Dear Mr. Watchorn,

**Executive Summary:**

This week, I developed a simple stopwatch program using the C programming language. The program measures and displays elapsed time in a minute:seconds format. The stopwatch can be started, paused, and resumed, and the last recorded time is stored and can be recalled.

**Discussion:**

The program is designed as a state machine, with five states that represent various operational modes - Initialization, Wait, Timing, Display, and Shutdown. Transition between states is controlled by user keyboard inputs.

The first design decision was to include <stdio.h>, <windows.h>, <time.h>, and <conio.h>. These headers provide essential functionality for console I/O operations, timing functions, and user input handling.

I had to determine how the program would interact with the user. The program uses the GetAsyncKeyState function for non-blocking input, allowing the stopwatch to time and check for user inputs concurrently.

The code uses clock\_t variables to measure the elapsed time and a state variable to determine the program's current state. The use of global variables was a conscious decision to allow easy access across the whole program.

**Outcomes:**

The stopwatch program runs as expected, transitioning between states based on user inputs. During the 'Timing' state, the stopwatch accurately tracks and displays elapsed time.

The stopwatch program was compiled and tested on a system with an AMD Ryzen processor and a Windows OS. An integrated development environment (IDE), CLion, was used for code writing and compilation.

Please refer to the attached image of the program in action.

**Conclusions:**

This programming task is a practical exercise for understanding state machines and handling user interactions in C programming. It showcases how we can incorporate real-world functionality like a stopwatch into a simple console application.

This stopwatch can be used in multiple scenarios where time tracking is needed, such as in personal workout routines, cooking timers, or productivity tools.

Best Regards,

Michael Dekoski

Attachments

A screen shot of a computer

Description automatically generated with medium confidence

Attachment 1: All states are shown. I for initialize, W for wait, and T for timing.