Procedure

1. **Hardware Setup**
    - **Identify components on NI USB-6215 DAQ (Analog Inputs/Outputs, Digital I/O).**
    - **Connect DAQ to the computer and launch NI MAX to check device recognition.**
2. **LabVIEW Introduction**
    - **Open LabVIEW → Start a new Virtual Instrument (VI).**
    - **Design a Front Panel with numeric controls for input/output voltages.**
    - **Create a Block Diagram to define data flow between components.**
    - **(Aside: Created git repo to host .vi file versions rather than saving multiples**
3. **Basic VI Test**
    - **Wire a direct connection between input and output for initial testing.**
    - **Run VI → Adjust input values and observe output response.**
4. **Connecting to USB-6215**
    - **Use DAQ Assistant in LabVIEW to interface with AO0 (Analog Output) and AI0 (Analog Input).**
    - **Physically connect AO0 to AI0 using wires.**
    - **Measure voltages with DMM (Digital Multimeter) and compare with AI0 readings in LabVIEW.**
5. **Data Collection & Analysis**
    - **Vary AO0 voltage and record corresponding AI0 and DMM readings (at least 10 data points).**
    - **Plot DMM vs. AI0 vs. Programmed Voltage in Excel → Analyze linearity & accuracy.**
    - **Investigate load curve using a 10kΩ potentiometer to determine Thevenin parameters in different regimes.**
        - **Ammeter connection problem popped up in this step. Original circuit followed faulty logic leading to a short.**
6. **Execution Control**
    - **Ensure ADC reads after DAC updates using error in/error out wiring.**
    - **Avoid unintended capacitive effects in wiring via timer**
    - **Play with LabVIEW input displays**
        - **Produce waveforms**
        - **Apply trigger (which doesn't actually turn the system on, just marks data recording start points)**

Key Takeaways

- DAQ systems combine **hardware (USB-6215)** and **software (LabVIEW)** for real-time data collection.
- **LabVIEW VI** allows graphical programming to acquire, process, and analyze data.
- **NI MAX** ensures hardware recognition before interfacing with LabVIEW.
- **Precision & non-linearity** of the DAQ system can be characterized via experimental plots.