

MIT Subject 2.017

Lab 1 Worksheet - Introduction to C Programming the TattleTale Model 8 (TT8)

Goals:

Learn how to set-up the TT8 and the TT8's development system.

Learn how to write and run simple C programs.

Learn how to time processes using digital I/O and an oscilloscope.

Learn how to store and retrieve data from the TT8's Compact Flash Card.

1. Understand the roles of the following programs in TT8 software development: Metrowerks C Compiler, Metrowerks IDE, Crosscut, Windows XP, PicoDOS.
2. Set up PC to develop TT8 code. Set up a TT8 and establish communications between the PC and the TT8 using the Crosscut program.
3. Write and test *hello.c*, the classic "Hello World" program.
4. Write and test a program that prompts you to input your first name, inputs your name and then prints it to the monitor screen. It should loop endlessly.
5. Write and test a program that calculates the first 20 numbers of the Fibonacci series: $f_0 = 0$, $f_1 = 1$, $f_{i+1} = f_i + f_{i-1}$. It should calculate the numbers and print them to the monitor screen.
6. Using the commands *PConfOutP*, *PSet*, etc., send pulses through the parallel port [D,3] (pin A8 on the IO-8 board) to the oscilloscope before and after the calculation. About how long does it take the TattleTale to compute these 20 Fibonacci numbers?
7. Modify this program to store the 20 Fibonacci numbers in a file on the compact flash card. Look at the resultant file using the *type* command in PicoDos.
8. How long does it take to write this to the flash card?
9. Upload your Fibonacci numbers to the PC and plot them in an f vs. i graph (Excel, Matlab, or similar is OK). An even more interesting plot is f_{i+1}/f_i ; can you show that this approaches $\frac{1}{2} + \frac{1}{2} \sqrt{5}$ (the golden ratio)?

Your lab notebook should contain:

Lab Worksheet on the first page.

Print-out of the relevant source code, liberally commented.

Notes on the execution of your programs, including the timing questions.

A list and a graph of your Fibonacci numbers.