4180 Final Project

Home Entry System (Alarm system)

Parts List:

- Touchpad/keypad
- Bluetooth module
- Speaker with audio amp
- Mbed Microcontroller
- LCD screen
- Status LEDs
- Servo Motor
- Dual H-bridge
- Small Door Lock (maybe Adafruit door lock solenoid)
- External Power Supply (Batteries)
- Voltage regulators/dividers (common ground)

Phase 1: Designing

- Gather example code
  - RTOS examples (4180t2_F16 test)
- Find a smaller breadboard
- Reconfigure parts to optimize space
- Setup GITHUB

Design Elements

1. Low Power Mode until initial user interaction (while loop for sleep until an interruption occurs)
   - uses #/or any key to wake up
   - wakes with Bluetooth connection

2. Display Passcode prompt on LCD

3. Waits for user to enter passcode

   3.1 Sleeps after 2 minutes with no interaction

   3.2 Passcode entered (move to step 4)

4. Check for incorrect/correct passcode

   4.1 Set passcode (4 digits)

   4.2 Only 3 attempts allowed

      4.2.1 Incorrect Attempt Displayed after each attempt

      4.2.2 Sets off alarm

      4.2.3 Lockout for 1½ Minutes

      4.2.4 Resets and asks the user to enter passcode again

5. Open door lock

   5.1 Chime to signal the lock has been opened

   5.2 Use motors to unlock door

(Room for additional features under the current steps)

Nice to Haves (Notes from Prof. Hamblen)

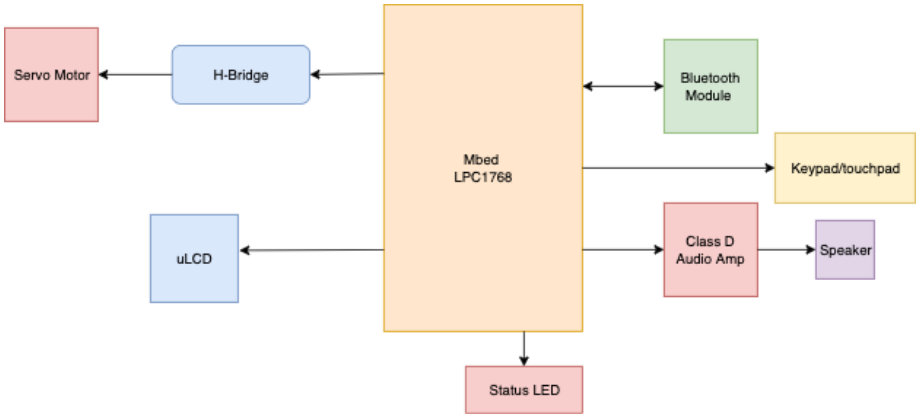
- Adafruit Door Lock (replaces motor)
- Door Model
- Motion Sensor for wake (PIR motion sensor)
- Pi camera

Phase 2: Build/Testing

- Build circuit
- Develop code
- Test overall code/threading
- Examine computational power and time
- Power considerations

Phase 3: Optimization

Phase 4: Final Testing



Pin Connections

Mbed LPC1768	uLCD	Power Supply
GND	GND	GND
p11	RST	
p10	TX	
p9	RX	
VIN	Vin	+5V

Mbed LPC1768	PIR Motion Sensor	Power Supply
GND	GND	GND
P29-PullUp	Vout	
VIN	VCC	+5V

Mbed LPC1768	Servo	Power Supply
GND	GND	GND
p21	PWM Signal	
	VIN	+5V

Mbed LPC1768	Adafruit Bluetooth Module	Power Supply
GND	GND, CTS	GND
VIN	VIN	+5V
p13	RXI	
p14	TXO	

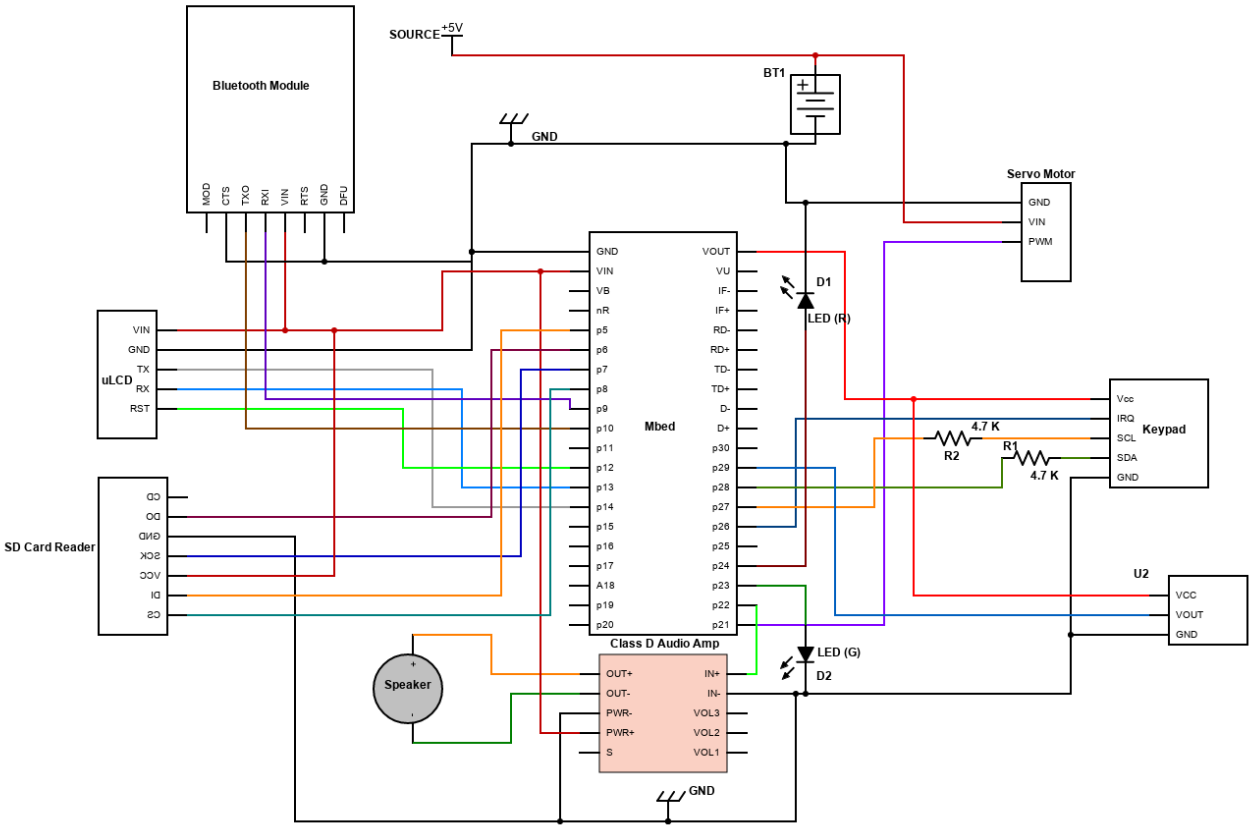
Mbed LPC1768	Class D Audio Amplifier	Speaker	Power Supply
GND	PWR-, IN-		GND
VIN	PWR+		+5V
p22	IN+		
	OUT+	+	
	OUT-	-	

Mbed LPC1768	Sparkfun Touchpad	Power Supply
GND	GND	GND
VIN	VCC	+5V
p26	IRQ	
p27	SCL-4.7K PU	
p28	SDA-4.7K PU	

Mbed LPC1768	Status LED
GND	GND
p23	Green
p24	Red

Mbed LPC1768	SD Card Reader
	CD
p6	DO
p7	SCK
p5	DI
p8	CS
VOUT	VCC
GND	GND

Circuit Diagram Rough Draft (with Servo)



Some functionality:

1. Press 11 on touchpad to unlock, else do nothing or display press unlock first.

Potential New Plan

- Use motion sensor or sonar to wake
- Touchpad only used for inputting code
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