

2024

# Hawai'i Annual Code Challenge (HACC)

<b>Challenge Title</b>	
<b>Department / Organization</b>	Hawaii Keiki Museum
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<b>The Challenge</b>	
<b>Describe situation to be solved</b>	The Hawaii Keiki Museum is building a playhouse that will showcase how much energy is consumed in a typical household. We are looking to develop an “energy meter” the display energy used by various appliance and devices in the typical household. Energy usage will be simulated from online estimates of usage for a variety of data.
<b>Preconditions</b> <i>(How does it work now)</i>	None
<b>Assumptions/Issues</b> <i>(list any conditions that could impact the solution)</i>	Potential inputs: <ul style="list-style-type: none"><li>• Ceiling fan</li><li>• Air Conditioner</li><li>• Washer &amp; Dryer</li><li>• Refrigerator</li><li>• Electric Range Oven</li><li>• 75” TV</li><li>• Porch lights</li><li>• Ceiling light</li></ul>
<b>Current Approach</b> <i>(how is situation currently being handled)</i>	N/A
<b>Users</b> <i>(Who would use the application - employees or constituents or both? How many users would there be?)</i>	Children and Guests to the Hawaii Keiki Museum

<b>Business Rules</b>	<p>What we are looking for is a display, either numbers, a bar graph, or a line chart, that accumulates proportionally when each of these appliances is turned on.</p> <p>This display will be an educational tool for community members to learn about energy consumption (and perhaps cost) in the home. The input values won't be measured in actuality, we are looking for a simulation that increments the display output value by a "typical amount" that is appropriate for such appliances in the home setting. For example, the team could take the value from the datasheet of a GE appliance available at Home Depot and use those as "typical amounts".</p>
<b>Special Requirements</b>	<ul style="list-style-type: none"> <li>• In the physical playhouse, kids will have toggle switches that "trigger" the value, so we need to be able to send the trigger signal to e.g. an arduino that will interpret the switch state and add the correct value to the program that is built.</li> <li>• The program we are looking for in the code challenge is just the display part, not the full input Arduino system. Just the output display and visualization. But we would appreciate it if we had an arduino-friendly way of feeding the display the signals.</li> </ul>
<b>Technical Platforms</b> <i>(in use or desired to be used)</i>	
<b>Data set to be used or collected</b>	<p>Data has been supplied by HECO – supporting files will be added to our slack channel. Other references:</p> <ul style="list-style-type: none"> <li>• <i>State of Hawaii Energy Efficiency Potential Study 2020:</i> <a href="https://hawaiienergy.com/about/information-reports/">https://hawaiienergy.com/about/information-reports/</a></li> <li>• <i>Hawaiian Electric Energy Consumption Calculator:</i> <a href="https://www.hawaiianelectric.com/products-and-services/save-energy-and-money/calculate-energy-consumption">https://www.hawaiianelectric.com/products-and-services/save-energy-and-money/calculate-energy-consumption</a></li> <li>• <i>Pacific Power Energy Usage Calculator:</i> <a href="https://www.pacificpower.net/savings-energy-choices/home/energy-usage-calculator.html">https://www.pacificpower.net/savings-energy-choices/home/energy-usage-calculator.html</a></li> <li>• <i>U.S. Department of Energy's Estimating Appliance and Home Electronic Energy Use:</i> <a href="https://www.energy.gov/energysaver/estimating-appliance-and-home-electronic-energy-use">https://www.energy.gov/energysaver/estimating-appliance-and-home-electronic-energy-use</a></li> <li>• <i>Additionally, you can search for tools like the Energy Star Appliance Calculator or Savings Calculator for ENERGY STAR Qualified Appliances on Google or ChatGPT</i></li> </ul>
<b>Data set calculations or reporting needs</b>	
<b>Solution Road Map</b>	

<b>Basic Flow</b> <i>(steps of user action/system response)</i>	<ol style="list-style-type: none"> <li>1. Data on various appliance obtained</li> <li>2. UI/UX displayed on mobile or web app when a specific appliance or device is selected</li> <li>3. Display must have</li> <li>4. Arduino usage, nice to have</li> </ol>
<b>Goal of Solution</b>	Education resource to teach out energy usage and consumption
<b>Business Value</b> <i>(potential financial or time savings)</i>	Positive impact on understanding how much energy various common household devices use
<b>Success Scenario</b> <i>(how you know a solution is working)</i>	Teaching children how important it is to reduce energy usage
<b>To be completed by the HACC Planning Committee</b>	
<b>Community/Industry Data Available</b>	
<b>Potential Community/Industry Co-Sponsors</b>	