Mini Project- Autonomous Window Operator

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Objective:
The purpose of our project is to create an interface that uses multiple temperature sensors and a motor to autonomously operate a window or a door. The motor will be controlled by the temperature inputs and can also be overridden by the user. If time allows we will use an RFID reader and tag to limit the access only to authorised users.

Requirements of the project:

- For the values of two temperature sensors to be read and processed by a program that we have written.
- Depending on the temperature values, the program will either drive a motor to open the window, or will not operate the motor.
- The user must also be able to control the operation of the motor using the buttons on the ChipKIT.
- The temperature values must be displayed on the ChipKIT screen.

Optional features:

- To use an RFID reader as an additional method of security which will prevent unauthorised operation of the window.

Solution:
We will use the ChipKIT Uno32 board together with the basic I/O shield as well as a weather resistant temperature sensor, the on-board temperature sensor, a servo motor and an RFID reader with a magnetic key for this project. The intended use for our product is in schools and nurseries to provide a safe automatic way of controlling the temperature in the room. The key will be used to give access to the buttons on the ChipKIT board, which will manually operate the motors as well as disable the automatic controller. This allows for an adult or other responsible person to open the window, but prevents children from accidentally opening it. We will display the reading from two temperature sensors on the screen. All of the programming will be written in C and we will use the MCB32 tools as the interface between the compiler and the ChipKIT.

Verification:
When testing the project, we will need to replicate different scenarios to make sure that it operates correctly. To test colder environments, we will use a refrigerator and freezer to simulate a cold winter's day, and to test warmer environments, we will put the sensor on a radiator or use body heat to warm it up to simulate hot summer days. We will also need to calibrate the motor so that it opens the window by a suitable amount.

Contribution:
We will divide the work as follows: Ziqi will focus on researching on the temperature sensor and the motor and Oscar will focus on researching on the ChipKIT interface and RFID system. We will use data sheets for the external components and the ChipKIT for this research, as well as resources on C programming. After both members have finished the research, we will meet and continue developing the project as a group since all the components will be dependent on each other.

Reflection:
We have not yet the possibility to reflect on the project as we have not yet started to develop it yet. We will provide reflection in an later project report.