**Objectives**

- Begin implementing the project with ImGui, Boost.Signals2, and GLFW/GLAD libraries.
- Study GLFW and GLAD usage, including their compatibility and independent application.
- Debug and enhance the transformed code for UI functionality and event handling.
- Document the new linking and installation process for the updated libraries.

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**Activities**

1. **Studied GLFW and GLAD Usage**
    - Explored scenarios for using GLFW and GLAD:
        - **Using GLFW + GLAD Together**: Recommended for modern OpenGL development.
            - GLFW handles window and OpenGL context management and user input.
            - GLAD loads modern OpenGL functions (3.3+).
        - **Using GLFW Only**: For window management and input handling without OpenGL rendering.
        - **Using GLAD Only**: For OpenGL rendering when window management is handled by another library or API.
    - Recommendation: Use GLFW + GLAD together for modern OpenGL projects.
2. **Code Integration**
    - Replaced wxWidgets UI with ImGui for menus, toolbars, and dialogs.
    - Switched from SFML's `sf::RenderWindow` to GLFW for OpenGL context management.
    - Integrated GLAD for OpenGL function loading.
    - Replaced SFML's transformations and textures with GLM's `glm::mat4` and OpenGL texture management.
    - Enhanced file dialogs using ImGui and C++'s `std::filesystem`.
    - Improved input handling using GLFW callbacks.
    - Added GLSL shaders for rendering and effects.

- Optimized rendering pipeline with OpenGL's NDC coordinates.

3. **Library Installation**
   - Installed all libraries (ImGui, Boost.Signals2, GLFW, GLAD) using vcpkg.
   - Tested the installations with sample code.
   - Documented the installation and linking process with step-by-step instructions.
4. **Debugging and Testing**
   - Initial issues:
     - **UI Buttons Not Clickable**:
       - Debugged `render()` to ensure ImGui rendering occurred after scene rendering but before buffer swap.
       - Verified proper configuration flags in `initializeImGui()` and correct window flags for ImGui components.
       - Checked GLFW callbacks registration after ImGui initialization.
     - **Suspected Event Order Issue**:
       - Modified `drawToolbar()` to handle button click events.
       - Implemented `drawFileDialog()` for file browser functionality with navigation and file selection.
       - Updated `render()` to integrate dialogs with toolbar interactions.
     - **Persistent Issues**:
       - Investigated the possibility that ImGui rendering was incomplete or misconfigured.
5. **File Operations**
   - Developed functionality for "Load Image" and "Save Image" buttons:
     - Implemented dialogs for file browsing and saving.
     - Handled directory navigation and file selection.
     - Integrated OpenGL resource management for rendering loaded images.
6. **Further Debugging**
   - Tested with hardcoded file paths to bypass UI button issues:
     - Confirmed file loading but observed no image rendering.
     - Investigated ImGui file dialog functionality for better integration.
     - Referenced external resources, e.g., aiekick/ImGuiFileDialog, for enhancements.

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**Achievements**

- Successfully transitioned from wxWidgets/SFML to ImGui, GLFW, and GLAD with Boost.Signals2.
- Installed and tested new libraries, documenting the process for future reference.
- Enhanced toolbar and file dialog functionality in ImGui.
- Identified root causes of UI button issues and implemented partial solutions.
- Enabled basic file operations for "Load Image" and "Save Image" with OpenGL rendering pipeline preparation.

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**Problems & Solutions**

1. **Problem**: UI Buttons Not Clickable
    - **Solution**:
        - Updated `render()` to adjust the order of scene and UI rendering.
        - Verified ImGui component configuration flags.
        - Checked GLFW callbacks and event processing.
2. **Problem**: Persistent Button Interaction Issues
    - **Solution**:
        - Modified `drawToolbar()` to properly handle button click events.
        - Implemented file dialog functionality for file loading and saving.
3. **Problem**: File Loaded But Image Not Rendered
    - **Solution**:
        - Hardcoded file paths for testing.
        - Investigated ImGui file dialog integration for proper rendering of images.
4. **Problem**: Debugging Toolbar and Modal Interactions
    - **Solution**:
        - Updated toolbar logic to manage modal dialogs.
        - Handled file system access exceptions in dialogs.
        - Improved dialog management with ImGui's `OpenPopup()` and `BeginPopupModal()`.