Course resumes showcase the technical skills students obtain in each PLTW course. Each resume outlines the computational skills, analytical skills, and knowledge acquired in the course. Course resumes also detail student experience with tools, software, lab work, and engineering design. The detailed skills listed within course resumes illustrate the immediate, applicable contributions that students can make within a workplace.

Computational and Analytical Skills

- Use mathematical processes to convert any value between any number systems
- Calculate voltage, current, and/or resistance for components in a complex circuit
- Translate circuit designs, truth tables, design requirements into logic expressions
- Simplify circuits using Boolean algebra theorems and DeMorgan's theorems
- Simplify a logic expression graphically using the Karnaugh Mapping process
- Use algorithmic thinking to solve a problem computationally

Digital Electronics Design Experience

- Implement the design process to design a circuit
- Design a circuit to meet voltage, current, or resistance design requirements
- Select components in a design to produce a desired waveform
- Implement the best combinational logic circuit design
- Apply knowledge of logic gates to select an appropriate gate for the circuit design
- Troubleshoot the design of a circuit by analysis and comparison to the truth table
- Implement a circuit design based on logic expressions
- Troubleshoot existing circuits based on logic expressions
- Determine when NAND only or NOR only implementations are the most efficient
- Implement a seven segment display into a circuit design
- Determine when a common cathode or common anode seven segment display may perform better in a particular circuit design
- Design a sequential circuit
- Describe the function of XOR/XNOR gates in a circuit design
- Design an adder/subtractor circuit related to the carry out and use on XOR gates
- Design a desired frequency of a clock signal in a 555 timer design
- Design a sequential logic circuit to produce a desired output
- Design synchronous/asynchronous counter circuits based on design requirements
- Design a state machine based on specific design requirements
- Design a circuit with motors as outputs that operate at different voltage levels
- Select and apply the most appropriate design method for circuit implementation

Practical Application Experience

- Solder and de-solder components to printed circuit boards
- Validate circuit design through measurement using a probe/oscilloscope and analysis of timing diagram
- Select and apply the most appropriate technology for circuit implementation
- Implement designs on an FPGA
- Create a program to manage inputs and outputs of a single-board computer

Tools and Software

- Oscilloscope
- DMM
- FPGA Digital Mini System
- Digital Logic Board

Professional Skills

- Team collaboration
- Project management
- Problem-solving
- Communication skills
- Presentation skills
- Technical writing

Course Knowledge

- Foundations in Electronics
  - Introduction to safety, electricity, and components
  - Introduction to common analog and digital circuit designs and applications
- Combinational Logic
  - Designing AOI combinational logic circuits
  - Alternative Design: Universal gates and K-mapping
  - Specific combinational logic designs
  - Introduction to PLD design and circuit prototyping on a PLD
- Sequential Logic
  - Sequential logic circuit design
  - D flip-flops, J/K flip-flops, and flip-flop applications
  - Asynchronous counters
  - Counter design SSI, MSI, and MOD asynchronous counters
  - Synchronous counters
  - Counter design SSI, MSI, and MOD synchronous counters
- Controlling Real World Systems
  - Introduction to state machines
  - Introduction to sensors, motors, and state machine design
  - Introduction to programming with Python