ECE 3574: Applied Software Design

Meeting 08: Building Cross-Platform Software using CMake

The goal of today's meeting it to learn about building larger software projects that have multiple modules of code, unit tests, and main programs.

- ▶ Why CMake?
- ▶ Running CMake: GUI and command-line
- ▶ Writing a basic CMakeLists.txt configuration file
- ▶ Exercise
- ▶ Milestone 1

Software Configuration and Build tools

You should be able to build all dependencies and the code itself, in debug and release mode, for all platforms supported **in a single step**.

This can be done by a variety of means, including customs scripts and IDE tooling. We will be using a popular open source tool for this called cmake.

Why CMake? What problem does it solve?

- ▶ Once a project gets to a certain size, compilation and linking, setting compiler flags, etc becomes complicated

See example: manual builds -> build scripts -> makefiles and limitations

- ▶ This is especially true for cross-platform projects. It is a pain to maintain build configuration for each platform (VS .sln, XCode .xcodeproject, makefiles, . . .)
- ▶ CMake is a build generator, it writes the files needed for the specific IDE or build tool. We will use this, warts and all.

There are many other tools for bulding C++ code, e.g. MSBuild, scons, Bazel, Buck, premake.

Running CMake

- Using the GUI
- Using the command line

See demo.

Basic CMakeLists.txt Syntax

```
cmake_minimum_required(VERSION 3.5)
project(YOURPROJECTNAME CXX)

add_executable(exename1 file1.h file2.cpp ... )

add_executable(exename2 file3.h file4.cpp ... )

enable_testing()
add_test(test_name exename arguments)

See demo
```

More advanced CMake

CMake is a very flexible tool. Some examples

- ▶ perform different configurations based on platform
- ▶ write source files at configure time
- ▶ run external scripts and programs for memory checking, coverage analysis, documentation generation, etc.

The CMakeLists.txt file in the starter code demonstrates many of these.

Exercise 08

See the website.

Next Actions

- Read the Overview of Qt
- Install Qt on your host system (see the website)