ByteCraft Hex Editor

Project History and User Manual

Created by: Dr. Eric O. Flores

CajaRota Tech Solutions

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Project Overview

ByteCraft is a powerful and user-friendly hex editor designed to handle binary file editing and text manipulation. Released under **GPLv3** license, ByteCraft enables users to view, edit, and modify the contents of binary files in both hex and ASCII formats. It features a clean interface with intuitive tools that allow users to easily navigate and manipulate file data.

Project History

The development of ByteCraft went through multiple stages, from a simple concept to a fully functional hex editor with split-view, highlighting, and various advanced features.

1. **Initial Concept**
    - The project started as a basic **hex editor** with minimal features using **Tkinter** in Python.
    - The goal was to create an editor capable of handling binary files and displaying them in hex format.

2. **Transition to PyQt5**
    - To provide a more professional and feature-rich GUI, I decied to transition the application from **Tkinter** to **PyQt5**.
    - **PyQt5** offers more polished interface, allowing for better handling of text and hex editing.
3. **Feature Enhancements**
    - I introduced **two-part editing screen**, allowing one to view **hex code** on the left side and the corresponding **text representation** on the right side.

- Additional menu options were added to toggle between hex/text modes, making the tool more versatile.

4. **Highlighting Functionality**:

    - A key feature is the ability to **highlight hex code** when text is selected, and vice versa.
    - This allowed for an intuitive link between hex data and the corresponding ASCII representation, greatly improving user experience.

5. **Tabular Hex Display**:

    - The tabular hex displays allows data to be reformatted into a **tabular format** with right-aligned hex values and monospaced fonts.
    - This ensured that hex code is clearly presented, making it easier to follow, read, and edit the binary content.

6. **Final Release**:

    - Final release is version 3.1. I will continue to work on this project and release new versions later on in a near future.
    - The project is complete with a user-friendly **menu system**, **search-and-replace functionality**, and customization **light/dark mode**.
    - While the software is released under the **GPLv3 license** for public use and modification. This application is specifically for the Deepin OS and Pop!_OS Facebook community. This is where I spend most of my time.

Technologies and GUI Interfaces Used:

1. **Programming Languages**:
    - **Original Code:** Created in C++ and then converted to Python3.
    - **Python**: A versatile and powerful language used to build the core functionality of the editor.

2. **GUI Framework**:
    - **PyQt5**: Chosen for its advanced widgets, flexibility, and professional look. It allowed for the implementation of a clean user interface with rich text editing features.

3. **File Handling**:
    - **Binary and Text Editing**: ByteCraft allows both binary file editing (in hex) and text file editing (in ASCII), using Python's built-in file handling capabilities.

4. **PDF Generation**:
    - **ReportLab**: Used for the printing functionality, allowing users to save content as PDF files.

5. **Cross-Platform Compatibility**:

- ByteCraft works on **Linux, Windows**, and **macOS** platforms, making it accessible to a wide range of users.

Cross-Platform Compatibility

Python-based applications, particularly those using **PyQt5**, refers to the ability to run the same codebase on multiple operating systems (Linux, Windows, macOS) without significant changes. PyQt5 provides bindings for the **Qt framework**, which is cross-platform by design. This allows the ByteCraft hex editor to run on **Windows** and **macOS**, as well as **Linux**, with minimal adjustments.

Here's how ByteCraft can work on different platforms:

Cross-Platform Compatibility of ByteCraft

As a developer, my preference has always leaned toward **Linux**, particularly **Pop!_OS**, which serves as my go-to operating system on both my desktop and laptop. My choice of programming languages ranges from **Basic**, **C**, **C++**, to more recently, **Python**—a language I've been exploring for the past two years. Given my daily use of Linux, I have tailored ByteCraft to run seamlessly on this OS. However, I understand that many users operate across different platforms, including **Windows** and **macOS**, which led me to ensure ByteCraft can be cross-platform. While I don't regularly use Windows or macOS, I've made sure the tool can be adapted for those environments with relative ease. Here's how ByteCraft functions across these platforms:

Linux (Other Distros)

ByteCraft was developed primarily on **Pop!_OS**, a Linux distribution known for its developer-friendly tools and ease of use. Naturally, the tool runs flawlessly on Pop!_OS, and by extension, it should work without any issues on other major Linux distributions like **Ubuntu**, **Debian**, **Fedora**, and others.

How it Works:

Since ByteCraft relies on **Python** and **PyQt5**, which are both well-supported across all major Linux distributions, the transition from one Linux flavor to another is seamless. Linux's shared Unix-like architecture ensures that the core dependencies work consistently across these systems.

Steps to Run:

1. **Install Python and PyQt5**: You can install both Python and PyQt5 through the distribution's package manager. For example, on Ubuntu or Pop!_OS, you would run:

   ```
   In Terminal type:
   sudo apt install python3-pyqt5
   ```

2. **Platform-Specific Dependencies**: Ensure that any platform-specific libraries (e.g., printing drivers) are installed and compatible with your Linux distribution.

User Manual: How to Use ByteCraft

1. Opening ByteCraft:

- When you launch ByteCraft, you'll see the main window shown in one complete editing screen. You can divided into two parts click on View and select Hex/Text Mode then the

screen will be divided into two screens (hex on the left and text on the right) when you open a file.
- By default, only the **hex view** is shown, and you can enable the **split-view mode** by navigating to the **View menu**.

2. Main Features:

- **Two-Part Editing Screen**:
  - The left side shows the file's hex values, while the right side shows the text equivalent. You can switch between the views or keep them both visible.
- **Hex/Text Toggle**:
  - Use the **View menu** to toggle between **hex-only** mode and **split-view mode** (Hex/Text Mode).
  - In **split-view mode**, changes made in the hex side are immediately reflected in the text side and vice versa.

3. Editing Files:

- **Hex Editing**:
  - You can click on the left panel to edit the hex code directly.
  - The values are displayed in a tabular format for easy navigation and editing.
- **Text Editing**:
  - You can also edit the text directly on the right side (when in split-view mode).
  - ByteCraft will automatically highlight the corresponding hex value when text is selected, and vice versa.

4. Menu Options:

- **File Menu**:
  - **New**: Clears the editor for a new file.
  - **Open**: Opens an existing file in either text or binary format.
  - **Save**: Saves changes to the current file.
  - **Save As**: Save the file under a new name or format (text/hex).
  - **Print**: Offers options to print the file or save it as a PDF.
  - **Quit**: Exits the application.
- **Edit Menu**:
  - **Cut/Copy/Paste**: Basic editing functionality to cut, copy, or paste text/hex.
  - **Undo/Redo**: Allows reverting or redoing changes.
  - **Search**: Enables you to search for specific text or hex values.
  - **Search and Replace**: Find and replace functionality in both hex and text.
- **View Menu**:
  - **Toggle Hex/ASCII Mode**: Switch between hex and ASCII view.
  - **Hex/Text Mode**: Enable or disable split-view.
  - **Light/Dark Mode**: Switch between light and dark themes for the interface.

5. Search and Replace:

- You can search for specific text or hex values in the **Edit menu**. Use the **Search and Replace** feature to find and substitute values easily.

6. Hex Highlighting:

- When text is selected on the right side, ByteCraft will automatically highlight the matching hex value in **yellow** on the left side.
- Similarly, if you select a hex value on the left, the corresponding text will be highlighted in **light-green** on the right side.

7. Saving Files:

- You can save your changes in either **binary** or **text** format using the **Save** or **Save As** options. If you're editing a binary file, make sure to save it as a **hex file**.

8. Print as PDF:

- Use the **Print** option to generate a PDF file of the contents for easy reference or sharing.

My Final Thoughts

While ByteCraft is a flexible and lightweight hex editor designed with both power users and beginners in mind. With its simple interface, advanced features like hex highlighting, search and replace, and split-view mode, ByteCraft is perfect for binary file editing, reverse engineering, and low-level file manipulation.

Developed using **PyQt5** for professional-grade GUI and **Python** for backend logic, ByteCraft combines the simplicity of Python with the power of a robust GUI framework, offering a cross-platform solution for anyone needing a high-quality hex editor. Released under **GPLv3**, ByteCraft is open for public use, modification, and distribution.