

Self-proposed two-member group project

EE332: Digital System Design

Final Project

Objective:

Through the final project, students are required to:

- design a complex digital system by using the design techniques introduced in the course, and implement the system on the Nexys4 DDR FPGA board.
- work on a group with 2 members, who together create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
- read manuals of device/pmod to understand their operation principles, and thus to design circuits to drive the device/pmod through pmod and other device connectors.

Requirements:

- The system should have at least 2 independent modules to drive (or communicate with) external pmods, i.e., each member must independently complete at least an independent module to drive one pmod. The pmods and onboard devices are served as sensors / curators (or inputs / outputs), such that the system may sense the environment, process the data / signal collected, and take actions to response to the external world.
- The system should contain several sub-blocks, organized in a hierarchical structure.
- Each group has 500 Yuan budget to purchase necessary pmod and other materials/components for the project. Budget above 500 Yuan may be requested and will be considered case by case.

Important Date:

- Project proposal presentation: 3rd April
- Project proposal report: Due date: 16 April 12noon
- Project Demonstration and presentation: 29th May
- Final report and source code: Due date: 1st June.

Project proposal

- Save project proposal in pdf format
- Submit to bb system
- Submit early for an early start, but no later than deadline
- Proposal must contain: 5%
 - Title
 - Description of the function and specification to be realized and goals of the project and the work to be carried out (300-500 words).
 - The pmod device/external device used
- Oral 5%

Final Assessment:

The project is assessed by the following aspects:

- Demonstration of the system 5%
 - The complexity of the system
 - The completeness of the system, and the meeting of the specification
 - The fully making use of the budget

- Report, including the following contents 10%
 - Title, authors (and indicate the author for each subsequent session)
 - Describe the system functions, **specifications**, and any extension.
 - The pmods devices/external devices used and their models, if available, and development environment.
 - Define the global inputs and outputs.
 - Top module block diagrams. Explain the function of each module, and define the input and output signals for each module.
 - Task plan, schedule, and budget.

Each member completes **his/her own** designs of the following two items:

- Describe the operation principle of the pmod device/external device, the protocol used, if any, and the required sequence of signals to drive the pmod.
- Describe the design of the pmod drive and another key module, including the algorithm, ASM chart, conceptual diagram, and VHDL code.
- Test results, analysis of performances, **meeting of specifications** and limitations of the system.
- Oral Presentation 5%

Report Requirement

- Observe the Honor Code
 - Do not copy or paraphrase text without proper attribution
 - Do not copy or modify figures without proper attribution
 - Never, ever manipulate, suppress, or make up experimental results
- Indicate how ChatGPT is used, if applicable.

No Plagiarism, for report and/or codes