ECE 376 - Homework #5

Keypads in C, Stepper Motors in C.

Please make the subject "ECE 376 HW#5" if submitting homework electronically to Jacob_Glower@yahoo.com (or on blackboard)

Design an embedded system which uses the keypad and the stepper motor. Some suggestions are...

Combination Lock

1) Requirements:

Inputs:

• Keypad

Outputs:

• Stepper Motor

Relationship

- Input a four digit number on the keypad
- Press *
- If the number is 1234, then
 - Rotate the motor 100 steps at a rate of 20ms/step
 - Pause 1 second
 - Rotate back 100 steps at a rate of 20ms/step
 - Then wait for a new input
- If the number is not 1234, then do nothing.

2) C code, flow chart, and resulting number of lines of assembler



6.5%)
1.2%)
0.0%)
0.0%)
0.0%)

- 3) Validation: Collect data in lab to verify you met the requirements.
 - In theory, check all possible combinations.
 - In practice, to a random sample

Verify that the requirements are met

Input numbers from 0000 to 9999

- 1234 accepted
- 5678 accepted
- 1932 accepted
- 9999 accepted

Press *. If the code is incorrect, nothing happens

- 7341 * resulted in no action (incorrect code)
- 8312 * resulted in no action (incorrect code)
- 2222 * resulted in no action (incorrect code)

If the code is correct, step 100 times at 20ms per step, wait 1 second, return

- 1234 * is input
- Motor steps 100 times at 20ms per step
 - Motor turned 180 degrees
 - LCD display indicated that it made 100 steps
 - Oscilloscope indicated that each step is 24.7ms (timing isn't quite correct)
- Pauses 1.0 second
 - Measured as 1.0 second on an oscilloscope
- Motor returns to original spot at 20ms per step
 - Motor returns to original position (check)
 - LCD indicated that it's back at 000 position
 - Oscilloscope indicates that it's actually 24.7ms per step (timing isn't quite right)

Each sequence should take 5.0 seconds total

- Stopwatch app measured the total time as 6.0 seconds
- The timing isn't quite correct (probably the 20ms steps actually take 24.7ms)



4) Demo. Video or in person.