

# Vixx Project Documentation

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## Introduction

This project aims to implement a lightweight version of the Vim text editor in C++, focusing on replicating its core functionalities. Vim is renowned for its efficiency in text editing through keyboard shortcuts. Our Vixx replicates three primary modes: **Normal Mode**, **Insert Mode**, and **Command-Line Mode**, along with additional advanced features for enhanced functionality.

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## Features Overview

### 1. Basic Features

#### Normal Mode

- **Purpose:** Default mode for navigating and manipulating text.
- **Key Functionalities:**
  - **Cursor Movement:**
    - `h`, `j`, `k`, `l`: Move cursor left, down, up, and right.
    - `←`, `↓`, `↑`, `→` (Arrow keys): Move cursor left, down, up, and right.
    - `0`: Jump to the beginning of the current line.
    - `$`: Jump to the end of the current line.
    - `gg`: Move to the first line.
    - `G`: Move to the last line.
  - **Line Operations:**
    - `dd`: Delete the current line.
    - `yy`: Copy the current line.
    - `p`: Paste copied content below the cursor.
  - Press `i` to enter **Insert Mode**.
  - Press `:` to enter **Command-Line Mode**.

#### Insert Mode

- **Purpose:** Allows direct text entry like traditional editors.
- **Cursor Movement:**
  - `←`, `↓`, `↑`, `→` (Arrow keys): Move cursor left, down, up, and right.
- **Key Functionalities:**
  - Supports real-time text input with the cursor following the text.
  - `Enter`: Create a new line from the cursor and move the cursor to its beginning.

- **Backspace**: Delete characters, including line transitions.
- Press **Esc** to return to **Normal Mode**.

## Command-Line Mode

- **Purpose**: Execute commands for file operations and advanced tasks.
- **Key Functionalities**:
  - Commands include:
    - **:w**: Save the current file.
      - If no file name specified when running **w**, you need to use **:w <filename>** to specify a filename.
    - **:q**: Quit the editor.
    - **:wq**: Save and quit.
  - Press **Esc** to return to **Normal Mode**.

This program can correctly deal with a line of text that is too long, and it can correctly deal with columns that are overflow the scope of the window. When user moving the cursor, the text in the window automatically scrolls to the area where the cursor is located.

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## 2. Advanced Features

### (1) Line Numbers and Navigation

- **Feature**: Display line numbers for reference.
- **Command**: **[line\_number]+G**. For example, **12G** will move the cursor to line 12.

### (2) Repetitive Cursor Movement

- **Command**: **[number]+[arrow\_key]**. For example, **5→** will move the cursor 5 characters to the right.

### (3) Search and Replace

- **Command**: **:s/old/new/g**: Replace all occurrences of **old** with **new** in the text.

### (4) Undo and Redo

- **Commands**:
  - **u**: Undo the last action.
  - **Ctrl+R**: Redo the last undone action.

### (5) Multi-File Editing

- **Feature**: Open multiple files simultaneously.
  - **Commands**:
    - **:e <filePath>**: Open the file in a new tab.
    - **:b <num>**: Switch to the num-th file in tabs for editing.
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# How to Use Vixx

## 1. Launch the Editor:

- Open the terminal and run the program by `vixx <filePath>`.

## 2. Program Window:

```
[1] ../doc/A-paradoxical-ode.txt [2] ../doc/HarryPotter-1.txt
1 A paradoxical ode, after Shelley.
2 James Clerk Maxwell
3
4 I.
5 My soul is an entangled knot,
6 Upon a liquid vortex wrought
7 By Intellect, in the Unseen residing,
8 And thine cloth like a convict sit,
9 With marlinspike untwisting it,
10 Only to find its knottiness abiding;
11 Since all the tools for its untying
12 In four-dimensioned space are lying
13 Wherein thy fancy intersperses
14 Long avenues of universes,
15 While Klein and Clifford fill the void
-- NORMAL -- (5, 12) 12 "../doc/A-paradoxical-ode.txt", 47L
```

- The top line shows all open file tabs, with the highlighted tabs for the current edit file.
- The **yellow numbers** in the left column are line numbers.
- The **white text** in the middle is the text content.
- The **green text** on the left side of the bottom line indicates the Mode and the position of cursor.
- The **light blue number** in the middle of the bottom line is the Normal numeric control record.
- The **blue text** on the right side of the bottom line gives the file name, relative path, and total number of lines.

## 3. Command-Mode Input:

```
[1] ../doc/A-paradoxical-ode.txt [2] ../doc/HarryPotter-1.txt
1 HARRY POTTER AND THE SORCERER'S STONE
2
3 ONE - The Boy Who Lived
4 Mr. and Mrs. Dursley, of number four, Privet Drive, were proud to say that they were perfectly normal, thank you very
much. They were the last people you'd expect to be involved in anything strange or mysterious, because they just didn
't hold with such nonsense.
5 Mr. Dursley was the director of a firm called Grunnings, which made drills. He was a big, beefy man with hardly any ne
ck, although he did have a very large mustache. Mrs. Dursley was thin and blonde and had nearly twice the usual amount
of neck, which came in very useful as she spent so much of her time craning over garden fences, spying on the neighbo
rs. The Dursleys had a small son called Dudley and in their opinion there was no finer boy anywhere.
6 The Dursleys had everything they wanted, but they also had a secret, and their greatest fear was that somebody would d
iscover it. They didn't think they could bear it if anyone found out about the Potters. Mrs. Potter was Mrs. Dursley's
sister, but they hadn't met for several years; in fact, Mrs. Dursley pretended she didn't have a sister, because her
sister and her good-for-nothing husband were as unDursleyish as it was possible to be. The Dursleys shuddered to think
what the neighbors would say if the Potters arrived in the street. The Dursleys knew that the Potters had a small son
:s/Porner/Harry/g
```

- When typing in command mode, the bottom line is temporarily replaced with light blue command input.

## 4. Perform Operations:

- Follow the commands outlined in the feature sections.

## 5. Save and Quit:

- Use `:wq` to save changes and exit.
- Use `:q` to exit directly.

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## Design Highlights

- Core Functionalities:** Implemented using keyboard-based commands to simulate authentic Vim behavior.

- **User Interface:** Clean and minimalist terminal UI for efficient text editing.
  - **Performance:** Optimized for real-time updates and smooth navigation.
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## Acknowledgments

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Enjoy exploring Vixx! Master its shortcuts and experience efficient text editing.