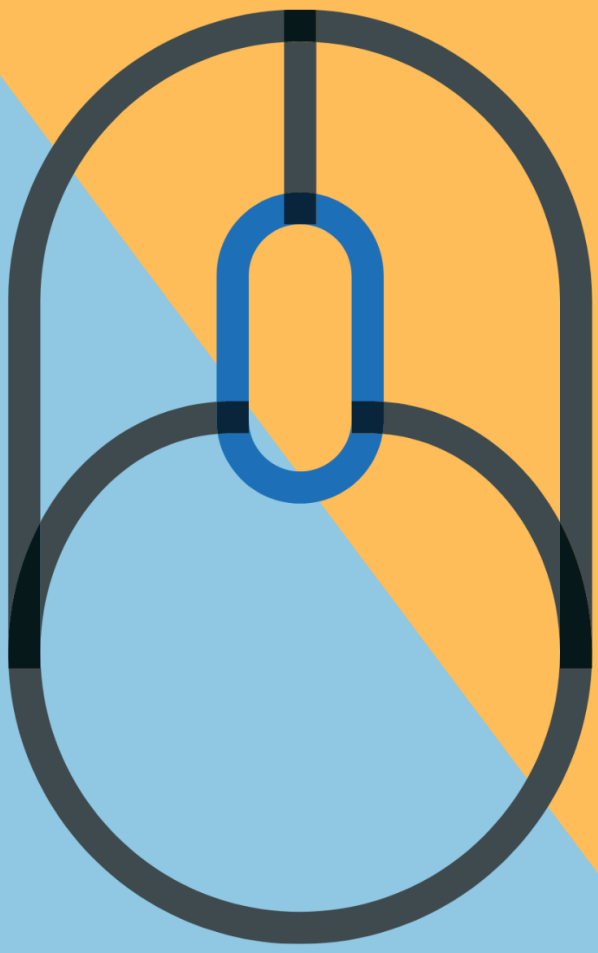
Mouse Disassembly



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Ten Ton Robotics

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Hi, this is Yuma Nagayoshi and Sean Chan-Sato, and we have chosen to reverse engineer a wireless gaming mouse. We received this mouse from a friend, and although it had been used for over two years, the mouse was still able to function. From the past, we were always curious about how it could deliver such accurate information in the span of milliseconds. The way it detects our movement and sends the instructions to the computer in the blink of an eye fascinated us all the time. This curiosity led us into disassembling this mouse, and we were astonished to find what was actually happening inside.

When first removing the three screws on the back, we can look at the mouse divided into five main categories; the front cover, back cover, scroll mechanism, and electronics. As you can see from this image, the back cover contains the battery and the circuit board. The battery is connected to the circuit board by two strands of wires, and it provides itself as the energy source of the device. The circuit board is where all components are connected, and it maintains the function of detecting motion and sending it to other machines. Inside the back cover is the optical sensor with a LED light that illuminates the surface beneath it. This sensor compares what it is seeing currently and what it was seeing previously. By comparing these images, the mouse has enough information to figure how far the mouse has been pulled and in which direction. This information is then translated for the computer to execute the movement. As we move above, we can see the scroll stuck between the center of the circuit board. The scroll contains tiny plastic spikes, almost shaped like a fan. Besides the scroll is the infrared diode and a receptor, one on each side of the scroll, soldered directly onto the circuit board. This portion of the mouse calibrates the wheel motion of the scroll into numerical values for the circuit board to understand. By turning the scroll, the infrared light travelling from the diode will be interrupted by the fan-like spikes moving, and this is how the receptor translates the wheel motion into information for the circuit board to understand. On the front cover of the mouse were two buttons that were both directly attached to 4 golden spikes. These golden spikes are sensors that calculate the number of clicks from the buttons which are then sent to the circuit board.

From this project, we've learned that all devices are made from even smaller devices to execute their purpose accurately. Every machine is carefully engineered to serve its motive, and we tend to miss these small details from their simplicity. Our team now notices that it's important to recognize the actions that are taking place behind what we see. We should all never overlook something based on its physical appearances or purposes until we understand what is truly happening behind the scenes.