ECE 3375 Project testing

User Control:

Switch 0:

System ON/OFF

0 = system off; state 0

1 = system on; if timer lengths are 0, display will be null;

Switch 1:

Interval changer enable; system has to be off to start (switch 0 = 0)

0 = unable to change intervals, state 0

1 = change intervals; switch 0 = 0,

Switch 2;

Flip between which length to change, DS = away from pot on stove, P= away from burner with nothing on it; switch 0 must be off and switch 1 must be on

0 = ds; use button 0 to increase, and button 1 to decrease, must press and depress button. Don’t be dumb and go negative.

1 = p; use button 0 to increase, and button 1 to decrease, must press and depress button

Start parameters: All switch are off, all buttons are off, and GPIO pins 0 and 1 are off.

GPIO pins, 1 = weight and 0 = motion detector, and 2 is stove output

Button info: For a button press, you must select it and then deselect it. The system will pause until you deselect the button

Led info. For testing clarity, led 1 means system is halted waiting for pot on stove, led 11, is state two waiting on either motion or pot reapply

State 1:

On initialize away time and weight time are 0, you must use the appropriate switches to adjust the weight and time to above 0 so the system can fall into state 2;

State 2:

If weight and time are above 0, the system will fall into state 2, “on”, where there is nothing on top of the stove and the stove is assumed to be off. The system is watching for changes to weight and motion. System will only change if weight or motion is activated

**State: 2A**

The system detects weight. If there is a detection of weight, the system will begin timer “P”. The timer will run as long as motion is not detected. If motion is detected the system restarts the timer. If no motion is detected for timer P, the system falls into state 3 and the stove is disabled.

**State: 2.B**

The system detects that the pot has been taken off the burner, by the weight = 0 and a timer running. This cause the system to fall into another substate where the burner may be unintentionally left on.

**State: 2.B.i**

The system pauses the original away timer and starts a new timer DS. Which times the length of time the burner can be on with nothing on it. If weight is turned back on without the timer going out. The system falls back into state 2A. And restarts the other timer. If motion is detected for an interval equivalent to the amount of times the cpu can add 1 to a value, it is assumed somebody disabled the burner and the system falls back into state 2. Where nothing is on. If the timer runs out the systems goes into state 3 and the stove is shut off.

**State 3:**

The stove is disabled by setting the relay to 1, the display is set to “SOFF” for stove off and the systems holds for a button press on button 1. When waiting reset all gpio back to 0 to reset system. When the button is pressed the timers are reset, and the relay is set back to 0 which is assumed that the applying a high output to the relay will shut the stove off and applying a 0 to the relay wont restart the stove, the stove is now off, and system falls back to state 2.

Testing

To test the situation where somebody has placed something on the stove and walked away and forgotten, initialize the system normally. Once the display is labeled “on” apply a value of 1 to the gpio pin 1. This will set the system into a state where it knows something is on the stove and the burner is on. The timer should have started in the simulator devices menu. While the timer is running apply a 1 and then a 0 to gpio pin 0, this should restart the timer to simulate someone being by the stove. Once the timer runs out you should see the display say SOFF. This mean the stove has shut off when the timer ran out. Disable the gpio pin 1 back to off or 0. Then press button 0 once to restart the system. If done correctly and the code works (gpio pins are all off), the display should say ON and the timers set to their lengths not running.

To test if somebody is cooking and is still around the stove, go into the on state, and apply 1 to both the motion and weight sensor, the timers might be bugging out however the system should not shut the stove off.

Setup state for phase 2 testing:

To test the situation where a pot has been placed on the stove for a certain time, it wasn’t forgotten, and then the pot was taken off the stove however the stove was not shut off. Set the system to the ON state or state2. Then apply a value of 1 to GPIO pin 1 to simulate the pot being placed, then before the timer runs out, switch GPIO pin 1 to off, the original timer should pause and a new one begin. This simulates the pot being taken off the stove after it was on it. All test from this state must be started before the second timer runs out, otherwise the system will fall into stove off state.

Test phase 2 part A

In the setup state, apply a value of 1 to the motion detector, this should take a few seconds, it simulates someone shutting off the stove by a certain interval of movement near the burner. After a quick moment the system will fall into state 2, where it is checking motion and weight again. The led lights will flicker dramatically to indicate movement is being tracked by the machine.

Test phase 2 part B

In the setup state, let the second timer run out. This should put the system into shutting off the stove as someone has walked away from the ON burner.

Notes and possible design fixes;

The system runs under the assumption that when weight is applied to the stove top the burner is on, and if there is weight and no motion it means someone has left. As well it assume a weight applied and a weight removed means the burner hasn’t been disabled. A new design should include a circuit within the stove that sends and receives a binary pattern for the state of the stove and turning the stove on and off. It would remove the number of states required for the machine as less assumptions have to be made. If it has to be assumed that the stove is on or off and assumed the person has accidentally left it on, it leaves more room for error. A device to get feed back from the stove and control the stove would make this system fool proof.