**HVAC Helper**

Description: Our HVAC System is intended to simulate a real-world HVAC system with a variable disturbance to the rooms. The command line tool contains objects that are representative of the components in the system and build that it is contained in. These objects include a Heater, Cooler, Blower, Room, Floor, Building, Controller, Clock/Time, and Temperature Sensor. Each of the previously named objects is intended to simulate a corresponding component of a building or HVAC system. The GUI contains a simplified version of the command line tool in order to streamline the process. The program has two floors each with a different room layout. Users are able to start and stop the program, indicated by a clock in the upper-left hand corner, as well as change the temperature of each room, change the outside temperature and turn on or off the heater and cooler.

**Team Members**

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**Target Audience**

This program is for educational purposes showing younger students how heating systems work in a simple way. To make the program easy for younger students the effects of the user’s actions in the GUI are displayed using an easy to understand color pattern. This color pattern varies by the temperature of the room, with red being very hot, blue being very cold, and green being approximately room temperature.

**Problems**

The biggest problem we faced was the room temperature automatically dropping to 69°F from 70°F at the start of the program. Unsure of what the cause of this was, there were many attempts at fixing the issue. The final solution ended up being setting the starting temperature to 70.1°F for all the rooms. The problem was caused by a feedback loop with the sliders triggering a change to the room’s temperature and a change in room’s temperature causing the sliders to readjust and change the room’s temperature. This was initiated by the computer not being able to store exactly 70.0 due to machine limitations.

**Interesting Items**

An interesting aspect of this program is that the floor layouts used are roughly based on Adam’s house. This was chosen since it was easy to model and younger students might better relate to a home design over an office or boxy layout.

**Lessons Learned**

A big lesson gained from the experience of building this program is to not have items produce infinite loops. If item-a causes a change in item-b each time item-a is changed, then item-b should not cause changes in item-a each time item-b is changed. Another good lesson to be learned from this experience is that graphics only need to be updated when there is a noticeable change to them.