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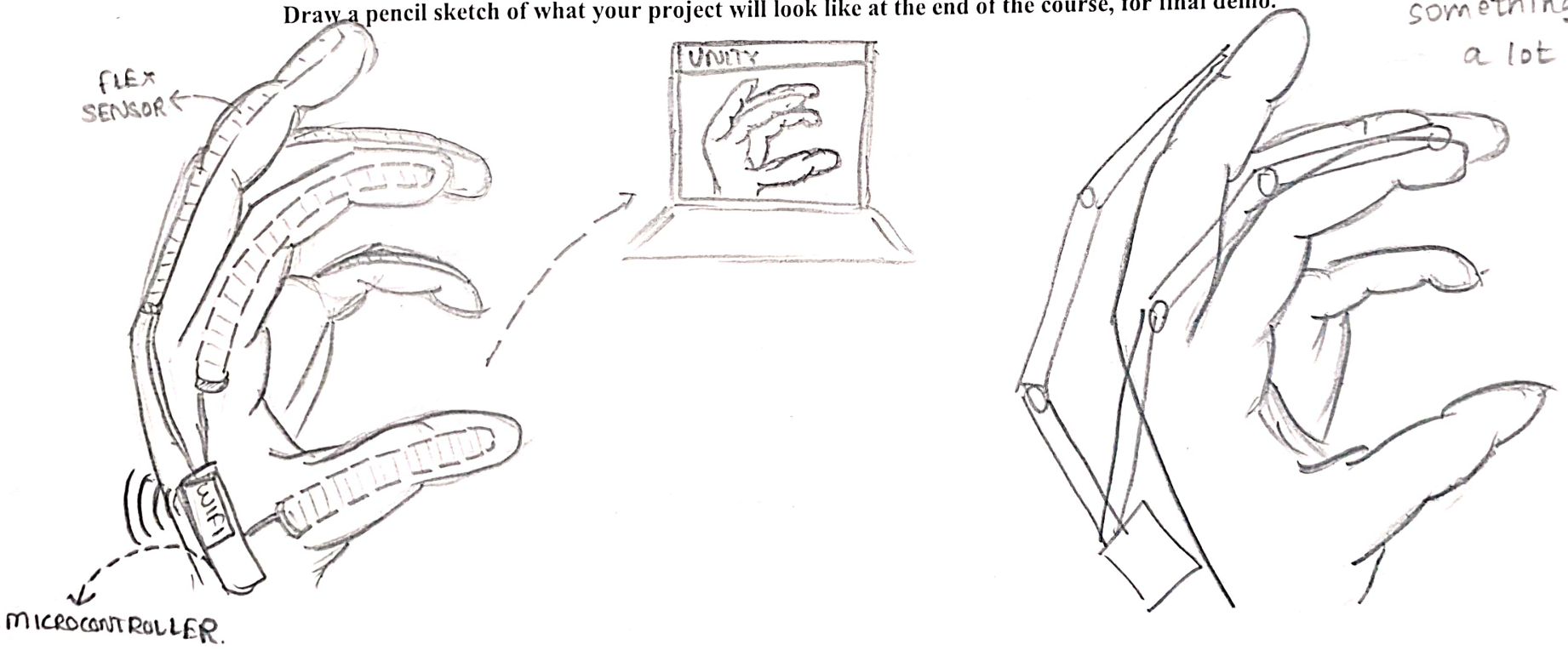
Group code: 17-Mon **Student names:** _____ **EDL 2025**

Project title: Exoskeleton Glove **Date:** 20/1/2025

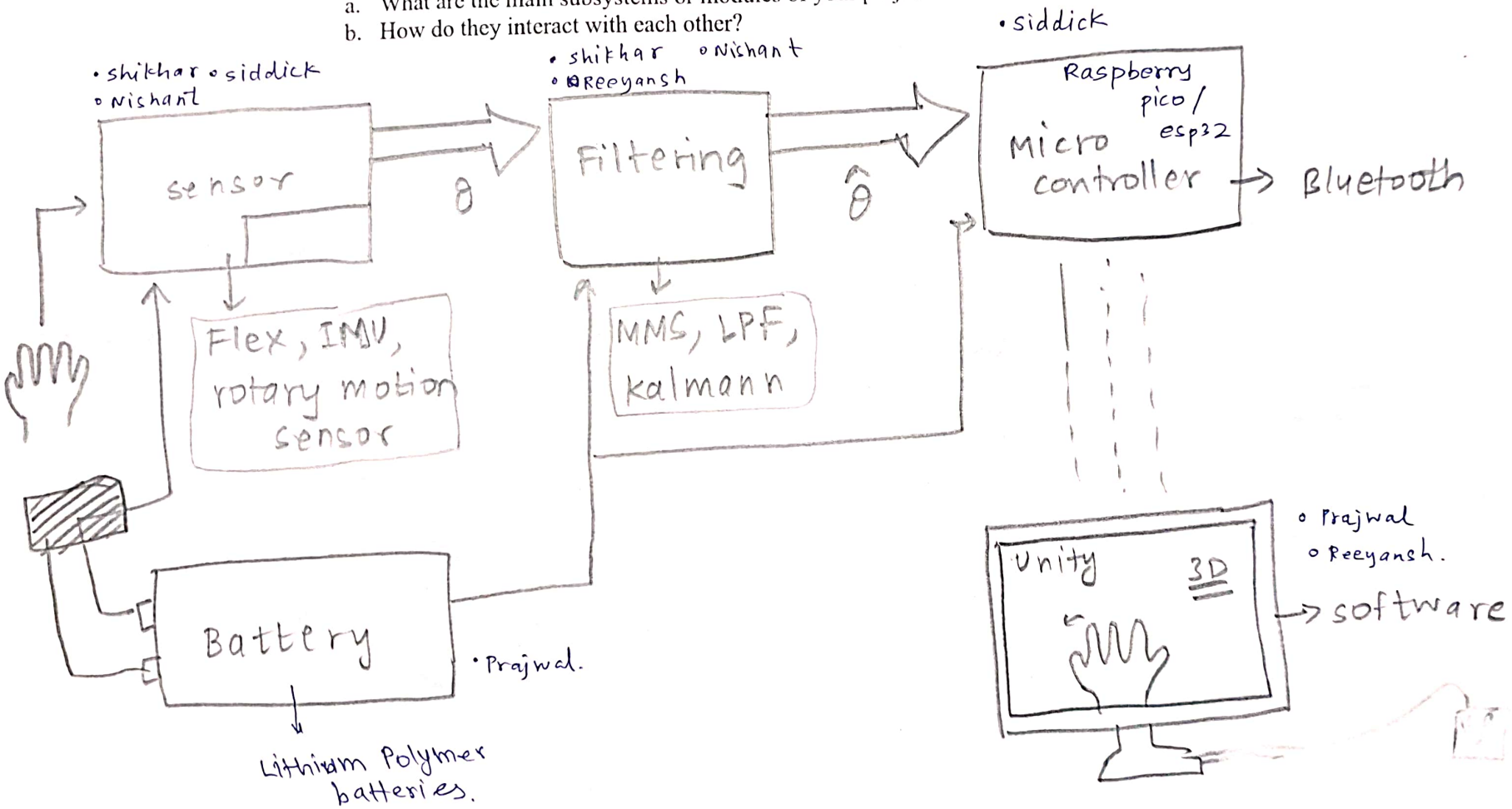
Use your notebooks for discussions and rough work. Fill out this sheet after working individually and discussing within your team.

1. **In simple words, describe what you are going to build in your project, what its purpose is, and how it will function.** Be as detailed as possible, covering all the major aspects of your project.
   a. What is the main goal of your project? To rebuild an accurate hand simulation
   b. What problem does it solve, and how? It can be used in VR gaming, hand rehabilitation.
   c. Who will use your project, and in what context? It can be used for tracking hand location, something is lacking a lot in current VR game scenario.

Draw a pencil sketch of what your project will look like at the end of the course, for final demo.



2. **Draw a block diagram of your project.** Create a visual representation showing the key components or subsystems of your project. For each block in the diagram, briefly explain its main function and how it fits into the overall system.
   a. What are the main subsystems or modules of your project?
   b. How do they interact with each other?



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3. **Write down details for these blocks:** What are the key performance metrics for each block (e.g., power, size, speed)? What trade-offs are you considering in your design choices? Are there any constraints or limitations for each block?

Block	Key specifications of this block	Design choices for this block
Sensors – (Shikhar, Nishant)	Fast, reliable angular measurements to estimate angular position of hand.	Flex sensors → possibly noisy IMU sensors → might take a lot of space Rotary sensors → will have to cad a mech-design
Microcontroller – (Siddick)	We will use this to collect sensor data, which we will then transmit to laptop.	Raspberry pico, esp32,
Filter – (Nishant, Siddick)	We can design a filter, to reduce noise.	(min max scaling) - MMS, Median filter, Kalmann Filter, Low pass filter.
Simulation – Prajwal, Reesarah	Real time precise simulation from the inputs received by the sensors and replicating the same on laptop	Unity 3D, blender library on python, simulik on matlab, ROS Gazebo simulation
Design – (Nishant)	Efficient mechanism to integrate all the block while maintaining comfort for the user	(i) glove with sensors mstalled (fabric) (ii) 3D printed mechanism for rotary sensors.

4. **What are the unknowns or uncertainties in this project?** Identify aspects of your project that you are uncertain about or that require further research. This may include areas where you know what you need to do but are unsure how to approach it.
    a. What technical challenges or questions are you facing?
    b. Are there any assumptions you must make in order to move forward?

1. We may have to make CAD ed models which may not fit in with our design properly (Joints and their sizes should be proper)
2. Accurate sensor positioning & wire routing
3. Designing optimized PCB to route all the connections & Power management
4. Raw data from sensors are is very noisy & needs proper filtering algorithm

Other things to consider from now until Milestone 1 deadline:

5. **Roles and Responsibilities: How will the work be divided among team members?** Assign specific tasks and responsibilities to each team member. Be clear about who is responsible for each part of the project.
    a. Who will work on which blocks or subsystems?
    b. What are the deadlines for each task?
    c. How will the team communicate and coordinate to ensure everyone is on track?

6. **Next Steps: What is your plan for the next phase of the project?** Outline what needs to be done in the short-term to move forward.
    a. What are the immediate next tasks or priorities? Literature review, Learn unity, Ideate mechanism, Study Sensors
    b. Are there any dependencies between tasks? How will you handle these interdependencies? Working together in hotels & contributing to all tasks.
    c. What resources or materials do you need to proceed?
    R.Pi Pico W, 3D Printing access, IMU, Fora sensor; Unity Access

7. **Feedback and Collaboration: How will you gather feedback and collaborate during the project?** Describe how your team plans to share progress, give and receive feedback, and collaborate throughout the course of the project.
    a. How often will you check in with your team members?
    b. Will you conduct regular brainstorming or review sessions?