CSE305 Computer Architecture

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Project #2 – Simple MIPS Emulator

**Introduction**

This program is an emulator which runs executables generated from the Simple MIPS assembler, which was the last assignment. This emulator does not use any special algorithms or technologies to run the executable faster.

**Project Structure**

The project contains three directories: Public, Source, and Tests. Public contains header files, Source contains C++ source files, and Tests contains unit tests. Source files in Tests are not necessary to build runfile.

Source contains 5 source files, whose roles are as the following:

* Common.cc implements common functions like hex integer parsing.
* Emulation.cc implements instruction execution.
* File.cc contains file I/O functions.
* Main.cc contains the entry point, parses the command-line argument, and converts errors into strings.
* Memory.cc implements the register file and the memory.

**Build Instructions**

This emulator is written in C++17. Although GCC 7 supports C++17, it lacks some standard C++17 headers (e.g. <filesystem> or <charconv>). To properly build the program, please use GCC 9 or higher. To install GCC 9 on Ubuntu 18.04, run:

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| sudo add-apt-repository ppa:ubuntu-toolchain-r/test  sudo apt update  sudo apt install gcc-9 g++-9 |

This project uses CMake 3.13. To build the program with CMake, run:

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| --- |
| mkdir build  cd build  cmake -DCMAKE\_CXX\_COMPILER=g++-9 ..  cmake --build .  ./runfile -n 10 -d input.o |

If CMake 3.13 or higher is not available in your system, you can use this command instead:

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| --- |
| g++-9 -std=c++17 -I./Public \  -o runfile \  ./Source/Common.cc \  ./Source/Emulation.cc \  ./Source/File.cc \  ./source/Main.cc \  ./Source/Memory.cc  ./runfile -n 10 -d input.o |

**Unit Tests**

To run the unit tests, please download Vcpkg from <https://github.com/microsoft/vcpkg> and install GTest. To build the unit tests with CMake, run:

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| --- |
| mkdir build  cd build  cmake \  -DCMAKE\_CXX\_COMPILER=g++-9 \  -DCMAKE\_TOOLCHAIN\_FILE=/vcpkg/scripts/buildsystems/vcpkg.cmake \  -DENABLE\_SIMPLE\_MIPS\_EMU\_TEST=ON \  ..  cmake --build .  ctest |