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Timer System Implementation

ASK
What is the Problem?

- A system needs to be designed to operate as a timer/countdown
- The timer needs to be able to count down from or count up to a maximum time of 9 minutes and 59 seconds
- Turn off the system by pressing B
- Input time or turn on the system by pressing D
- Begin timer by pressing A
- Press C to switch countdown modes
- Have a visual indication when time is reach or a key is pressed

Research & Imagine
How can this be Solved?

- An microcontroller device can be used to act as the timer controller
- A 1602 LCD can be used to display the timer system output
- A 4x4 Matrix keypad can be used to represent the 10 digits needed to enter time, and the 4 letters needed to switch modes
- External LEDs can be attached to a breadboard to serve as visual cues for when the timer is finished or when a valid key is pressed

PLAN
How can this be Implemented?

- The STM32L4R5XL is a viable choice for the microcontroller using MBED in order to control the interrupts of the 4x4 keypad, providing the I2C interface for the LCD, and powering the external LEDs
- The external LCD will be controlled by an I2C controller to communicate between the board and LCD
- Tickers and EventQueues can be used to schedule events and debounce the keys