Microcontroller and Applications Project Report

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Simple Stopwatch Using PIC18 Microcontroller

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Abstract:

Project Overview: This project involves designing a simple digital stopwatch using the PIC18 microcontroller. The stopwatch tracks time in seconds and milliseconds, providing basic functionalities like Start, Stop, and Reset. It utilizes a 7-segment display (or an LCD) to show the elapsed time and buttons to control the timer operations. The stopwatch demonstrates real-time operation, making it useful for timing various activities or experiments.

Need for the Project: A stopwatch is a widely used tool in various fields such as sports, labs, and daily activities to measure time intervals. Building a simple stopwatch helps in understanding the fundamentals of embedded systems, including timer management, input/output handling, and display interfacing. This project is ideal for beginners learning microcontroller programming and hardware interfacing, providing practical insights into real-time applications.

Input Devices:

- **Start Button**: Initiates the stopwatch and begins time counting.
- **Stop Button**: Pauses the stopwatch and halts the time count.
- **Reset Button**: Clears the elapsed time, resetting the display to zero.

Output Devices:

- **7-Segment Display** : Displays the elapsed time in seconds and milliseconds.

Microcontroller:

- **PIC18F4550**: The microcontroller is used for managing time counting, input handling (buttons), and driving the output display. The internal timers of the PIC18 are used for accurate time measurement.

Project Components:

1. **Microcontroller (PIC18F4550)**: Manages all system operations, including timekeeping, input processing, and output display.
2. **7-Segment Display**: Shows the time elapsed.
3. **Push Buttons (Start, Stop, Reset)**: Used to control the stopwatch's functionality.
4. **Debouncing Circuit**: Ensures smooth button presses without noise or glitches.
5. **Power Supply**: Provides necessary power to the microcontroller and other components.

Block Diagram