Engineering NB

Thomas Swenson

Meeting Entry - September 5, 2023

Goal: Beginning of Project

Summary:
Today we started defining the scope of the project and thinking about requirements. As a team, we considered features and goals for the project and started laying things out. The FPGA we chose is the Digilent Nexys A7 development board to create our prototype before porting everything to the TVS.

Meeting Entry - September 7, 2023

Goal: Dividing Tasks and Research

Summary:
This meeting we worked on dividing up tasks to individual group members. We also started searching for relevant resources that will help with the project. The team identified some key resources and materials to reference and each member knew their task. The main goal today was to keep the team well organized and productive.

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Meeting Entry - September 12, 2023

Goal: Defining Architecture and Specifications

Summary:
Expanding on the conversations from the previous week, today's meeting explored the technical dimensions of our project. The team outlined the architecture, highlighting the incorporation of a Xilinx MicroBlaze soft-core CPU on the Artix 7 FPGA, and specified the use of FreeRTOS for server operation. We decided on the Vivado version, secured essential materials, or devised plans to acquire them. Additionally, potential challenges were identified, and strategies to address them were outlined.

Meeting Entry - September 14, 2023

Goal: Installing and Getting Vivado Running for Everyone

Summary:
The goal for today was to get a working Vivado installation on every team members machine. We began by going through the installation step by step to ensure everyone was progressing. We made sure that everyone had the same version and that it was working well. Aside from one team member, who will need a different computer as Vivado does not support Mac, everyone got Vivado installed and working.

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Meeting Entry - September 19, 2023

Goal: Research Overview and Progress Check

Summary:
During our meeting, we took a good look at how far we've come. We chatted about the coding work, focusing on tackling those Vivado issues that popped up during implementation. Everyone pitched in with insights they got from digging into FPGA, MicroBlaze, and related stuff on their own. We all shared information which helped us work on our approach and make sure we're all on the same page.

Meeting Entry - September 21, 2023

Goal: MicroBlaze Tutorial and More Research

Summary:
Today's meeting focused on the exploration of MicroBlaze reading tutorials and researching. We worked through a tutorial as a team which let everyone gain hands-on experience with MicroBlaze implemented on the Artix 7 FPGA. We dove into key concepts, functionalities, and possible applications in our discussion. Team members shared what they found in their research, digging into the details and potential challenges of bringing MicroBlaze into our project. This meeting set the stage for the next steps in coding and implementation, helping us get a better grip on how to work with the chosen soft-core CPU.

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Meeting Entry - September 26, 2023

Goal: Continuing MicroBlaze Tutorial and Research
Summary:
Similarly to last meeting, today we focused on the Microblaze again and worked through more tutorials. We continued discussing our research as well. Since we already got some basic tutorials running last meeting, today we focused on more specific features of the Microblaze. Everyone practiced coding relating to the Microblaze since collaboration was convenient while we met.

Meeting Entry - September 28, 2023

Goal: GPIO, UArt, QSPI, and other IP Implementation
Summary:
Today, as a team, we discussed a few different IPs such as GPIO, QSPI, and UART. We worked on researching these to learn more about configuring them and if they would work well with the current state of the project. After researching, we shared our findings and worked on some coding to get all of the IPs working well with one another.

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Meeting Entry - October 3, 2023

Goal: Planning for Implementating Digilent Nexys A7

Summary:
Today, we started taking a look at moving to the Diligent Nexys A7. There was a decent amount of preparation needed as there are lots of issues that could arise from this. We discussed some testing practices to validate the project working well on a new platform.

Meeting Entry - October 5, 2023

Goal: Designing HTML and Defining Function

Summary:
Today we discussed the design of the HTML involved in the project and what it should do. The first thing we did was to determine the general layout of the web server since this is mainly what a user will interact with. Currently, we also plan to implement JavaScript to improve the experience and provide real time telemetry.

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Meeting Entry - October 10, 2023

Goal: More HTML Design and Planning

Summary:
Some team members have experience with HTML and web design which has been helpful when designing the web server. The goal is to create a pleasant visual experience while maintaining functionality. Displaying telemetry and the ability to input commands are the main focus for the web server currently.

Meeting Entry - October 12, 2023

Goal: Intro to Xilinx SDK and FreeRTOS

Summary:
Today the team started researching the Xillinx Software Development Kit or SDK and FreeRTOS. FreeRTOS is the real-time OS that we are planning to use in the project. The RTOS will collect telemetry and handle commands. No one in the group has much experience with the Xilinx SDK so we learned a lot today regarding the SDK.

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Meeting Entry - October 17, 2023

Goal: FreeRTOS Hello World

Summary:
Today we started taking a look into getting a "Hello World" running in FreeRTOS. The idea was to get the Hello World design running so we could have some more practical experience regarding FreeRTOS. This would also serve as validation of FreeRTOS working properly. As a team, we walked through a FreeRTOS "Hello World" template for us to work off of.

Meeting Entry - October 19, 2023

Goal: FreeRTOS Hello World Design Troubleshooting

Summary:
Today we focused on expanding from the FreeRTOS "Hello World" from the last meeting. With the addition of more features some issues arose which allowed us to troubleshoot and debug to hopefully make things go smoother in the future.

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Meeting Entry - October 24, 2023

Goal: 1PPS Discussion and Implementation
Summary:
Today we worked towards implementing a 1 pulse per second or 1PPS on our FPGA. It was important that this is an accurate indicator and gives us validation that the FPGA is working properly. A lot of the future features will be very time sensitive so working out any issues regarding that is important.

Meeting Entry - October 26, 2023

Goal: Implementation of 1PPS Continued

Summary:
After planning everything out in last meeting, we began the implementation of the 1PPS. We wanted to implement this feature without it negatively effecting anything else. We were unable to get the 1PPS working this meeting.

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Meeting Entry - October 31, 2023

Goal: 1PPS Debugging and Constraint File Issues

Summary:
We continued working on the 1PPS and eventually got it working. There were a few issues that came up during the coding of the 1PPS but in the end we verified the timekeeping was functioning properly. There were some issues with the constraint files so that was the topic of discussion for a good portion of the meeting.

Meeting Entry - November 2, 2023

Goal: 1PPS Debugging and Constraint File Problems Continued

Summary:
We continued to address the issues with the constraint files and worked collaboratively on this issue. We also returned to the 1PPS in order to review the code and make some refinements. We ended up with it seemly optimized well.

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Meeting Entry - November 7, 2023

Goal: Updating and Refining SDD, SRS, and Test Plan

Summary:
In today's meeting, we carried forward our focus on the ongoing refinement of the Software Design Document (SDD), Software Requirement Specification (SRS), and Test Plan. This critical task aimed to ensure clarity and completeness in our project documentation. Our session commenced with a thorough review of the existing documentation, pinpointing areas that demanded enhancement or clarification. The team then turned its attention to the incorporation of essential diagrams, including class diagrams offering a detailed representation of software structure, data flow diagrams illustrating information pathways, and use case diagrams highlighting various system interactions.

Collaboratively, we dedicated efforts to guarantee that the updated documentation accurately portrayed the current state of the project. This comprehensive update serves not only as a valuable reference for the existing team but also establishes a robust foundation for potential future contributors and maintenance. It reflects our commitment to maintaining clear, detailed, and accessible documentation, which is pivotal for the continued success and development of our project.

Meeting Entry - November 9, 2023

Goal: Updating and Refining SDD, SRS, and Test Plan Continued

Summary:
Today, the team pored over the documents some more with the same goals in mind. We did our best to address any feedback we had received previously. The main focus of today was adding visual aspects to the documents as they were lacking in this regard. The goal was to replace some text with diagrams while maintaining the meaning and information.

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Meeting Entry - November 14, 2023

Goal: FreeRTOS WebServer Implementation

Summary:
Today we started working on integrating FreeRTOS with the interactive web server. We collectively created a plan and tried to address any problems prior to them arising and we created a good footprint down. This will hopefully make the integration easier and less error prone.

Meeting Entry - November 16, 2023

Goal: FreeRTOS WebServer Implementation Continued

Summary:
Building upon the progress from our previous meeting, today's session maintained the momentum in implementing the FreeRTOS WebServer. The team remained unwaveringly focused on refining and expanding the features of the web server within the FreeRTOS environment.

We spent the meeting collaboratively coding and discussing important details. Our talks were centered on ensuring the web server has a user-friendly interface and works efficiently. We also looked into practical ways to exchange data between the server and external computers using TCP over Ethernet. There was a special emphasis on handling telemetry data securely from the onboard AXI bus and peripherals.

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Meeting Entry - November 21, 2023

Goal: FreeRTOS WebServer Implementation Troubleshooting/Debugging

Summary:
Today we focused on debugging and finishing up the FreeRTOS web server integration. We mainly addressed any issues that had come up as we implemented this. We collectively reviewed the code and searched for any errors to fix or any optimizations that could be made. The main focus is consistent and secure handling of telemetry data since this is one of the selling points of the TVS.

Meeting Entry - November 23, 2023

Goal: Final Presentation and Documentation Creation and Practicing

Summary:
Today, the team focused on creating the final presentation and refining project documentation for a detailed summary. The objective was to bring together our achievements, challenges, and the overall project journey in a concise and well-documented format.

The team worked together to create the final presentation. One of our goals was to focus more of using graphics than walls of text to allow for better understanding. We also worked on the project documentation, including the Software Design Document (SDD), Software Requirement Specification (SRS), and Test Plan. We wanted to give them their final touches and make them as accurate as possible. The team also dedicated time to practicing the presentation, focusing on delivering a cohesive and driven overview.

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Meeting Entry – November 30, 2023

Goal: Final Rehersal/Review

Summary:
Today, we put the finishing touches on the presentation and ran through it once more to make sure it would be as smooth as possible. Everyone knows their slides and we were able to make some minor improvments to the presentation.