COM207 Devlopemnt Log

Property	Session	Objective	Date	★ Learning and Reflection	Evidance
Workshop	Week 3 - Workshop 4 - PCB Design (Layout)	Convert Shimaketics into a 3D model and develop foundational skills in Fusion 360 CAD to design basic models for creating a baseboard for the PCB.	@October 15, 2024	On the 11th, I was unable to attend the session; however, Ben kindly guided me through a separate session. We began by discussing how to convert a schematic diagram into a 3D representation. He emphasized the importance of mindfully arranging the components and layers within a PCB. I then learned how to create a baseboard in Fusion 360 and import it into EasyEDA to design a custom base. This process included understanding the wiring of components, focusing on both underwiring and overwiring techniques. Additionally, I explored how to create motifs and specific designs for the PCB layout. Throughout this learning experience, I kept a generic	

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				idea in mind for my project. However, before placing the order, I intend to thoughtfully refine the board shape and consider adding any additional components. I will also review the wiring and motifs to ensure a cohesive and functional design, aiming to complete this by the end of the week. Power Supply: Connect the positive terminal to the power distribution points on the top layer. Ground Connections: Route all ground connections to the bottom layer, ensuring they connect to the ground plane. Signal Traces: Wire the signal traces on the top layer according to the schematic, prioritizing short paths to minimize resistance.	
Lecture	Class 1 - Induction session	I got the debrief about the module overview, and learned about development log	@September 24, 2024	started my devlopment log for this module	
Workshop	Week 1 - Workshop 1	Soldering session, learnt to make circutes with pico microcontroller, power, h bridge motors and ir sensors.	@September 27, 2024	Since all the basic components,their functions and their circutit making was delved into, i started thinking about the basic constuction, that I need to make to satisfiy this assigment, and also learnt a bit about iffrent motors and ir sesnsor arrangments, and how that could affect the effucency of the mouse ...	
Workshop	Week 2 - Workshop 3	PCB design using EasyEDA, while gaining a solid	@October 4, 2024	In class, I recently learned how to design PCBs (Printed	

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		understanding of basic electronic components and their schematic symbols. Additionally, to develop the ability to calculate resistor values		Circuit Boards) using EasyEDA, which is an online tool that helps with both schematic capture and PCB layout. We covered the basics of how to use the software, and through this, I got to know the standard symbols for common electrical components like resistors, capacitors, diodes, and transistors, and how these are organized within a schematic. We also studied how to calculate combined resistance in both series and parallel circuits. This gave me a deeper understanding of how resistances interact depending on the circuit configuration, which will be especially useful for designing and troubleshooting circuits in my mouse project.	
Workshop	Week 4 - CAD 1 - Fusion 360	Investigate power law, Ohm's law, and resistor law while working on the PCB layout and reviewing wiring. Additionally, learn Fusion 360 and CAD to design a motor based on a provided design drawing, and develop skills in rendering the completed motor design.	@October 18, 2024	Initially, I focused on modeling from a drawing, recognizing that all necessary information for creating a useful model was present. The level of detail incorporated into the model was flexible, allowing me to tailor it to my objectives. I started by including essential components such as the motor shaft, gearbox, and motor body, establishing a solid foundation for the overall design. However, I encountered difficulties in learning and understanding the measurements and illustrations	

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				from various component drawings, which challenged my ability to accurately translate the designs into a model. Had a bit of a hard time getting the hang of Fusion 360, especially with the different textures and keeping up with the steps at that speed. But I finally managed to create a motor, render it, and put together a component drawing with all the measurements. It felt like a big win after all the struggles!	
Notes Self	Fusion 360 CatchUp Notes	Modeling From a drawing and creating a drawing, rendering our model, slicing and printing	@October 29, 2024	I've attached the notes I've pulled together on the basics of Fusion 360 up to this point. They go over the steps for things like modeling from a drawing, creating a technical drawing based on a model, and rendering the model to make it look polished. I also added a picture that shows all the components I've built and assembled so far	https://docs.google.com/document/d/11U4RmCtFy3g15YU7tYgH0K83UZdwG-EblFtYcuH-0T4/edit?usp=sharing
Notes Self	Basic Elecroninc s Physics Equations	Resistor in series and Parallel, Ohms Law, Power Law and subsituting each other variable in other equation then trying to find the required value.	@November 1, 2024	Ohm's Law explains the relationship between voltage, current, and resistance, highlighting how the voltage across a component depends on the current through it and its resistance. The Power Law helps understand how power in a circuit relates to voltage and current, showing the different ways to express power, including how it can be derived using	https://docs.google.com/document/d/11U4RmCtFy3g15YU7tYgH0K83UZdwG-EblFtYcuH-0T4/edit?usp=sharing

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				only current and resistance or voltage and resistance Series and Parallel Resistor Configurations describe how resistances add up in circuits. In series, the total resistance increases by summing the individual resistances, while in parallel, the combined effect reduces the total resistance, emphasizing how current divides across branches. Have added my notes on these topics, in the google docment that is attached.	
Workshop	Week 5 - CAD 2 - 3D Printing	Progressed on assembly construction by integrating the motor, motor mount, and PCB board layout in Fusion 360, rendered the assembly, and then explored orca slicer to 3D print the motor mount.”	@October 25, 2024	This session was a bit stressful, as I hadn’t finished my motor mount before class. During the first part of the session, we went over the slicer settings and installation while I worked simultaneously on completing my motor mount. I learned from a mistake that it’s much easier to negative-extrude areas before adding modifications like chamfers or fillets, as the unmodified edges are simpler to adjust as a whole. I managed to 3D print my first motor mount, but I ran into an issue that many in the class faced: I’d made the hole size for the motor the exact same as the mount, so it didn’t fit quite right. I’ve adjusted the sizing and will test the fit next session. I have attached the document with all the settings need incase we	https://habitual-seahorse-fa9.notion.site/3D-Printer-Configuration-Manual-129af4ccc223805c9b84f72208ce7028

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				need a reference in the future.	
Workshop	Workshop Week 7 PCB Devlopment 3 - Assembely	To master inspecting and verifying new PCBs by thoroughly comparing them with the original designs. Usually, that involves using electronic testing equipment to detect any problems and tinkering the parts up in step by step soldering, with software on each step to identify issues and get bugs out early.	@November 8, 2024	When our PCB boards arrived, they looked wonderful, and we were all extremely excited to begin working with them. I started by soldering and testing a few components, and it was a fascinating, hands-on experience. My board worked correctly on the first attempt, but Revin's had issues. With Ben's help, we learned that even if a soldered joint appears solid, the metal might not be fully melted and thus may not conduct properly. By reheating the soldered joint, we got it working. I also learned how to properly place the TCRT sensor onto the breadboard and discovered that it has a filleted and a non-filleted side, which affects placement. This session was both engaging and educational, giving us firsthand insights into PCB assembly and troubleshooting.	PCB Development 3 - Assembly (1).pdf Time lapse lab.mp4 
Spv	Supervised session - pcb assembly continouation	To assemble the PCB by completing the soldering of all components and testing their functionality using specific test codes, ensuring that each component operates as expected	@November 14, 2024	During a supervised session, we focused on assembling the PCB. First, I completed soldering all the components. Then, I tested each component individually using specific test codes. My Pi Pico blink code worked correctly, as did the switch. However, for the LED test, only two of the LEDs functioned properly. I'm unsure of the reason for this issue.	

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				Unfortunately, the session ended before I could investigate further. In the next session, I plan to troubleshoot the problem with Ben's help.	
Notes Self Workshop	Week 8 - Lazer Cutting	designing within the constraints of 2D fabrication. Working with large sheets of wood, plastic, or metal can be faster and more efficient than other methods like machining or 3D printing, even if it means losing a dimension in the design.	@November 15, 2024	This session was split into two parts. First, we learned to create 2D models in Fusion 360 and design interlocking edges, allowing the pieces to fit together like a puzzle once cut. While not everyone completed this within the given time, we were encouraged to create a simple design in Fusion to practice operating the printers. We transferred our files to OneDrive, uploaded them to Adobe Illustrator, and adjusted the lines to red with a thickness of 0.035 mm. We then verified the placement before proceeding to print. Additionally, we learned how to adjust printer settings for different materials, ensuring accurate results. **Things to Remember for Laser Printing:** 1. Ensure you hear the hissing sound and that the gas suction is on. 2. Log into the system with your student ID. 3. Verify that the mouse is working properly. 4. After uploading your file, set the line color to red and the thickness to 0.035 mm. 5. When adjusting settings for the material: - Use a caliper to measure the	

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				material's thickness. - Update the thickness value to ensure a perfect print on the first trial. 6. Do not click "Save" or "Apply" when updating the material settings—click "OK" to apply the changes.	
Notes Workshop	Week 9 - PCB Assembely 2 - Testing continiouation	To test the micromouse PCB by verifying its functionality and ensuring all components are soldered correctly.	@November 22, 2024	During this session, we continued testing the micromouse PCB and its components. Initially, while testing the LED function, one of the LEDs didn't work. I retraced my steps, verified the wiring using the circuit diagram in EasyEDA, and used a multimeter to check the connections. Eventually, I discovered that a microcontroller pin was not properly soldered. After re-soldering the pin, the LED functioned correctly. Next, the second TCRT sensor failed to work properly. Upon reviewing the circuitry, I learned to unsolder the defective TCRT, replaced it with a new one, and re-soldered it onto the board. This resolved the issue, although I suspect the problem may have been caused by how the TCRT was bent to align it or some external factor. Finally, I tested the motors with basic code, and they worked perfectly. After confirming the functionality of all individual components, I compiled their	Comp207 Motor test.mp4 Comp207 Tcrt Test.mp4  Comp207_Basic_Test_Code.ino

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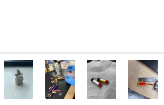
				corresponding code into one function for streamlined testing in the future.	
Self Spv	3D Printing and Lazer cutting	The objective was to model components for the bot using Fusion 360 and then 3D print them.	@November 28, 2024	During this session, I worked on Fusion modeling the components needed to assemble my bot. I started by designing a basic body for the bot and printed it out. While the print turned out to be thinner than expected at the bottom, it fit perfectly on the PCB body, which was great. Next, I designed a wheel for laser cutting, which was an enjoyable and quick process. The wheels came out great, with perfect sizing that fit the motor well and worked smoothly. However, since the wheel placement on the motor mount is slightly towards the back, the bot doesn't stand fully straight. I plan to design an additional part to attach to the front of the motor mount, which I can laser cut or 3D print to help the bot stand upright.	
Lecture Workshop	Week 10 - 3D Scanning	The workshop emphasized integrating 3D scanning into the micromouse project by creating an aesthetic component, experimenting with photogrammetry apps like KIRI Engine and Polycam to generate a 3D mesh, scanning the model, and proceeding to 3D print it. Additionally, we focused on repurposing batteries by extracting them from old vapes,	@November 29, 2024	During this session, we explored various 3D scanning techniques, learning how they work along with their advantages and limitations. Afterward, we headed to the lab to work on clay-modeled sculptures, which was a refreshing and enjoyable break from the usual academic tasks. I decided to model a tiny mouse that could sit on my micromouse, aiming to 3D print it at a	

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		soldering them together, and transforming them into functional, rechargeable, and reusable power sources.		smaller scale. Using the Polycam app, I scanned my model, exported the file as a GLB, converted it to STL, and spent considerable time editing the mesh, scaling it, and preparing it for 3D printing. Although my scaling was slightly off, resulting in the mouse being larger than intended, the final result was unexpectedly fun and charming. The little mouse adds a lot of personality to my micromouse, making the process both rewarding and enjoyable.	
Self Spv	Catching up!	The objective was to catch up on previous sessions by fixing the battery, 3D printing the model from the 3D scan, testing components, and starting the coding for the micromouse.	@December 5, 2024	First, I re-soldered my battery, as the connecting wire had come loose and was flimsy. Then, I worked on 3D printing my model, which I had previously 3D scanned and made some edits to. I began by fixing issues in the 3D model, such as reshaping the back of the mouse, then scaled it and 3D printed it. While the print turned out well, in hindsight, it's bigger than I would have liked, so I'll need to reprint it at a smaller size. Next, I started coding for my micromouse, aiming to implement a state machine, similar to the one I created for my Braitenberg vehicle in COMP208. However, this approach led to several issues with state transitions, so I didn't have time to fully resolve them. After discussing with	

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				others, I decided that for the next session, I'll focus on creating a basic conditional code that works and then convert it into a state machine if needed.	
Workshop	Week 11 - Colabirative feedback	The objective is to focus on refining the bot's locomotion and code while addressing functional issues with guidance and support provided during the session.	@December 6, 2024	During this session, I focused on programming my motors to respond to readings from the TCRT sensors. Instead of immediately implementing a state machine, I began with a series of simple if conditions. Initially, the conditions worked well: when the right sensor detected something, the right motor spun, and when the left sensor detected something, the left motor spun. However, when I added a condition to stop the motors when all three sensors detected something, it didn’t work as expected. It was suggested to adjust the order of conditions in my code, as only one condition is evaluated at a time, but the issue persisted. When all three sensors were covered, only the right motor continued to spin. After troubleshooting, we discovered that one of the pins on my PiCPO was improperly soldered. Once this was fixed, the system worked as intended. Additionally, I encountered an issue where my bot wouldn’t work with the battery, only to realize I had forgotten to turn on the switch.	Comp207 - Testing all comp vid.mp4 Comp207 - Basic fuction video.mp4 Condition_code.ino comp207_test_function.ino

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				This was a valuable reminder not to overcomplicate every problem and to start with the basics when troubleshooting.	
Notes Self	3d Scaning Notes	Notes from the 3d scaning lecture	@November 30, 2024	1. **Structured Light** ◦ **Use**: Capturing detailed 3D surface geometry. ◦ **How it works**: Projects a series of light patterns onto an object and uses a camera to capture the deformation of the patterns, which is then used to reconstruct the 3D shape. 2. **Photogrammetry** ◦ **Use**: Creating 3D models from photographs. ◦ **How it works**: Takes multiple photos of an object from different angles, and software stitches these images together to create a 3D mesh. In most cases, we will use a photogrammetry app to take pictures of our object, scan it, convert it into a 3D model, and then convert it to STL format for editing and further work. 3. **Laser Pulse (LiDAR)** ◦ **Use**: Mapping large areas or objects with high precision. ◦ **How it works**: Emits laser pulses and measures the time it takes for the pulses to bounce back, creating a point cloud to form a 3D model. 4. **Contact**	

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				◦ **Use**: Measuring precise 3D shapes of objects or surfaces. ◦ **How it works**: A probe physically touches the object's surface to record exact coordinates, generating a 3D model based on direct contact.	
Self	Updated Github, and Readme Edited and Made the State code Work	Uploaded all the documents into the git hub and made a read-me file. Further, I edited the state machine code based on the working conditional statements.	@December 8, 2024	I concentrated on organizing and documenting my work by creating a comprehensive README file for my GitHub repository. I ensured all relevant files were uploaded, including CAD designs, electronic schematics, the EasyEDA file, test code, and the current codebase. The README was carefully structured to enhance accessibility and clarity, making it easier for others to navigate and understand the project. This effort not only consolidated my progress but also provided a well-documented resource for future reference. Following this, I worked on the state machine code, building upon the existing conditional logic. The implementation functions effectively, transitioning through four states: **Move Forward**, **Turn Right**, **Turn Left**, and **Stop**, based on the TCRT sensor values. This marks significant progress in integrating sensor-based logic into the robot's control system	Comp207 - Working State Code.mp4 Basic_state_micro_mouse_code.ino
Self	Re laser cut the wheel and	Reprint the body of the	@December 12, 2024	The task involved reducing the size	

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	print the body	micromouse to improve its fit and structure. Additionally, I needed to laser cut the wheels of the bot to ensure they fit better and function more effectively within the overall design. This process aimed to refine the physical components of the robot for better performance and alignment.		of the central hole that connects to the motor and re-cutting it for a better fit, which was successfully achieved. Additionally, I reprinted the body of the bot, including adjustments to how the battery stand is attached. However, there was an issue with the sizing of the body again, and I realized further rework on the CAD model is necessary. I plan to rework and reprint the body after the New Year to ensure proper sizing and alignment, resolving any remaining issues with the fit and structure of the micromouse.	
Spv	Lecture - Pre submission clinic	We got to work more on our projects, I had to resolder my battires togeher and remake a new now	@December 19, 2024	Extracted battres from vape,soldered all the wires together and taped it off so we can use it.	
Self	Github Update + Fusion Diagrams	Uplode CAD and Code Files	@December 12, 2024	Started uploding all the fusion files along with the code files. also made new drawing for few of the parts and converted it into png and uplded them onto the git, so it is easier to uplode in the readme hence making it easier more professional.	
Self	Clean Up easyeda		@December 12, 2024	Made the shimatic diagrams more precentable and tookk couple ofscreenshots of not only the boards but also the layout so, i can add it to the readme. Also made a not of all the component customer contributer numbers	
Self Workshop	Week 12 - Market Testing	Develop a concise, three-question survey to gather targeted	@December 20, 2024	In today's session, I created a Google Form with three questions to	

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		feedback from three peers, identifying specific areas for improvement in my robot's design. Based on the feedback, implement necessary design enhancements		gather feedback from three of my peers on key aspects of my project: GitHub documentation, digital prototyping, and code efficiency. The feedback has been incredibly valuable in helping me identify both strengths and areas for improvement in my work. **GitHub Documentation:** Feedback on my GitHub repository indicated that while the structure is generally navigable, there is room for improvement in terms of providing more detailed documentation for beginners. Ana pointed out that step-by-step instructions would be beneficial, and Luke suggested incorporating more visual aids to help guide users through the process. Based on these insights, I plan to update my GitHub repository by adding more comprehensive documentation, including clearer instructions and visuals, to make it more user-friendly. The average score for my GitHub documentation was 4.33/5, reflecting both positive feedback and areas for enhancement. **Digital Prototyping:** The feedback on	

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				digital prototyping was mostly positive, with peers appreciating the simplicity and effectiveness of the design. However, Ana mentioned a specific improvement: adding a hole in the shell for motor wires to optimize the layout. Revan also suggested a redesign of the motor pins on the PCB to reduce the risk of breakage. I see these as valuable suggestions and will incorporate them into future iterations of the prototype. Overall, the digital prototype received an average score of 4.33/5, indicating strong approval with some room for practical improvements. **Code Efficiency:** Regarding the code, most feedback indicated that it works well, though Revan suggested that the movement logic could be refactored for better readability and maintainability by converting state-based movement into functions. Additionally, there was feedback that the code runs a bit too fast, which I will address by adjusting the speed. This feedback is crucial for ensuring that the robot operates at an optimal pace and that the code remains clean and efficient. The code received an average score of 4.33/5, reflecting a solid foundation with areas for	

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				refinement. **Conclusion:** The overall feedback was constructive and highlighted areas where I can make significant improvements. The average score across all aspects was 4.33/5, showing that the project is on the right track but still has room for improvement. Moving forward, I will focus on enhancing the GitHub documentation, refining the digital prototype, and optimizing the code to address the feedback I received. This iterative process of gathering feedback and making adjustments will help ensure that the final product meets both functional and user experience expectations.	
Self	Updating Readme	The task was to create a clear, beginner-friendly README document for the micromouse project. This document needed to outline the entire process of building and programming the micromouse, with simple, step-by-step instructions and images. It had to be well-structured in Markdown format, ensuring ease of use for users with no prior experience. The goal was to provide a comprehensive yet accessible guide for replicating the project.	@February 2, 2025	Creating the README document was a challenging yet rewarding process. Although it might seem like a small task, it required significant effort and attention to detail. I had to revisit each step of the micromouse project, breaking it down into clear and concise instructions without being overly wordy. This involved explaining every detail of the build and coding process, making sure that even someone with no prior experience could easily follow along. The most time-consuming aspect was ensuring that the document was not only	

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				informative but also visually engaging. I included images, rendered drawings, and measurements, all of which helped to simplify the instructions and make them more accessible. Each visual element was carefully chosen to support the text and aid in understanding, making the process smoother for beginners. Furthermore, I had to balance being thorough with being succinct. It was important not to overwhelm the reader with unnecessary information while still covering every crucial detail. The Markdown format made it easier to structure the document in a logical and clear way, with sections for setup, assembly, wiring, and code explanation. In hindsight, this task reinforced the importance of clear documentation, especially for complex projects. A well-organized README not only helps others replicate the work but also serves as a valuable reference for future improvements. Although the task was time-consuming, the result was a highly useful, beginner-friendly guide that significantly contributes to the project's overall accessibility. This also makes it easier for when i have to make a	

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				video or rego through any step(a more consise and formal dev log :))	