**7-1 Final Project: Thermostat Lab**

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The prototype created in this assignment meets the requirements and specifications provided by SysTec. The use of an AHT-20 temperature sensor reads the room’s temperature via I2C, LED lights display the heating or cooling system status, and an LCD screen displays critical system information. Three buttons are used for mode selection and temperature adjustments. UART output is used to simulate sending information to a server. The code is complete and uses industry standard practices with comments as needed.

Raspberry Pi is a great device that supports all the previous peripherals, code base, and can connect to cloud services if a wi-fi model is used. The device has plenty of RAM and flash resources for the code to run quickly and effectively. Raspberry Pi would perform these functions; however, the cost and power consumption of the device would make this a poor option for scalability.

Some Microchip devices can support Wi-Fi directly while operating at a lower power level and can be much more cost-effective than a Raspberry Pi. Microchip supports the peripherals as well, but the code would need to be rewritten in C or C++ for these devices (Microchip, 2025). Microchip’s devices are optimized for lower power consumption, so they can operate with internal rechargeable or disposable batteries could be an option for these microcontrollers.

Freescale is now called NXP microcontrollers. Their devices appear to have better specifications than those of Microchips, offering improved performance. NXP devices appear to require C or C++, like Microchip, so the entire program would need to be rewritten for these microcontrollers as well (NXP, 2025). NXP offers advanced processing capabilities that could support future features, which could include AI-based climate prediction or multiple zone controls.

Based upon the advantages and disadvantages of each of these configurations, Microchip would be an excellent choice for a lower-end model of the thermostat, and NXP would be ideal for luxury thermostats with more features.

**REFERENCES**

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