

**Course Instructor: Cristina Ruiz Martin**



**Carleton**  
**UNIVERSITY**

**Course Project Proposal**

**Advance Topics in Software Engineering: Software  
Development in C**

**Submitted by:**

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## **Problem statement**

A home temperature control system maintains room temperature in all seasons. The temperatures can be changed by the user as per the requirements once simulation gets completed.

When the system is "on", the controller gets a reading of the room temperature. The measured temperature is compared to the desired temperature. If the measured temperature does not match with the desired temperature, then the system (heating or cooling) will turn on. When the house no longer requires change in temperature i.e., the measured value is equal to the desired value, then it will prompt user to ask again if he wants to change temperature or not. If he does not want further to change in temperature program will stop execution at that point. If he wants to change then he can set his different desired temperature and algorithm will start working again.

### **A. Client Requirements:**

#### **1. Controller requirements:**

- The controller should switch between heating and cooling by comparing desired and measured temperatures.
  - If the desired temperature is 28°C and Measured temperature is 22°C, the system should work as a heating system and when the desired is 28°C and measured is 31°C, then it should work as a cooling system.
- Controller should be able to save all the user provided inputs.

#### **2. Temperature measurement**

- Room temperature (first input by user manually) (after measured by simulation)
- Desired temperature (first input by user manually) (after measured by simulation)

#### **3. User operations**

- Turn On/Off system
- Manually Change temperature after every simulation

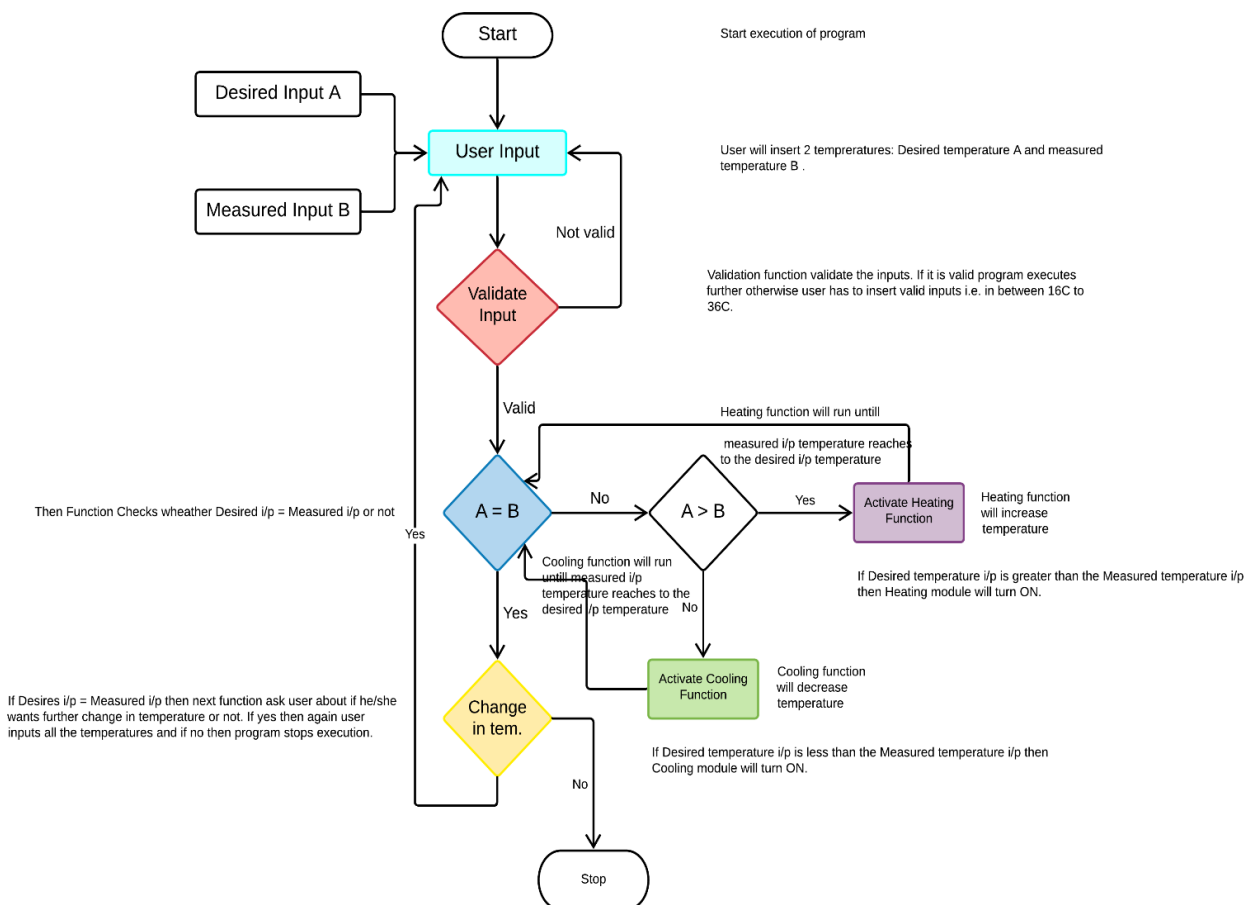
## B. Assumptions:

1. User will enter room temperature and the desired temperature at the starting of every simulation.
2. The device will be in standby mode when the house no longer requires change in temperature.

## C. Requirement release:

1. In first release we will give user inputs, validating inputs, heating algorithm.
  - temperatures between 16<sup>0</sup>C to 35<sup>0</sup>C or not.
2. In second release we will provide cooling algorithm and change in desired temperature functionality.

## D. Flow Chart: Functions to be implemented are coloured.



## E. Functions and return value:

### 1. **Function Name:** User Input

**Input parameter:** i. Desired temperature A

ii. Measured temperature B

### 2. **Function Name:** Validate Input

**Input parameter:** inputs of user input function

**Return value:** Boolean (valid/invalid)

### 3. **Function Name:** Check Temperature (A=B)

**Input parameter:** inputs of user input function

**Return value:** Boolean (true/false)

[For heating and cooling we introduced new function which is random function. In random function we are passing array value and from which random function will choose one integer value and pass it to the heating function and according to return value from random function temperature will increase/decrease. For example, array [1,2], when random function will call it will choose one value from 1 and 2 and the chosen value will affect the temperature change in heating/cooling function.]

### 4. **Function Name:** Activate Heating

**Input parameter:** i. random function

i/p of random function: array

return value: integer value from array

ii. Inputs of user input function

iii.  $B = B + \text{return value of random function}$

**Return value:** Updated B value

### 5. **Function Name:** Activate Cooling

**Input parameter:** i. random function

i/p of random function: array

return value: integer value from array

ii. Inputs of user input function

iii.  $B = B - \text{return value of random function}$

**Return value:** Updated B value

**6. Function name:** Change in tem

**Input parameter:** String (Yes/No)

**Return Value:** Boolean

#### **F. Functions to be implemented by group member:**

- |                           |            |
|---------------------------|------------|
| a. User input             | Sanjana    |
| b. Input validation       | Sanjana    |
| c. Change in temperature  | Sanjana    |
| d. Temperature comparison | Mitulkumar |
| e. Heating function       | Mitulkumar |
| f. Cooling Function       | Mitulkumar |