2024 Controls/Programming DWM (Prototyping, Part 2)
Majd Bohsali, Ananth Venkatesh

Source: 2024 Crescendo Prototype | GitHub Projects
See also: 🔲 Programming Week 2

Week 2:

- What have we been doing?
    - Robot
        - Introduce RGB gamer lights (Warren, Nicholas)
            - This was unnecessary but crucial nonetheless
        - Allow accessing Limelight stream from static URL (Nicholas)
        - Change swerve controls to use gears and acceleration profiles (Ananth, Nicholas)
            - Use joystick clutch as gear shifter
            - Add acceleration profiles
            - Telemetry still in progress
    - Autonomous
        - Track robot velocity during autonomous (Nandini, Briar)
    - Jankboard
        - Jankboard performance hotfix (Ananth)
        - Make Jankboard a desktop app (Arvind)
        - Add audio cues to Jankboard (Ananth)
    - Improvements
        - Update WPILib to 2024.1.1 (Arvind)
- What are we currently working on?
    - Swerve
        - Adaptive cruise control (Ananth)
        - More accurate acceleration data (Nandini, Briar)
    - Vision
        - Coral-accelerated deep learning model to detect notes (Gavin)
        - Display Limelight camera feeds in Jankboard (Ananth)
        - Follow AprilTag on command (Majd)
    - Autonomous
        - Design and test more competition-specific autonomous routines (Majd)
    - Jankboard
        - Massively improve Jankboard performance (Youwen)
            - 30 billion percent performance increase achieved!!!
        - Monitor robot connectivity in Jankboard (Ryan)

- - Improvements
    - [Detect more controller keybinds](#) (Nicholas)
    - [Develop primitive robot simulation for offline testing](#) (Arvind)
- What are we moving forward with?
  - **THE BACKLOG**
    - Overdue items from the Prototyping iteration
    - Critical bugs
      - [Fix field-oriented swerve driving direction](#)
    - Lots of code review 😥 (Ananth)
  - Jankboard
    - [Add quick access apps to Jankboard](#) (Youwen)
      - Bind Xbox controller buttons to UI elements and allow controller-based app navigation
    - [Sync gears, acceleration profiles, and other data with Jankboard](#) (Arvind)
      - String data currently can't be received by Jankboard
    - [Update Jankboard robot model and other UI improvements](#)
      - Highlight new RGB gamer light strip
    - [Correctly announce game mode](#)
  - Bozo Intelligent Systems
    - [DeepBozo SRR](#) (Youwen, Warren)
    - [Integrate LLM backend to bypass coprocessor restrictions](#) (Warren)
- Team goals:
  - Fully documented code 🤣
  - Massive dejankification and technical debt reduction (Nicholas)
  - **Business: Working on [Team-1280/Identity](#) and branding guidelines**
    - *Still* waiting for Spencer to send design assets
  - **Mechanical: Rotating servo mount for LiDAR**
    - Rohan, this is no longer an option—it is a requirement (get it done!)
    - Only need 180° rotation sideways but with high motor speed
      - Wiring is no longer an issue
  - **Electrical: Underglow + More cameras?**
    - Transition underglow from old robot to new one
    - Add broken Limelight and Microsoft LifeCam to new robot (using jetson nano)

2024 Controls/Programming DWM (Prototyping, Part 1)
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Source: 2024 Crescendo Prototype | GitHub Projects
See also: 🟨 Programming Week 1

Week 1:

- What have we been doing?
  - JankBoard
    - Optimize driver dashboard display for 16:9 (Youwen)
      - Youwen does not know CSS, and thus half our codebase is now maintainable only by ChatGPT
    - Create media player and "download" songs (Youwen)
      - Mostly pirate though
    - Add infotainment system to dashboard (Youwen)
      - ... and nearly break the entire git repository because of MacOS jank and a 1 GB file upload
    - Add media player to infotainment apps (Ananth)
    - Allow sending data back to the robot (Arvind)
  - Field-oriented swerve
    - Fix field-oriented controls (Ananth)
    - Improve swerve controls with speed management (Nicholas)
    - Document swerve codebase (Nandini, Briar)
  - Autonomous, with events
    - Implement path planning (Majd)
    - Allow executing events during autonomous (Majd)
  - LiDAR and Limelight, with multi-detection
    - Integrate Limelight and follow AprilTags (Gavin)
    - Enable multi-AprilTag detection (Gavin)
    - Implement and calibrate LiDAR subsystem (Warren, Nicholas)
    - Document LiDAR subsystem (Nicholas)
  - Internal codebase improvements
    - Partially document subsystems (Warren)
    - Re-enable continuous integration (Nicholas)
    - Safely import JSON parser into swerve codebase (Nicholas)
    - Fix error with automatic code formatter (Ananth)
- What are we currently working on?
  - Drive controls
    - Sync drive controls with Jankboard UI (Nicholas, Ananth)

- - - Integrate gear shifter
    - Add acceleration profiles
    - Send current state to Jankboard
  - Telemetry
    - Allow tracking speed during autonomous (Nandini, Briar)
    - Stream Limelight camera feed from Jankboard (Ananth)
  - Vision
    - Detect notes with Limelight & Coral TPU (Gavin)
  - More jank
    - Introduce RGB gamer lights (Warren)
      - No one asked for this (just like no one asked for pneumatics), but Warren did it anyway, and now all of programming must suffer
- What are we moving forward with?
  - Jankboard
    - Driver dashboard movement and fault indicators (Ananth)
    - Add quick access apps (Youwen)
  - Autonomous
    - Design competition-specific autonomous routines
      - Once the robot is built, set commands to execute actions during the autonomous mode and test
  - Subsystems
    - Waiting for mechanical to finally do stuff ...
- Team goals:
  - Fully documented code
  - Massive dejankification
  - **Business: Working on Team-1280/Identity and branding guidelines**
    - Still waiting for Spencer to send design assets
  - **Mechanical/Electrical: Rotating servo mount for LiDAR?**
    - Challenges mainly center on avoiding wire fractures while spinning the LiDAR at high speed (use long wire and rotate backward after a certain point or rotate about the center with wire attachment in the center)
  - **Electrical: Underglow?**
    - RGB gamer lights are currently in progress, and underglow would entail only a little bit more work (code will be nearly identical to existing RGB gamer light code)