Project 48 – Introduction to Microcontrollers

Meeting Minute 2

Week of September 24, 2024

Team 48: Gonzalo Allendes, Tyler Winder, Kaleb Lenfest, Felix Leong

Meeting Minutes

Meeting Sessions

The following table details meetings with our sponsor including the date, start and end time, duration of the meeting, and the goal of the meeting.

Meeting#	Date	Start Time	End TIme	Duration	Goal
2	9/24/24	19:28	20:14	46 mins	Setup of Arduino IDE, DX Core

Meeting Attendance

The following table details who was present at each sponsor meeting including if any other people were present besides the sponsor.

Meeting #	Leong, Felix	Lenfest, Kaleb	Winder, Tyler	Allendes, Gonzalo	Martin, Bob	Other Attendees
2	X	X	X	X	X	None

Meeting 2

Topics Covered

Arduino IDE Walkthrough

How to install Arduino IDE as well as the needed Library DxCore.

Lab Manual Suggestions

Hints for what to cover for the getting started section of the lab manual.

Deliverable Expectations and Future Topics

Information about OneDrive, useful links and existing documentation, board that will be used. Also discussed topics for the next meeting.

Action Items

The following table details a list of action items resulting from the sponsor meeting.

Action Item	Assignee	Deadline
Meet with Enrique to get Boards	Tyler	9/25/24
Consult Bob Martin about using a standard Microchip format for educational documents.	Tyler	9/25/24
Begin drafting 'Quick Start' installation instructions.	Team	9/25/24

Action Item Details

Use this space to detail additional information for action items.

Meet with Enrique to get Boards: Enrique is sick so hand delivery date may be postponed

Additional Notes

OneDrive updated with files that will be used throughout the whole capstone
Useful links in the documents, one URL that will be exceedingly important
Dropshipping smaller boards with microcontroller soon

Goal:
- Walkthrough installation of Arduino
- Setup of Arduino environment for usage of DXCore microcontroller (Curiosity Nano board)
- Arduino website has a lot of outstanding documentation

Installation:
1. Go to arduino.cc → software → downloads
2. Arduino packages in Windows app store, installed Arduino into sandbox environment
3. Recommended MSI installer for Windows, macOS is okay, Windows-focused lab manual
4. Download and install onto computer
5. Run Arduino IDE
6. DXCore not installed in Arduino by default, board-specific library
   - Arduino has general libraries for sensors and motors
   - As vendors split, they created the core library (specific to a specific board and microcontroller)
7. In the Arduino IDE: go to second one down from left bar → file → preferences →
   - Contains additional board support libraries
   - Arduino is the default board package installed with default Arduino installation
8. AVR3: first mile Arduino board
9. Missing DXCore, need to find board support package

Recommended settings changes (for faster debugging):
- Check on "show verbose output during compile and upload" (add this to lab manual) for easier debugging
- Go to "Additional boards manager URLs" and add manager URL (first link in links file) → ok → ok
- Install DXCore 1.5.11 (latest release)
- Install compilers along with the library
  - Home directory: (users)/AppData/Local/Arduino15
  - Might consider putting this in an appendix
  - By default, AppData is hidden, need to go to burger button → view → show hidden files and folders
  - Called Arduino15 because they refactored the entire package at version 1.5
  - Arduino directory describes Arduino setup (master indexer)
    - /packages
    - DXCore includes megatinycore
      - /packages/DXCore/…/1.5.11 - Contains C headers and compiler code (framework), code is compiled every time a sketch is built
      - /cores/dxcore/ – Contains the core functionality of Arduino

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First Project - Blink:
1. Go to file → examples → basics → blink
   - First project everyone does
   - Arduino based on wiring language (basically C++)

Sketch File Structure:
- setup() - Setup is called once when the CPU starts running
- loop() - Called infinitely after the CPU starts running

Microcontroller Pin Mode - GPIO:
- Pins can be inputs or outputs
- Modern microcontrollers have pins that can be both input and output
- Every Arduino board has at least one LED called user support LED
  - Used to verify LED's listed port ID
- Future topic in future meeting: Pulse Width Modulation
- Good out-of-box experience (OOBE) – within 5 minutes, important to get things working fast

First Lab Manual:
- How to get Arduino and DXCore installed
- Description of Sketch files and describe blink mode

Phase 2 - Start of the New Year:

DCC Security Nano (AVR64DD32 Curiosity Nano Board):
- Common form factor on low-cost eval tools
- Diamond-shaped square is microcontroller, 32 pins, 64 bytes of flash
  - Double the memory and has extra peripherals
  - Trivial to debugging parts (unified device programming interface)
  - Zigzag pattern to prevent the need for soldering
  - Highly recommend soldering headers (top and bottom row of holes)
  - DD usually provides the best combinations of features people need
  - Has voltage translators to support multi-voltage channel support?

Appendix:
- Reference to online manuals for the board

Next Meeting:
- Should have all the hardware
- Walkthrough build, upload, and debugging process with Curiosity board
  - Do not need bootloader
  - Explain in detail: GPIO ports and serial output from board
  - Details that people need to know when getting serial output

Manual assumes reader has access to both Curiosity boards

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