

ECE 243 Computer Organization
Open Software/Hardware Project Description, March 5, 2023

In the 'Open Software/Hardware' Project option your group will build software of your own choosing, running on the DE1-SoC, including attaching hardware of your own choosing to the DE1-SoC. (You can debug the software of your project on CPULATOR, but it must be demonstrated on the actual hardware). This is an opportunity to do something that you are interested in within the bounds of the course. The amount of work should be roughly equivalent to two labs' work.

There are two possibilities for the Open Software Project:

1. Create an animation that you find interesting, that is controlled by the switches or pushbuttons (and possibly the PS/2 mouse or keyboard, which also available on CPULATOR). This could be a game, or some kind of dynamic artistic display.
2. Do any project that you like, as long as it connects to the course material, and involves the creation of software running on the DE1-SoC. This can include attaching your own hardware to the board and creating an application with it.

A requirement of the project is that it must be different from all the other projects in the class and so you must get 'uniqueness approval,' as described in the **FinalProjectStructure** document.

Other Input Devices

You may wish to use two other forms of input not covered in the course: the PS/2 keyboard interface (which is also available in CPULATOR) or the PS/2 Mouse. These interfaces are described in Section 4.5 on page 24 of document **DE1-SoC_Computer_ARM** (given out with Lab 3). The CPULATOR documentation describes how CPULATOR emulates these devices: https://cpulator.01xz.net/doc/#io_devices (click on the left hand side for PS/2 keyboard and mouse).

Submitting Project and Grading:

Submit your code to Quercus, prior to being graded on your final lab day, in the week of April 11. You should include a PDF that describes how to operate your project. Also include in the report an 'attribution' table that indicates what fraction of the work each partner did, with a short description of what work each partner performed.

During your final lab day, show your TA a demonstration of your project and answer questions.

Here are three example demonstrations from a previous years' projects that were software only: [EXAMPLEVIDEO](#). These projects were done only on CPULATOR, but that isn't necessary this year. Projects will be graded on the level of functionality (how much

you did) and difficulty (how challenging was the project). Difficulty comes from both code/algorithm complexity as well as any hardware I/O or device complexity. There will be a meeting among instructors and the TAs to create a uniform grading standard across all projects.