Pass Two Page

Pass Two Algorithm:

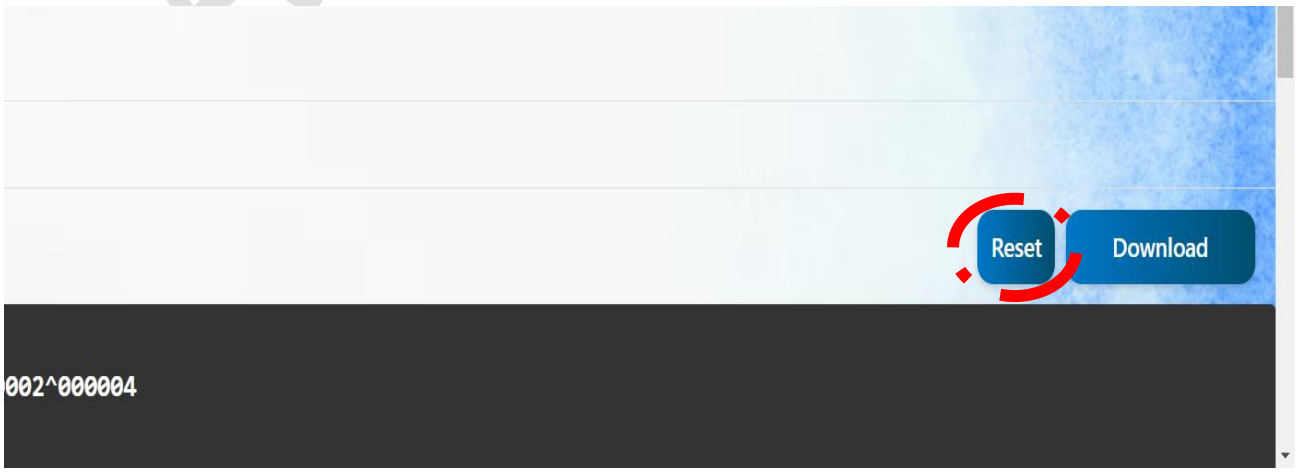
This page contains the algorithm for Pass Two of the Two-Pass Assembler.



Add Ons

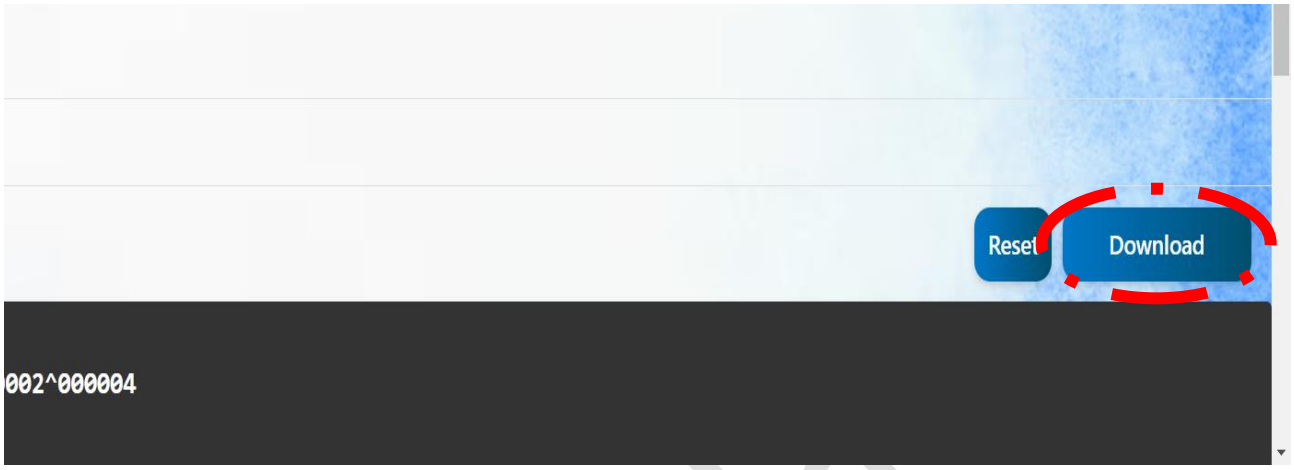
Extra Features

- Reset or Restart: After finishing a process, you can restart the workflow by refreshingthe page or clicking the restart option.
- Compatibility: Works on modern browsers (Chrome, Firefox, Edge).



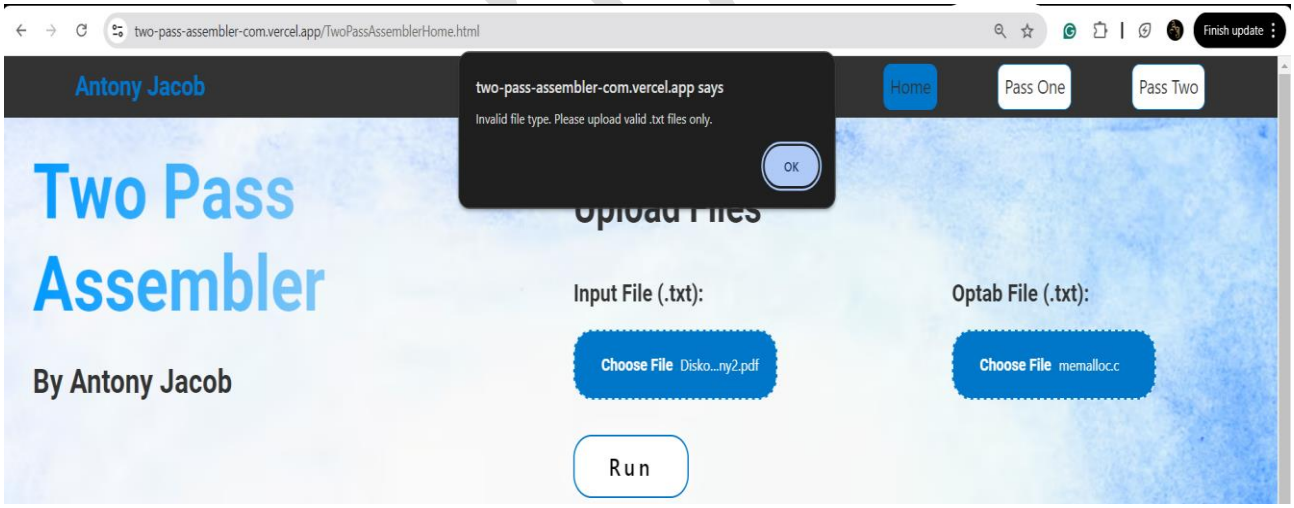
Tips for Effective Use

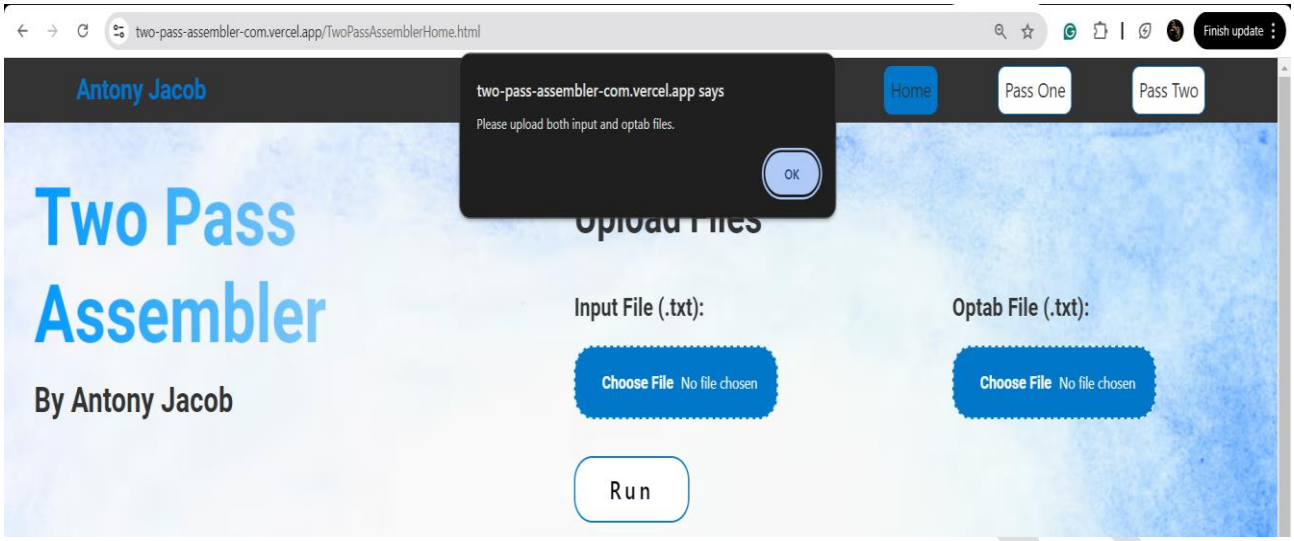
- Ensure correct formatting of the input files.
- Review the intermediate code thoroughly before moving to Pass 2 to avoid errors.
- Use the download feature to keep a local copy of all outputs.



Troubleshooting

- File Upload Issues: Ensure that the files are correctly formatted and of the proper type. If no file is uploaded, the process will not proceed.





- No Output in Pass 1: Check if the input assembly file is correctly structured.
- Object Code Errors: If Pass 2 generates incorrect results, revisit Pass 1 and ensure the intermediate code and symbol table were properly generated.

Conclusion

The Two-Pass Assembler web tool simplifies the task of assembling programs by providing an intuitive interface for performing both Pass 1 and Pass 2 operations. It generates crucial outputs such as intermediate files, symbol tables, and object codes, all available for download. Whether you are learning assembly language or working with real-world projects, this tool serves as a vital asset in understanding and generating machine code from assembly instructions.

Take advantage of the structured Pass One and Pass Two processes to turn your assembly language programs into executable object code, all from the comfort of your web browser!