`malloc-craft`

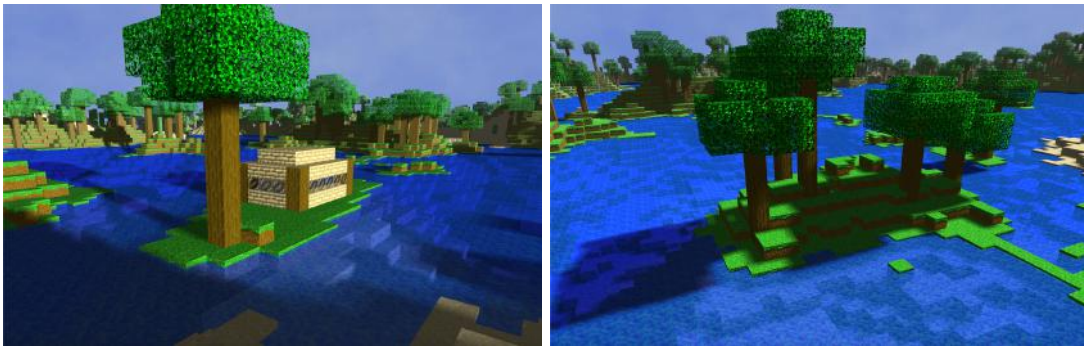### Nick Mankowski

GitHub Repository

Overview

`malloc-craft` is a Minecraft-like voxel game written in C using OpenGL. This project focuses on memory management and modern graphics programming techniques to create a block-based 3D world where players can build and explore.

Key Features

- Procedural terrain generation with multiple biomes

- Dynamic chunk loading and management

- Block placement and destruction with raycast selection

- Procedural tree generation

- Texture atlas support for various block types

- Performance optimizations with mesh batching

- Lighting system with softened shadows

Settings

Many parts of `malloc-craft` are configurable. Please see `include/settings.h` for more information.

Project Structure

- **include/** – Header files defining the game's architecture

- **src/** – Source directory

- **lib/** – Third-party libraries

  - cglm – Math library optimized for graphics programming

  - GLFW – Platform-independent window and input handling

  - glad – OpenGL loading library

  - stb_image – Image loading utilities

- **res/** – Game resources
    - **shaders/** – GLSL shader programs
    - **textures/** - Textures
    - **xcf/** - Raw GIMP files used to create textures

Prerequisites

- CMake (version 3.10 or higher)
- C compiler with C11 support (gcc, clang, MSVC)
- OpenGL 3.3+ compatible graphics hardware and drivers

Building

1. Clone the repository with submodules:

   ```
   git clone https://github.com/MankowskiNick/malloc-craft.git
   cd malloc-craft
   ```

2. Create a build directory:

   ```
   mkdir build && cd build
   ```

3. Generate the build files with CMake:

   ```
   cmake ..
   ```

4. Build the project:

   ```
   make
   ```

Acknowledgments

- GLFW – Window and input management
- cglm – Graphics math library
- stb – Image loading
- glad – OpenGL loading